

Emergency & Storm Mode Protocols (Base → Surge → Peak)

1) Signal & Triggers: Thresholds, Sensors, and Mode Switching

- 1. Define Base/Surge/Peak thresholds for power, water, air, occupancy, security, and comms.**
- 2. List sensors per domain (e.g., voltage sag, tank level %, PM2.5 $\mu\text{g}/\text{m}^3$, pressure differentials) and their polling rates.**
- 3. Specify red-flag combinations that auto-escalate mode (e.g., grid loss + tank < 35% → Surge).**
- 4. Write hysteresis rules to prevent mode flapping (minimum dwell times, return thresholds).**
- 5. Map the decision graph: who/what can force a switch (autonomy → steward → council).**
- 6. Stipulate “unknown = caution” defaults when data is missing or stale.**
- 7. Create local/remote override procedures with audit trails.**
- 8. Define test cadence for trigger accuracy (monthly dry-runs; quarterly full switchovers).**
- 9. Publish a mode card (laminated) for every room/node.**

2) Incident Command Lite: Roles, Handoffs, and SLA Clocks

- 1. Name roles (Lead, Safety, Operations, Comms, Logistics, Scribe) and deputies.**
- 2. Set on-call ladders and handoff checklists per shift.**
- 3. Define SLA clocks for detect → isolate → stabilize → repair.**

4. Pre-assign decision limits (who can de-energize, evacuate, or declare Peak).
5. Create a common log format (time, event, action, owner, status).
6. Build mutual-aid contact sheets and escalation trees.
7. Drill role swaps to avoid single points of failure.
8. Track response-time KPIs and publish after each event.

3) Public Alerting: Levels, Scripts, Channels, and Accessibility

1. Standardize alert levels (Advisory/Watch/Warning/Shelter/All-Clear) with icons and colors.
2. Write plain-language scripts for each level—short + long forms.
3. Define channels (SMS, app, PA, siren, radio, door-to-door) and fallbacks.
4. Ensure accessibility (multi-language, captions, screen-reader, TTY, pictograms).
5. Establish quiet-hours rules and opt-in/opt-out controls.
6. Time targets: alert issuance within X minutes of trigger.
7. Validate message comprehension via periodic surveys and drills.
8. Log performance (delivery %, open rate, time-to-hear) on Truth Boards.

4) Power Continuity: DC-First Islanding, Black-Start, and Load Shedding

1. Draw the one-line for islandable DC bus and essential AC taps.

2. Define black-start stacks (sequence, timings, dependencies).
3. List critical loads by tier and auto-shed order; include manual bypasses.
4. Write inverter/charger set-points and transfer criteria.
5. Specify battery SoC bands for Base/Surge/Peak and reserve floors.
6. Integrate thermal storage as “virtual battery” in shedding logic.
7. Establish generator/fuel cell/fission (if any) safety interlocks.
8. Test: monthly micro-islanding, quarterly full black-start.

5) Thermal Orchestration: Heat/Cool Cascades, Safe Set-Points, and Radiators

1. Define thermal rungs: process heat → DHW → root zones → living spaces → radiators.
2. Publish safe set-points per mode and space type (clinics, nursery, commons).
3. Write radiator and louvers choreography for Surges/Peaks.
4. Use night-side cold or seasonal chill as stored “cold mass.”
5. Coordinate lighting scenes (COLORVISION) with thermal comfort to reduce load.
6. Create over-temp and freeze-protect actions (valves, pumps, bypasses).
7. Validate °C-hours in band and comfort KPIs after events.

6) Water Security: Source Separation, Sanitation Pulses, and Priority Tiers

1. Color-code networks (potable/grey/black/process/fire) with check valves and test points.
2. Define storage floors and ration bands for Base/Surge/Peak.
3. Write sanitation pulses (thermal/UV/ozone) schedules and verification tests.
4. Prioritize uses: clinic, kitchens, hydration, sanitation, agriculture—by mode.
5. Add manual pump & gravity/pressure backups; label routes clearly.
6. Draft contamination decision tree (isolate → shock → test → re-commission).
7. Stock repair kits and spares caches; set MTTR targets.

7) Air Safety: Pressure Zoning, Filtration/UVGI, and Safe Rooms

1. Define clean→less-clean flow with pressurization set-points.
2. Specify filter grades (pre/HEPA/ULPA) and changeout indicators.
3. Describe UVGI/upper-room UV and pathogen modes.
4. Identify safe rooms and occupancy limits by population.
5. Smoke/dust mode: recirculate with aggressive filtration; outside air clamp.
6. Write door discipline, vestibule use, and mask protocols.
7. Validate ACH, PM, CO₂, and pathogen surrogate targets in drills.

