

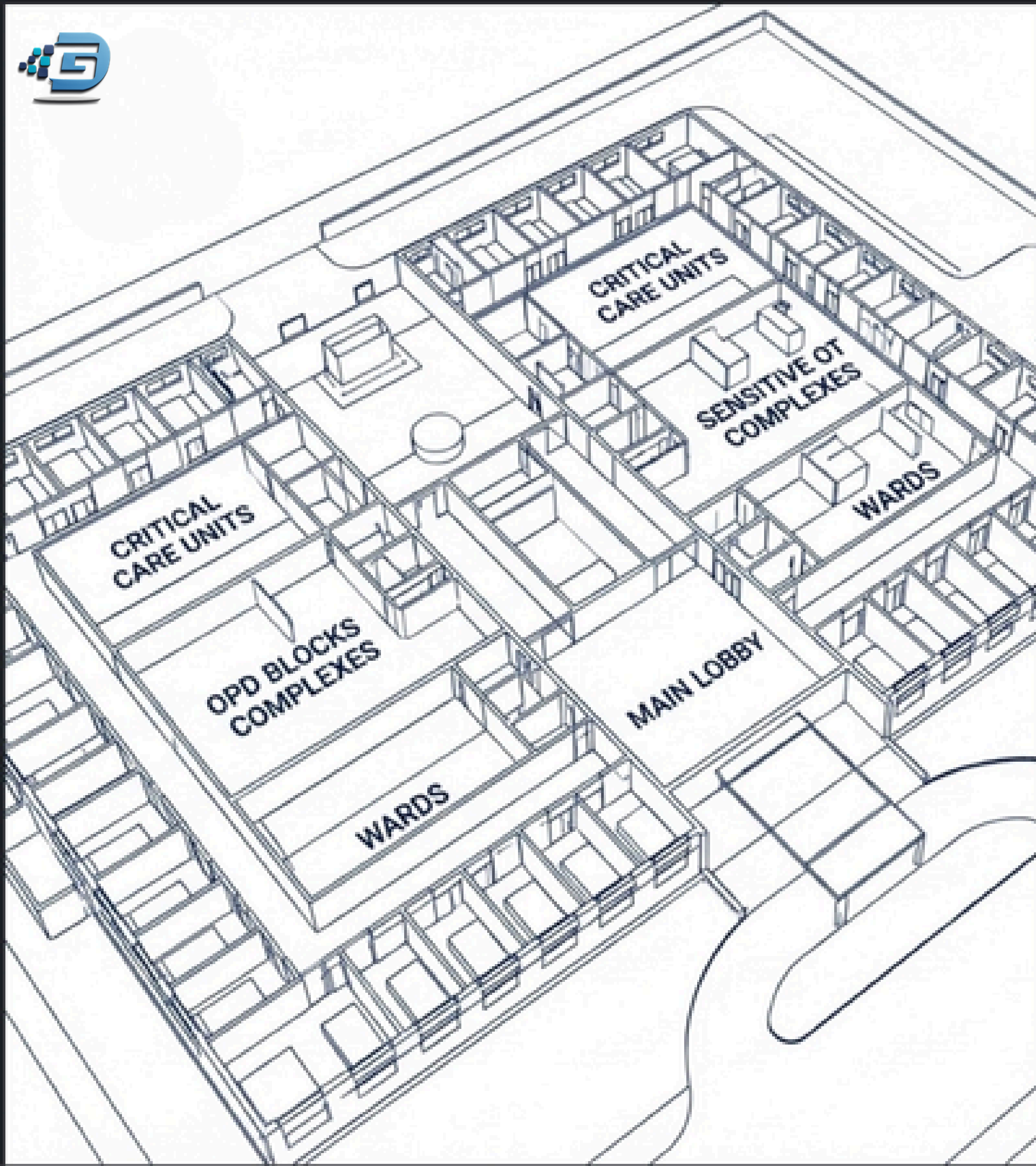


The JLNH&RC Fire Safety Upgrade: A Turnkey Case Study



Engineering a State-of-the-Art Life Safety Network in a Live Clinical Environment

Executed by DG MICROPRONIX PVT. LTD.
30 Years of Engineering Excellence.



The Environment & The Challenge

The Environment: Jawaharlal Nehru Hospital & Research Centre (JLNH&RC), a comprehensive, 250+ bed medical facility featuring critical care units, OPD blocks, and sensitive OT complexes.

The Objective: Complete upgrade to a fully integrated Fire Detection, Alarm, and Suppression system achieving strict NBC-Part IV compliance.

The Core Constraint: A **brownfield execution**. Heavy engineering, piping, and electrical integration must be executed seamlessly around ongoing, critical medical operations without disrupting patient care.



