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WHITE PAPER

FEASIBILITY STUDY METHODOLOGY

Dementia-Focused Nursing Homes

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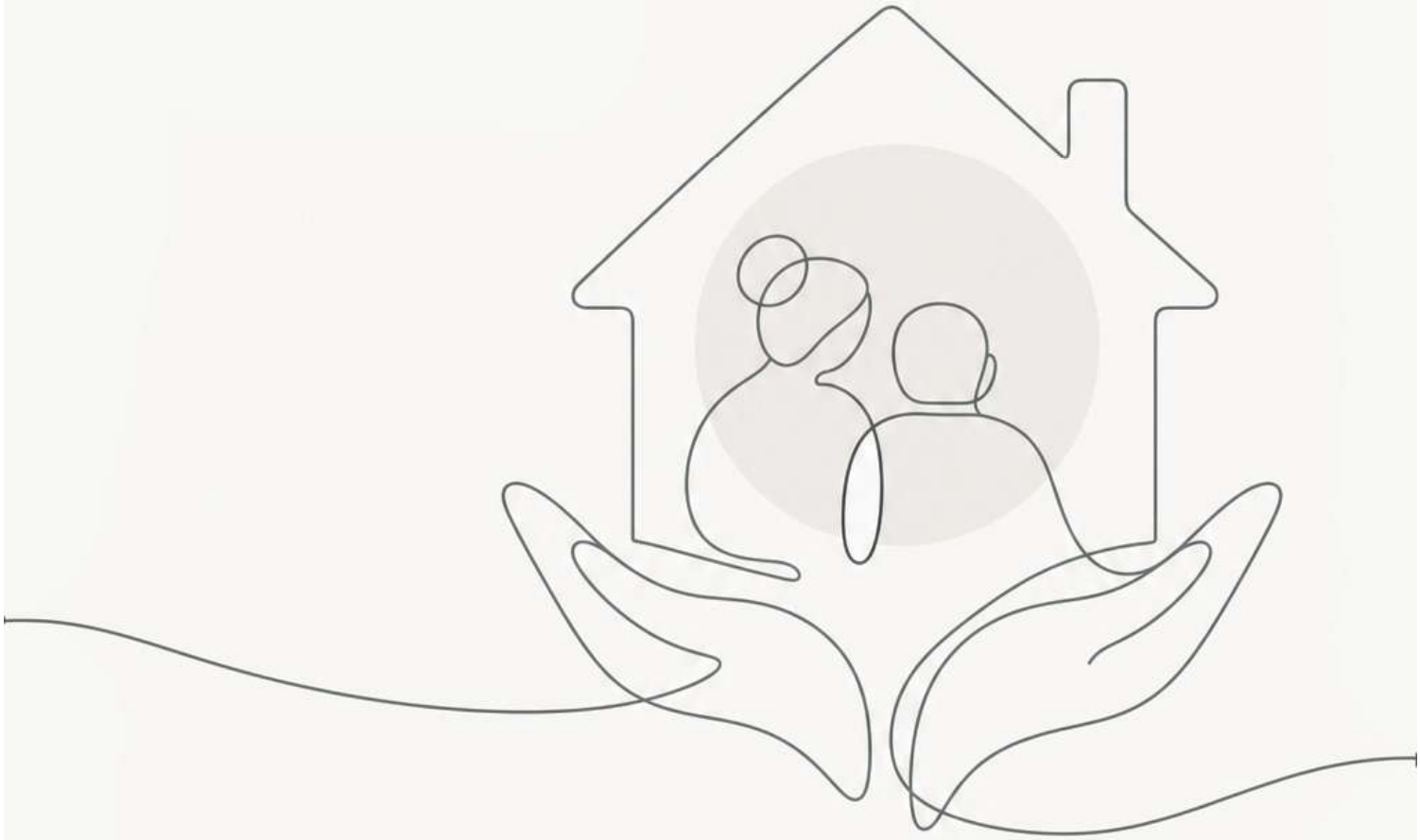

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Preface

I have been in the industry for long enough to know that the projects that matter most rarely arrive cleanly. They arrive with hesitation, competing priorities, and the particular kind of institutional caution that comes from organisations carrying genuine responsibility for vulnerable people. These are precisely the projects that hold the deepest meaning for Arch'lab – the ones that ask us to understand how people live, how they are cared for, and what it means to design spaces worthy of that care. It is that conviction that drives this white paper, and it is one project in particular that gave it its truest shape: Apex Harmony Lodge (AHL) in Singapore.

After 26 years of devoted service, AHL team wanted to look honestly at their dementia-focused nursing home to reimagine it as an ecosystem – a place of genuine empathy and dignity for the people living within dementia, for the families who love them, and for the caregiving staff who show up every single day. That aspiration was clear from our very first conversation. What was less clear, and what took considerable time and patience to resolve, was how to reconcile that vision with the realities of safety compliance, physical building limitations, and the complex layering of needs that a nearly 30 y.o. facility carries within its walls. In the end, we agreed to begin with an extensive feasibility and cost exercise – one that would give AHL the clarity and confidence to understand how, and how far, they could move forward.

The road to that agreement was not always smooth. There were moments when the project seemed to recede, when the gap between our methodology and the pace at which a non-profit organisation must make decisions felt difficult to bridge. I understand that hesitation now with far more tenderness than I did then. Entrusting the design of an environment for people living with dementia to an architecture practice and agreeing to work within that practice's framework rather than a conventional procurement sequence requires a specific kind of institutional courage.