8) Food & Cold Chain: Rations, Preservation, and Community Kitchens

1. Tier pantry and cold storage for 3/7/14-day autonomy.
2. Standardize ration menus (kcal, protein, micronutrients) by mode.
3. Define preservation pivots (drying, pickling, fermentation, root-cellaring).
4. Assign kitchen roles; safety & allergen control under stress.
5. Protect cold chain with backup power and “ice battery” protocols.
6. Stand up community kitchens for mass feeding and morale.
7. Track spoilage %, kcal/person/day, and meal equity.

9) Shelter Operations: Space Reassignment, Occupancy, and ADA Access

1. Pre-plan space conversions (gyms → dorms; halls → clinics).
2. Post floor plans with egress and ADA routes; light them during outages.
3. Set occupancy caps and hygiene schedules per shelter zone.
4. Provide gender-safe, family, and quiet areas; policies posted.
5. Stock bedding, sanitation, and privacy kits; re-use & laundering plans.
6. Run check-in, headcount, and reunification procedures.
7. Train stewards for de-escalation; publish shelter KPIs (incidents, occupancy, satisfaction).

10) Medical & Behavioral Health: Triage, Privacy, and Trauma-Informed Care

1. Deploy START triage or equivalent; lay out hot/warm/cold zones.
2. Define medication/security protocols and cold-chain backups.
3. Create confidential behavioral health intake and referral paths.
4. Provide rest/quiet rooms and light scenes for stabilization.
5. Train peer supporters; rotation to prevent burnout.
6. Telehealth fallback workflows; consent and privacy by role.
7. Track care metrics (wait times, follow-ups, crisis defusals, readmissions).

11) Mobility & Evacuation: Safe Routes, E-Cargo, Special Needs, and Pets/Livestock

1. Map primary/secondary routes with real-time status and signage.
2. Stage e-cargo bikes/carts; battery swap schedules; driver rosters.
3. Register special-needs transport and assistive devices in advance.
4. Include pets/livestock protocols, shelters, and vet kits.
5. Coordinate with regional agencies for road/bridge status.
6. Load order and marshalling points; muster counts.
7. Post-evac checklists and reentry criteria.

12) Cyber & Comms Resilience: Network Segmentation, Paper SOPs, and Degraded Modes

1. Segment OT/IT; maintain read-only mirrors for dashboards.
2. Define degraded comms modes (text-only, low-bit TTY, ham).
3. Cache paper SOPs, maps, and call trees; train handwriting logs.
4. Rotate keys; MFA for privileged roles; offline auth tokens.
5. Practice cyber incident playbooks alongside physical drills.
6. Store spare radios, chargers, antennas; test monthly.
7. Publish comms uptime and failover KPIs.

13) Supply & Spares: Cached Inventories, Tool Kits, and Reverse Logistics

1. Identify storm-critical SKUs and minimum cache levels.
2. Pre-build grab kits by domain (water, air, power, thermal, medical).
3. Mark tool unification (one-tool service); glove-friendly designs.
4. Plan reverse logistics: failed part quarantine → refurb queue.
5. Rotate perishables; cycle counts post-event.
6. Mutual-aid sharing agreements; resource typing.
7. Track fill rate, MTTR, and cache health.

14) Site Safety & Security: De-escalation, Fire/Smoke, and Perimeter Protocols

1. Train unarmed stewards; escalation criteria; partner with responders.
2. Draft fire response under low power; smoke compartmentalization.
3. Define perimeter lighting (dark-sky compliant) and badging during outages.
4. Queue management for scarce resources; fairness rules.
5. Evidence handling and incident reporting SOPs.
6. Family reunification and missing-person protocols.
7. KPIs: incidents per 1000 residents, response times, resolution rates.

15) Environmental Protections: Spill/Runoff, Debris, and Wildlife/Riparian Safeguards

1. Stage spill kits; train on containment/notification.
2. Protect drains and waterways; deploy silt socks, booms.
3. Define debris zones, sorting, and safe removal.
4. Respect wildlife corridors; nesting season restrictions.
5. Monitor turbidity/noise/dust; action levels posted.
6. Document remediation and post-event habitat checks.
7. Publish eco KPIs (violations, turbidity deltas, habitat indicators).