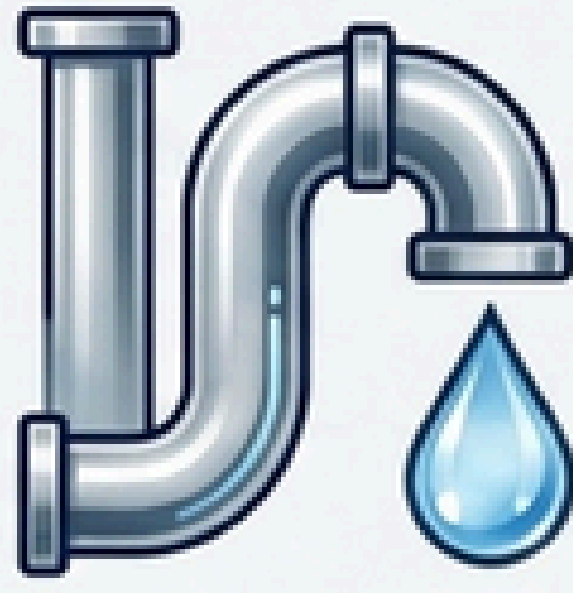
The Four Pillars of Protection

An integrated, holistic life-safety architecture distributed across four core subsystems:



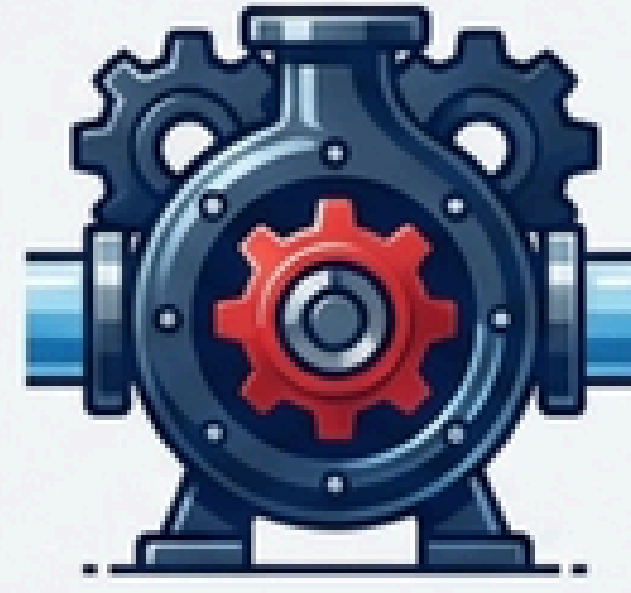
The Nervous System

Intelligent Fire Detection
& Alarm (FDA)



