

LEHO SARR AFRICAN FAMILY VILLAGE

Core Systems & Material Strategy

Consolidated Concept Document (Draft Structure)

1. FOUNDATIONAL PRINCIPLES

Project Goals

- Long-lifespan architecture (100–150+ year target lifespan)
- Minimal operational energy demand
- Passive-first climate response
- Reduction of mechanical dependency
- Collective/social housing model
- Educational and ecological integration
- Fire-resistant, flood-resistant, rot-resistant construction
- Reduced maintenance burden
- Reduced embodied carbon where feasible
- Architecture designed for dignity, beauty, and permanence

Core Design Philosophy

The building functions as:

- a passive solar thermal organism,
- a social commons,
- an educational village,
- and a resilient civic megastructure.

Primary emphasis:

- durability,
- thermal stability,
- communal life,

- and ecological integration.
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2. BUILDING FORM

General Geometry

- Terraced stepped south-facing structure
- Narrow floorplate to maximize daylight penetration
- South-facing glazing prioritized
- North circulation spine/hallway system
- Upper setbacks create terraces for lower units
- Shared central circulation cores

Site Orientation

- Optimized for winter solar gain
 - Southern exposure prioritized
 - Summer overheating mitigated with:
 - overhangs,
 - vegetation,
 - thermal mass,
 - nighttime ventilation
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3. STRUCTURAL SYSTEM

Primary Structure

CarbonCure Reinforced Concrete

Used for:

- columns,
- beams,
- transfer structures,

- floor slabs,
- elevator/stair cores,
- foundations.

Rationale

- high compressive strength,
- low maintenance,
- fire resistance,
- long lifespan,
- compatibility with thermal mass strategy,
- reduced carbon intensity compared to conventional concrete.

Structural Philosophy

Structure should:

- remain legible,
 - minimize hidden failure points,
 - prioritize longevity over minimum upfront cost,
 - allow modular future expansion.
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4. WALL SYSTEM

Primary Wall Material

Autoclaved Aerated Concrete (AAC)

Used for:

- exterior walls,
- interior thermal mass walls,
- partition systems where appropriate.

Rationale

- noncombustible,
- insect resistant,

- rot resistant,
 - vapor permeable,
 - thermally stable,
 - acoustically absorptive,
 - compatible with passive solar massing.
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5. THERMAL ENVELOPE

Exterior Insulation Strategy

Continuous Mineral Wool Insulation

Installed outside AAC and structural members.

Target:

- near-continuous thermal break envelope.

Reasons for Mineral Wool Preference

- fire resistance,
- vapor openness,
- longevity,
- reduced toxicity,
- compatibility with rainscreen systems,
- moisture resilience.

Thermal Bridging Reduction

Methods include:

- continuous exterior insulation,
 - thermally broken fastening systems,
 - minimized exposed structural penetrations,
 - AAC thermal buffer zones.
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6. RAINSCREEN & EXTERIOR CLADDING

Ventilated Rainscreen System

Exterior cladding mounted over:

- air gap,
- continuous insulation,
- structural attachment rails.

Candidate Cladding Systems

Equitone / Fiber Cement Panels

Preferred for:

- institutional permanence,
- mineral aesthetic,
- durability,
- low maintenance,
- compatibility with large panel systems.

Alternative Concrete Panel Systems

Potential future exploration:

- Lilitile,
 - custom concrete planks,
 - large-format mineral façade systems.
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7. PASSIVE SOLAR STRATEGY

South-Facing Glazing

Primary solar gain source.

Goals:

- winter heat gain,
- daylighting,

- psychological wellbeing,
- reduced electrical lighting demand.

Thermal Mass Charging

Solar gain absorbed by:

- AAC walls,
- concrete slabs,
- interior exposed thermal mass.

Nighttime Insulation Shutters

Integrated insulated shutters used to:

- reduce nighttime heat loss,
 - improve winter performance,
 - stabilize indoor temperatures.
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8. INTERIOR ENVIRONMENTAL STRATEGY

Thermal Philosophy

Thermal mass positioned inside insulation envelope.

Goal:

- interior thermal flywheel effect,
- delayed heat transfer,
- stable interior temperatures.

Ventilation

Potential future integration:

- stack ventilation,
- operable windows and shutters (maybe automated)
- nighttime cooling flushes,

- HRV/ERV systems where necessary.
 - Radiant Geothermal Heating/Cooling
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9. FIRE & RESILIENCE STRATEGY

Primary materials are:

- noncombustible,
- low-toxicity,
- moisture resistant.

Project aims for:

- high fire resilience,
 - low mold susceptibility,
 - flood tolerance where feasible,
 - minimal catastrophic failure pathways.
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10. AESTHETIC DIRECTION

Architectural Language

Hybrid of:

- civic architecture,
- ecological megastructure,
- passive solar modernism,
- terraced arcology,
- institutional warmth.

Visual Characteristics

- stepped terraces,
- mineral surfaces,
- winter gardens,
- deep glazing,

- structural legibility,
 - integrated landscape systems.
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11. FUTURE SYSTEMS TO DEVELOP

(BY WHICH I MEAN ABSOLUTELY NECESSARY CORE FEATURES OF THE EVERY OPTION AVAILABLE PILOT PROJECT THAT CAN NEVER BE NEGOTIATED OUT)

Pending future refinement:

- geothermal systems
 - winter arboretum integration,
 - greywater systems,
 - green roofing systems
 - skylights/solartubes (periscoping)
 - anaerobic waste systems,
 - photovoltaic integration,
 - vertical circulation details,
 - prefabrication strategy,
 - unit module design/redesign
 - cost modeling,
 - phasing strategy,
 - zoning/code analysis.
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12. PROJECT IDENTITY

Leho Sarr African Family Village is envisioned as:

- a resilient ecological housing system,
- a communal educational structure,
- a climate-adaptive civic prototype,
- and a long-duration architecture for collective flourishing.