16) Governance in Emergencies: Extraordinary Powers, Limits, and Sunsets

1. Specify temporary powers (rationing, curfews, requisition) and exact triggers.
2. Require time-boxed sunsets and renewal votes.
3. Keep transparent logs; daily public briefings.
4. Clarify oversight (council/ombuds), appeals, and grievances.
5. Protect civil liberties; ban discrimination and retaliation.
6. After-action accountability (what was used, why, outcomes).
7. Codify hand-back to normal governance.

17) Equity & Access: Lifeline Service Floors and Hardship Policies

1. Define lifeline floors (kWh, liters, kcal, shelter) by person/day during Surges/Peaks.
2. Prioritize vulnerable residents (medical devices, elders, infants).
3. Publish hardship waivers and zero-cost access steps.
4. Prevent price-gouging; post at-cost tariffs; watchdog hotline.
5. Track service equity KPIs by block/household type.
6. Provide multilingual navigators for aid enrollment.
7. Review equity outcomes post-event and correct gaps.

18) Data Dignity in Crisis: Open Telemetry, Privacy-by-Role, and Breach Response

1. Decide which metrics must remain public in crisis (safety, capacity, hazards).
2. Enforce role-based access for any personal/health data.
3. Hash-chain logs; sign alerts; time-stamp dashboards.
4. Plan breach response clocks (notify within X hours), remedies, and forensics.
5. Maintain “truth-on-paper” when digital fails; reconcile later.
6. Publish post-event data package with privacy safeguards.
7. Audit telemetry integrity and disclose findings.

19) Mutual Aid & Interoperability: MOUs, Resource Typing, and Regional Coordination

1. Draft mutual-aid MOUs; define assets (pumps, gensets, shelters).
2. Use standard resource typing (capacity, connectors, power).
3. Align comms protocols and common ICS forms.
4. Run joint exercises across jurisdictions.
5. Specify mobilization times, reimbursement, and liability.
6. Pre-stage cross-border caches and transport routes.
7. Maintain a shared situational awareness map.

20) Space Weather & Radiation: Shielding, Dose Dashboards, and Safe Modes

1. Define solar storm triggers (Kp index, CME alerts) and protective actions.
2. Map shielded zones; specify water/regolith/metal mass needed.
3. Create radiation “safe mode” set-points (habitation clustering, non-critical shutdowns).
4. Dose dashboards: units, thresholds, personal badges.
5. Test electronics hardening and surge protection.
6. Plan comms blackouts and store-and-forward data.
7. Reentry criteria after events; debrief and log dose distribution.

21) Training & Drills: Table-Tops, Live Runs, and Certification/Recert

1. Build annual exercise calendar: table-top → functional → full-scale.
2. Certify stewards per domain with recert intervals.
3. Include night/weekend and surprise drills.
4. Score drills with objective SLAs and publish results.
5. Capture lessons-learned; update SOPs and retrain.
6. Involve residents in evacuation and shelter drills.
7. Track training hours, pass rates, and readiness.

22) Financial Readiness: Reserves, Insurance, Performance Credits, and Escrow

1. Set reserve targets for 30/60/90-day scenarios.
2. Keep insurance current; define claims playbook and documentation.
3. Monetize resilience (peak-shave, uptime, water credits) to refill reserves.
4. Maintain remediation escrow for environmental incidents.
5. Pre-approve emergency procurement rules at cost.
6. Publish quarterly financial resilience reports.
7. Stress-test finances annually (multi-hazard).

23) Recovery & Reentry: Damage Assessment, Phased Restart, and Rehousing

1. Triage assets (green/yellow/red) and assign repair teams.
2. Phase restart: power → water → air → kitchens → clinics → commons.
3. Validate before occupancy (air/water tests, electrical/thermal checks).
4. Rehouse displaced residents with right-to-return guarantees.
5. Document claims and aid applications; navigator support.
6. Restore public services and reopen commons with ceremonies.
7. Publish recovery roadmap, milestones, and blockers.

24) After-Action & Learning Loops: Postmortems, Spec Revisions, and Public Reports

- 1. Convene postmortems within 7–14 days; cross-discipline required.**
- 2. Use a standard root-cause method (5 Whys/FMEA) for every major issue.**
- 3. Assign corrective actions with owners and deadlines.**
- 4. Version and publish updated specs/SOPs; announce changes.**
- 5. Thank and debrief residents; collect feedback surveys.**
- 6. Update drills, caches, and training based on findings.**
- 7. Issue a public “State of Resilience” report with KPIs and next steps.**