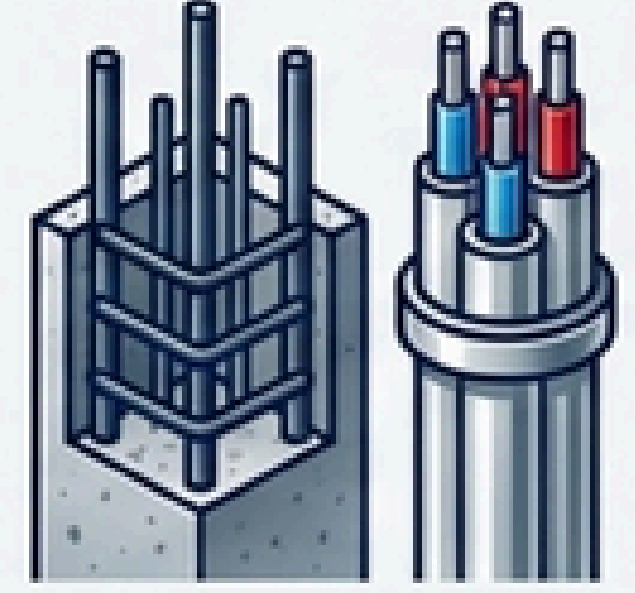
The Veins

Water-Based
Suppression Network



The Heart

The Central
Pump House



The Skeleton

Supporting Civil &
Electrical Infrastructure



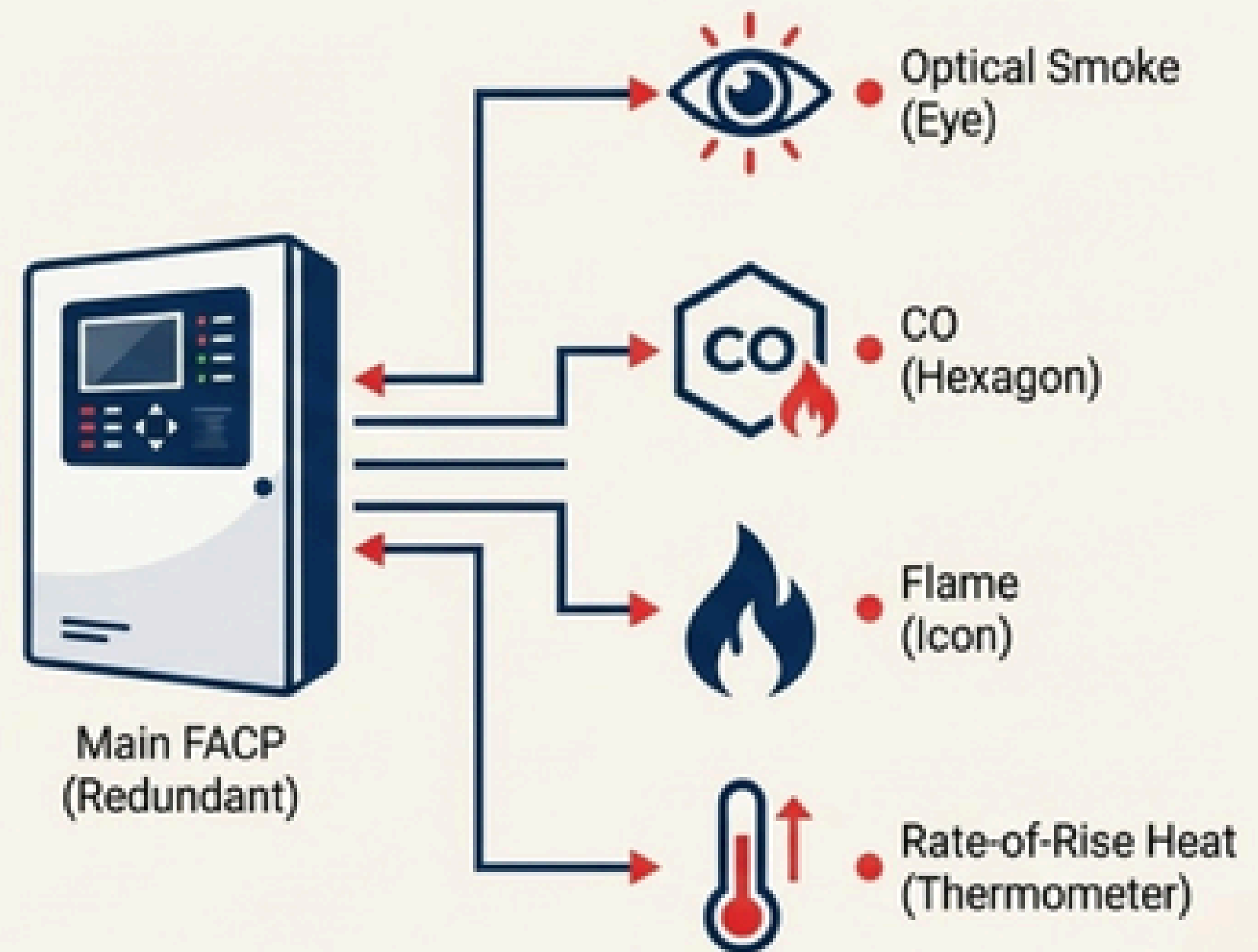
Pillar 1: Intelligent Fire Detection & Alarm

The sensory network of the hospital, designed for immediate threat identification and pinpoint accuracy.

Smart Detection: Microprocessor-based, addressable multi-criteria sensors combining Optical Smoke, CO, Flame, and Rate-of-Rise heat detection.

Complete Coverage: Installed across all open zones, and untraceable installed across all open zones, above false ceilings in critical areas (ICUs, OTs), and integrated with linear heat sensing cables.

Central Brain: Redundant, networkable Main Fire Alarm Control Panel (FACP) operating on Modbus RTU, equipped with a 24-hour SMF battery backup and secondary repeater panels.





Directed Evacuation & Public Address

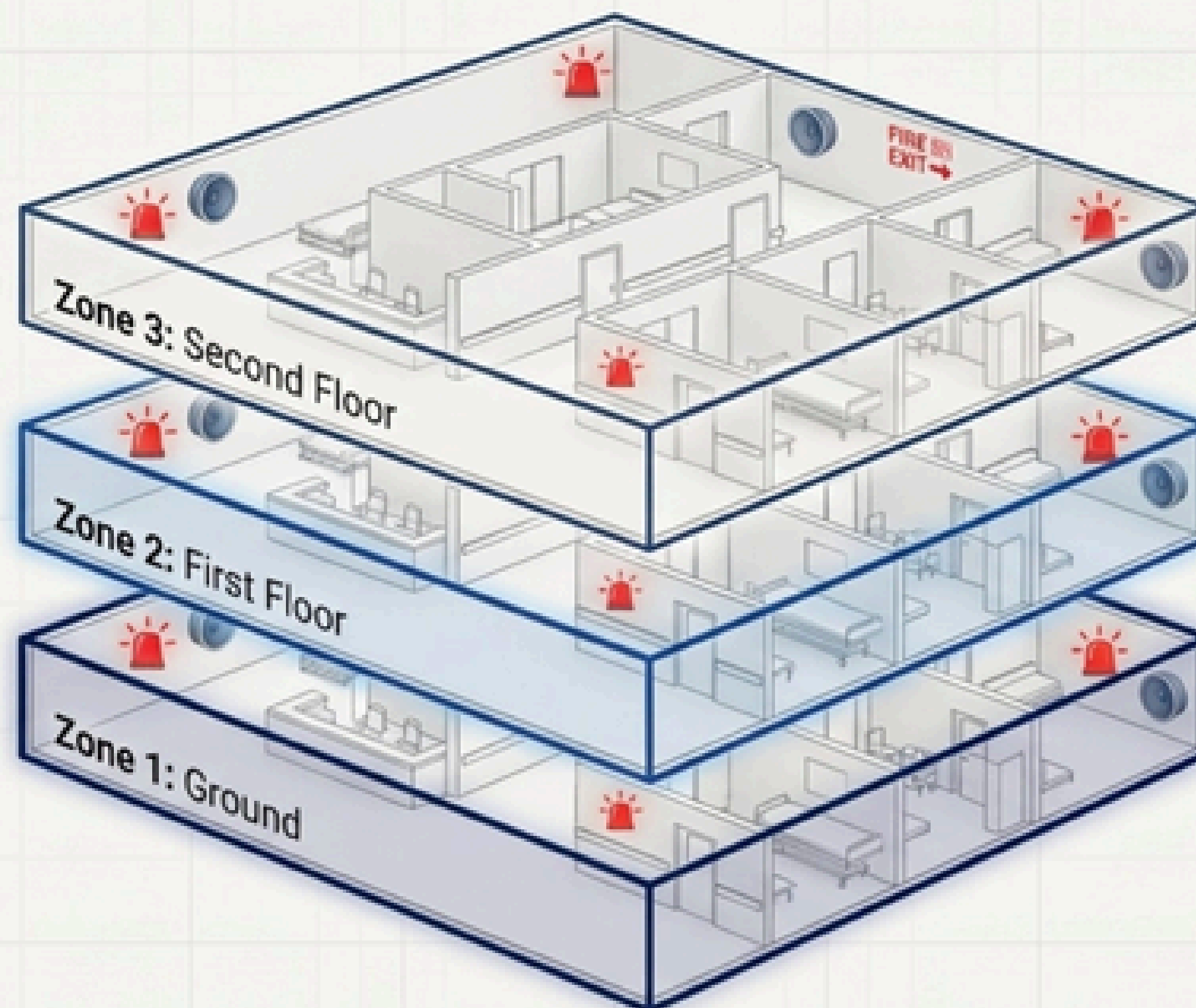
Translating detection into safe, coordinated human action.

Zonal Architecture:

- Dedicated audio routing configured by floor (Zone 1: Ground, Zone 2: First Floor, Zone 3: Second Floor) to prevent cross-chatter and confusion.

Dual Functionality:

- Capable of both clear public announcements and direct two-way voice communication during emergency scenarios.



Visual & Audio Signposting:

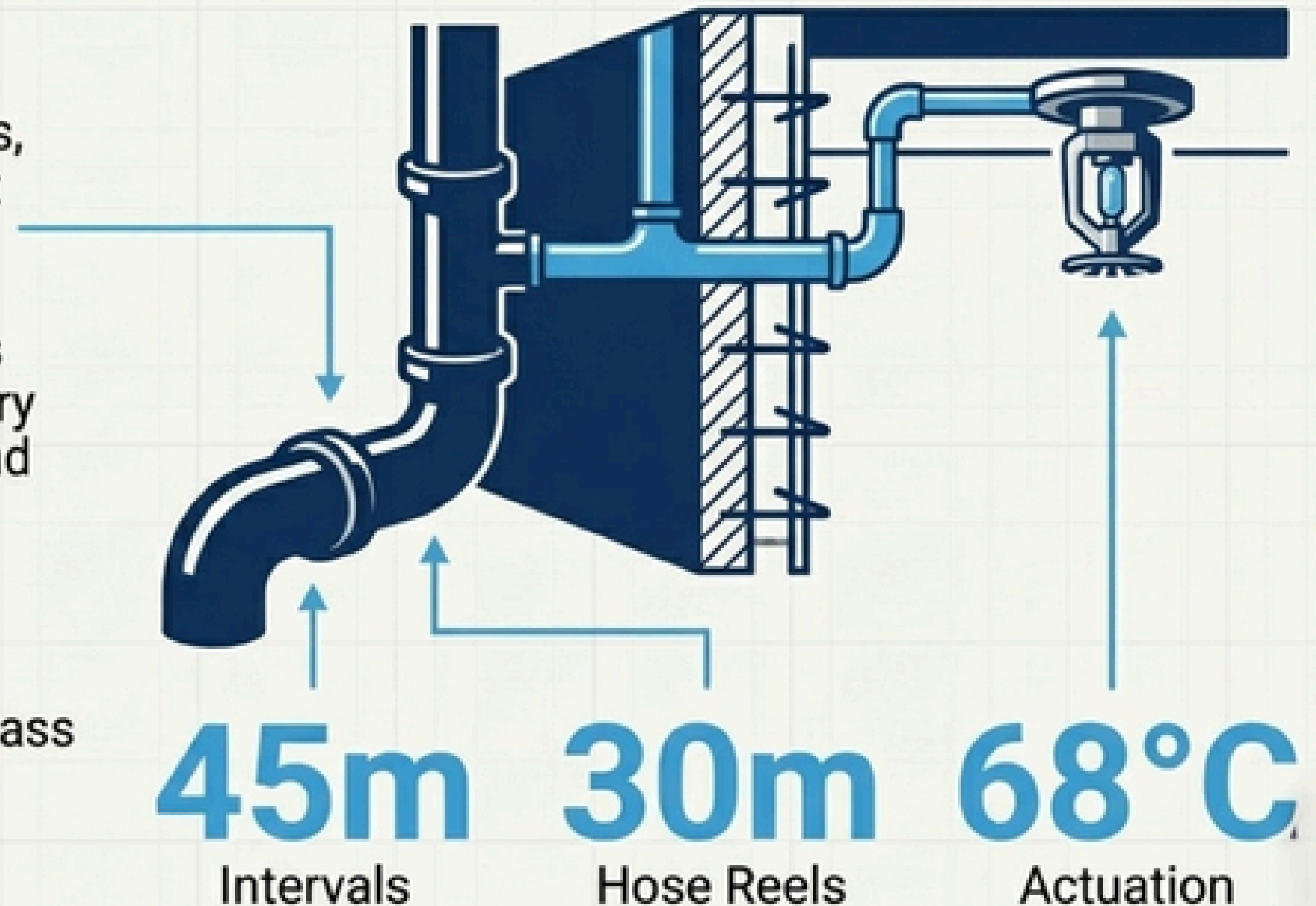
- Multi-tone electronic sounders (97 dB steady horn) paired with high-visibility strobes and self-luminous FIRE EXIT routing boards.



Pillar 2: Water-Based Suppression Network

An expansive, pressurized ring-main surrounding and penetrating the facility.

- **The Perimeter:** Underground ring main header traversing the hospital premises, feeding external hydrants positioned at strict intervals.
- **Internal Defense:** Dedicated riser pipes for multi-story buildings, equipping every landing platform with landing valves and swivel-type hose reels.
- **Automated Response:** Precision-engineered automatic sprinkler networks utilizing quartzoid glass bulbs for immediate actuation.

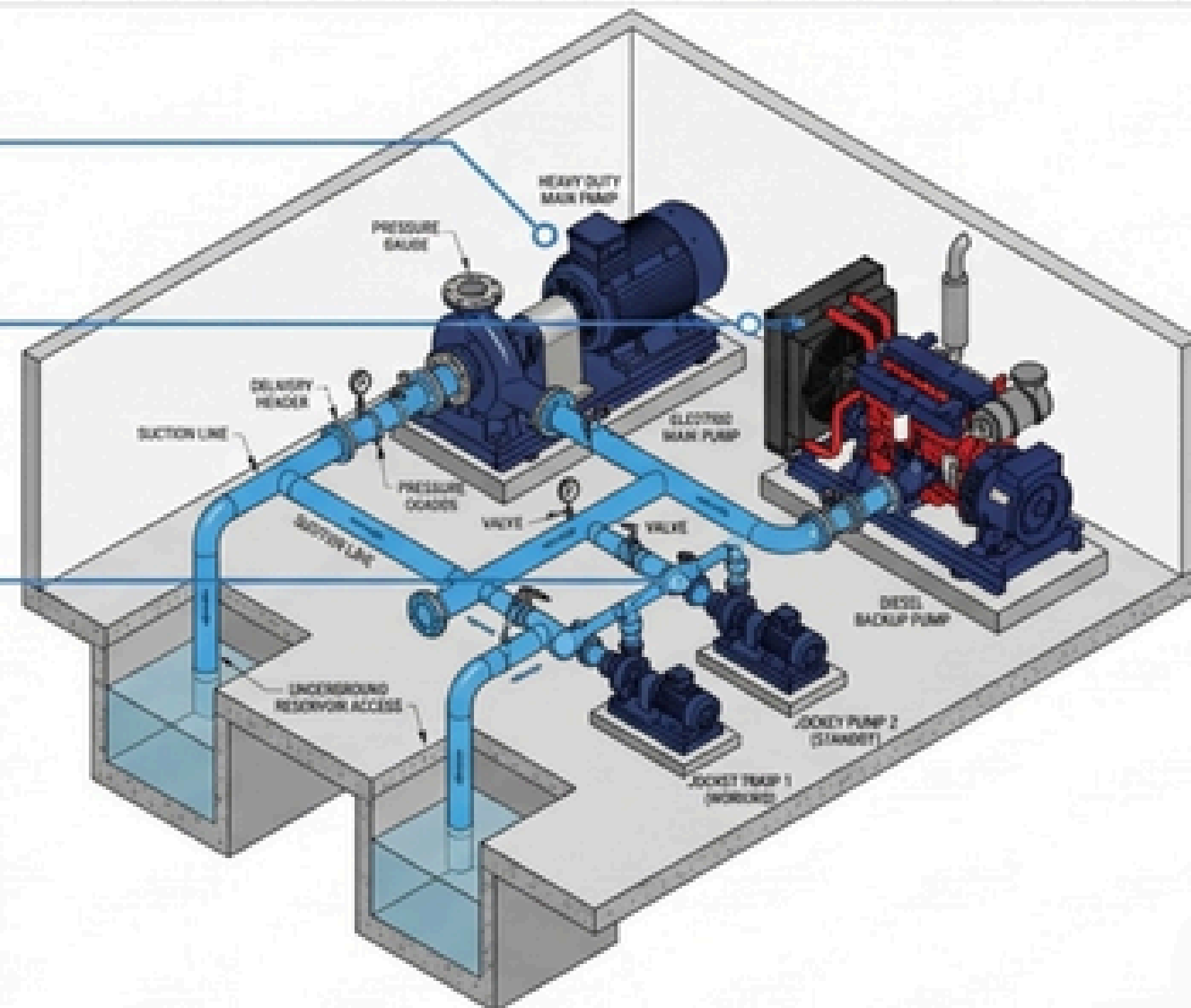




The Heart of the System: The Pump House

A fully automated, fail-safe mechanical core drawing from existing 1,000-gallon underground reservoirs.

- **The Primary Drive:** Heavy-duty Electric Main Pump for standard high-demand suppression.
- **The Backup:** Independent Diesel Engine-Driven Pump ensuring operation during total power failure.
- **Pressure Maintenance:** Dual Jockey Pumps (1 Working + 1 Standby) to automatically regulate line pressure and compensate for minor network fluctuations.
- **Operating Philosophy:** Fully automated start sequence based on pressure drops; manual-only shutoff for main fire pumps to ensure sustained suppression.





Pillar 3: Clean Agent Gas Suppression

Targeted, waterless protection for the hospital's most critical and sensitive assets.

- **The Vulnerability:** Areas where water discharge would cause catastrophic equipment failure or severe operational downtime.
- **Protected Zones:** Operation Theatre (OT) Complex, Server Rooms, Computer Rooms, and 180 T / R ICU.
- **The Solution:** NFPA 2001 compliant automatic clean agent suppression utilizing IG-541 or NOVEC 1230.
- **Mechanism:** Triggered automatically via the central FDA system to rapidly extinguish fires while leaving zero residue and protecting delicate electronics.

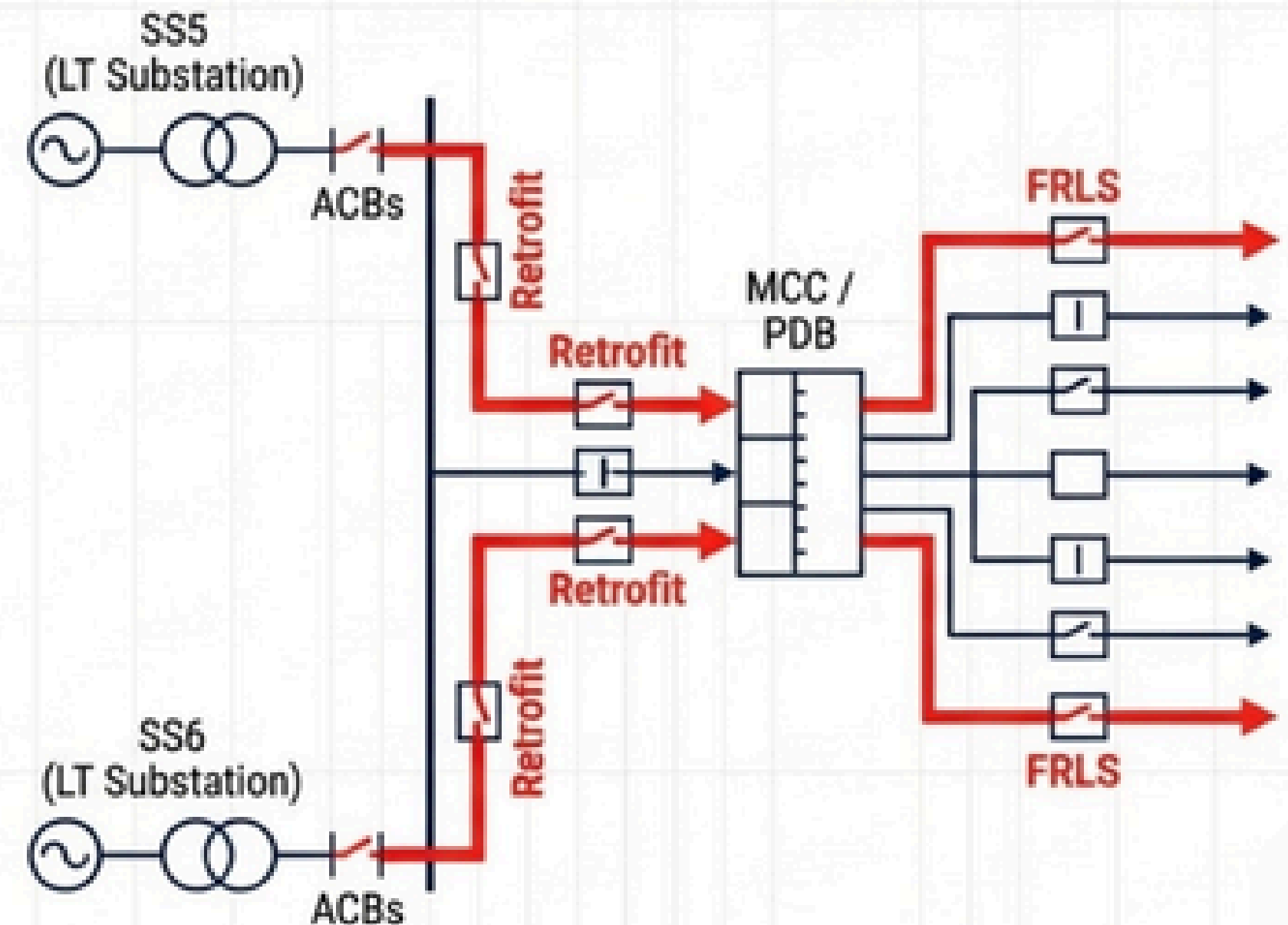




Pillar 4: Electrical Integration & Power

The resilient power infrastructure required to maintain a 100% active defense system.

- **Source Tapping:** Extracting 415V power from existing LT substations (SS5 & SS6).
- **Heavy Retrofitting:** Installing high-capacity breakers, including 1000A and 1600A ACBs, alongside dedicated 630A MCCBs in emergency feeder cubicles.
- **Centralized Control:** A bespoke Motor Control Centre (MCC) cum Power Distribution Board (PDB) facilitating seamless operation.
- **Cabling:** Extensive routing using 1.1 kV grade, XLPE, FRLS (Fire Retardant Low Smoke) armoured cabling to ensure survivability during a fire event.

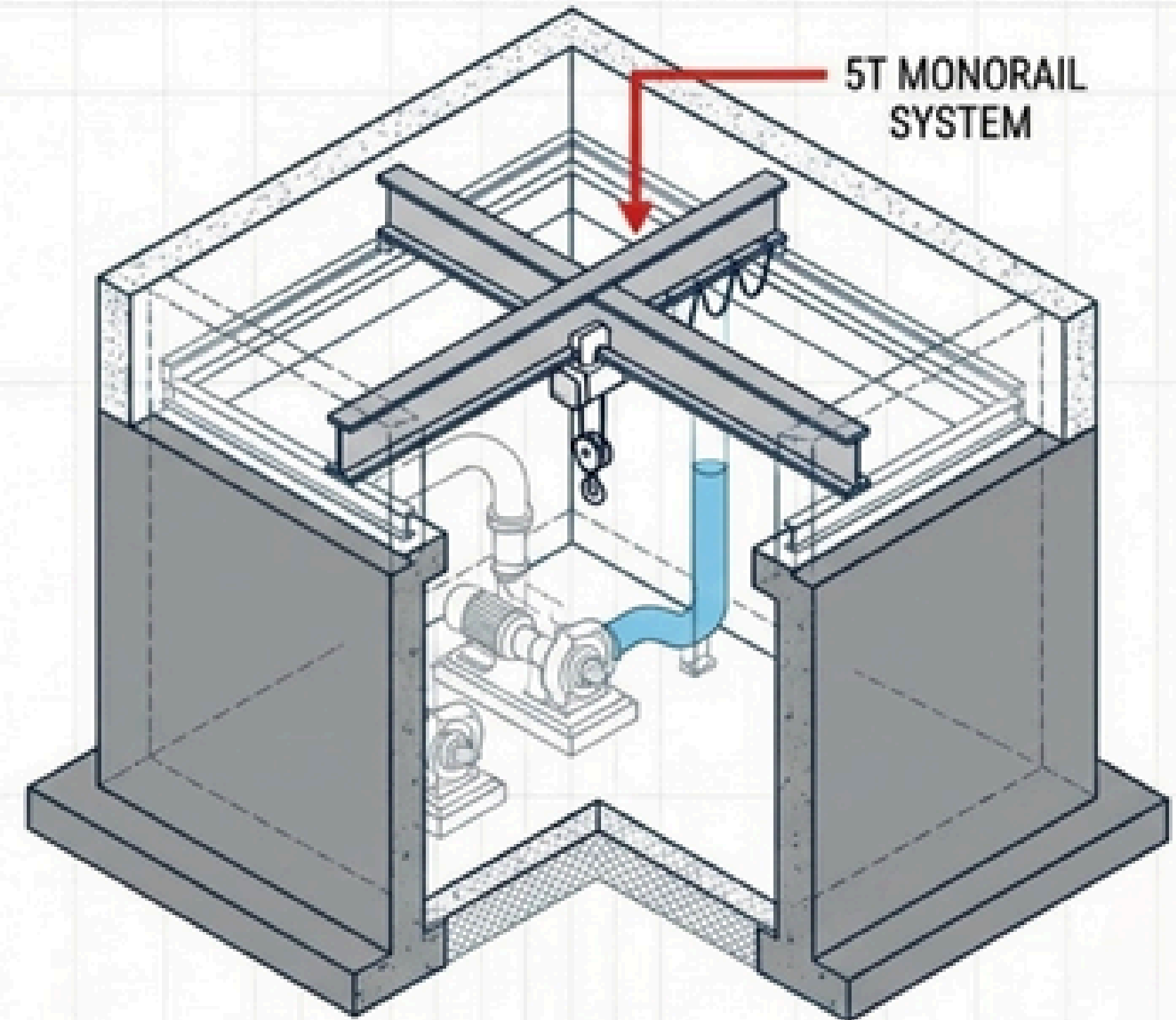




Civil & Structural Engineering

Constructing the physical footprint for the new safety architecture.

- **The New Pump House:** Complete construction of a dedicated RCC-framed underground building featuring structurally reinforced retaining walls.
- **Equipment Foundations:** Precision RCC foundations for heavy pumps utilizing non-shrink grout for ultimate stability and vibration dampening.
- **Material Handling:** Integration of internal structural steelworks, including a monorail with a 5-ton chain pulley trolley for long-term heavy equipment maintenance.
- **Site Preparation:** Comprehensive excavation, leveling, and trenching to integrate the new structures with the existing hospital topography.





The Execution Strategy: Surgical Precision

Integrating massive engineering infrastructure into a live clinical environment.



LIVE CLINICAL ENVIRONMENT

- **Zero Major Shutdowns:** Project phased to ensure existing critical systems remain fully online.
- **Controlled Environment:** Strict management of dust, noise, and debris to protect patient zones and maintain hospital sanitation standards.
- **No Disruption to Patient Care:** Operations continue seamlessly without patient impact.

TOTAL ISOLATION & ZERO DISRUPTION



HEAVY CONSTRUCTION & INTEGRATION

- **Brownfield Integration:** Specialized methodology for routing new pipelines and cables along existing structures with minimal invasive civil work.
- **Seamless Handover:** Tie-ins to the existing 1000-gallon underground reservoirs scheduled and executed with micro-planned precision.
- **Micro-Planned Precision:** Execution is tightly coordinated and timed to minutes.



Commissioning & Performance Guarantees

Rigorous, multi-day live testing to validate operational readiness and guarantee life-saving performance.

- **The 72-Hour Trial:** Uninterrupted, continuous trial run of the entire integrated facility.
- **Hydrant Stress Test:** Guaranteed delivery of water pressure at the highest and farthest nozzle in the network.
- **Live Actuation:** Physical demonstration of sprinkler valve operation (simulating a 68°C glass bulb break) and test-room gas suppression deployment.
- **System Synergy:** Validating the immediate, flawless handshake between the FDA detection panels and the automated mechanical pumps.

**3.5
kg/cm²
Guaranteed
Pressure**





Long-Term Reliability: The 5-Year CMC

Ensuring 100% uptime and NFPA 25 compliance long after the initial handover.

Comprehensive Coverage

A 60-month post-warranty contract covering all FDA hardware, network equipment, pumps, hydrants, and suppression software.



Rapid Response

Guaranteed emergency breakdown response time by authorized engineers.



Proactive Maintenance

Four equitably spaced, scheduled preventative maintenance visits per year to verify system health and avert breakdowns.

Zero-Cost Replacements

All defective equipment, spares, and components replaced entirely within the scope of the contract.





Securing JLNH&RC's Future

Delivering a fully integrated, automated, and resilient life-safety net.

- From isolated alarms to a cohesive, intelligent detection network.
- From basic hydrants to an automated, multi-agent suppression architecture.
- Executed seamlessly within a live, critical-care environment.

A state-of-the-art infrastructure designed to protect the people who protect our health.