They opened their world to us: their premises and operational rhythms, their challenges and their fears, their quiet daily victories and the compromises they had long since learned to live with. Their staff, at every level of seniority, spoke to us with a candour that is rarely offered and never taken for granted. We walked the wards at hours that revealed how the environment truly performed – not as it appeared during a formal visit, but as it lived and breathed across a full day of care. We heard from caregivers about the things that worked and the things that quietly broke their hearts. And the residents themselves, with all the grace and generosity that people living with dementia so often possess, gave us something we could not have found in any research paper. That honesty made better work possible. It always does.

The 10-stage methodology described here is Arch'lab's framework, developed as a direct product of collaboration with AHL, as well as years of experience with senior care and dementia-focused design, and grounded in an evidence base drawn from neuroscience, clinical medicine, and environmental psychology. It was tested in real corridors, refined through real conversations, and in several places fundamentally reshaped by the specific conditions, constraints, and hard-won intelligence that clients like AHL so generously made available to us. This paper is, in part, my attempt to extend that purpose beyond Arch'lab's own practice, and to share what we have learned, in the hope that it serves others who are trying to do the same.

Olesya Fomenkova, Arch'lab, Singapore 2026

The **central argument** of this paper is this: when architects understand dementia not as a category of disability to be accommodated, but as a lens through which the full range of human cognitive experience becomes visible, they become capable of designing environments that serve every person who inhabits them, across the entire span of cognitive capacity and decline. Dementia-inclusive design is, in this sense, the most demanding and most generative form of universal design.

Purpose and Audience

This paper provides a ten-stage, decision-gated feasibility methodology that prevents architectural decisions from being made before the clinical foundation required to evaluate them exists, and protects those decisions from erosion once made.

Its intended function is to address design professionals' need in structuring the pre-design and concept-stage process so that consequential decisions (about scale, configuration, programme, and investment) are grounded in clinical evidence, operational logic, regulatory awareness, and a rigorous understanding of how dementia affects the people who will live in the environments being designed.

The intellectual foundations of this paper draw from four converging bodies of knowledge:

- neuroscience and cognitive psychology;
- clinical geriatric medicine and dementia care practice;
- environmental psychology and evidence-based design research;
- and emerging practice in dementia-inclusive urban and architectural design,

with reference to Singapore's policy and built environment context. Singapore's experience is valuable not because it is locally specific, but because it demonstrates how internationally derived, evidence-based principles can be translated into real projects under particular urban, cultural, and institutional conditions – producing frameworks and findings that carry broader applicability.

The paper addresses 5 core questions that should govern any dementia nursing home feasibility process:

- Whether and under what conditions a proposed project is feasible as a dementia-specific facility;
- How the work should be sequenced from strategic inquiry through to brief definition;
- How scope, phasing, and capital investment should be prioritised;
- How meaningful stakeholder and co-design engagement should be structured and conducted;
- How care models should be translated into specific architectural and interior design requirements.

Section 1: Foundational Position

1.1. The Scale of the Challenge

Dementia represents one of the most consequential public health challenges confronting twenty-first century societies. Current global prevalence exceeds 55 million people, according to World Health Organization data, with projections indicating that this figure will approach 139 million by the middle of the century. In societies undergoing sustained demographic ageing (Singapore, Japan, South Korea, Germany, and the United Kingdom among them) cognitive impairment is already restructuring demand across every category of the built environment. Nursing homes occupy the most intensive position within this spectrum: they are the facilities to which people turn when dementia has progressed beyond the capacity of community or home-based support.

The design of these facilities therefore carries direct clinical and humanitarian consequence. Poor design does not merely fail aesthetically – it actively exacerbates the functional and psychological difficulties experienced by residents, increases the burden on care staff, and accelerates decline. Conversely, a well-designed dementia nursing home constitutes a form of environmental therapy: a built intervention that supports orientation, preserves function, reduces distress, and sustains human dignity over the course of a progressive illness.

1.2. Why Architectural Quality Cannot Be Assessed in Isolation

A recurring error in dementia nursing home projects is the treatment of architectural quality as an independent variable – something that can be evaluated, specified, and delivered without sustained reference to the clinical, operational, and financial systems within which the building must function. In dementia care environments, the quality of the built form is inseparable from the following interdependent determinants:

- The **clinical care mode**l and its specific spatial requirements
- The **staffing configuration** and the observation, circulation, and workflow patterns it generates
- The **resident acuity profile** – the level of dependency, cognitive impairment, and behavioural complexity that the facility must accommodate
- The **operational system** – how the building supports daily routines, clinical procedures, and emergency response
- **Regulatory compliance requirements** – including licensing, fire safety, barrier-free accessibility, and other measures to ensure the safety of both residents and employees
- **Financial sustainability** – the capital and recurrent cost envelope within which design must deliver genuine care quality

No degree of architectural refinement can compensate for a fundamental mismatch between a building and these determinants. A facility that is spatially sophisticated but operationally incoherent will fail its residents as surely as one that is merely institutional. It is equally important

to remember that even a general senior living facility must, in time, accommodate residents living with dementia – not as an exception, but as an inevitable reality of the population it serves.

1.3. The WHO Intrinsic Capacity Framework as a Design Lens

The World Health Organization's conceptual framework for healthy ageing, introduced through the Decade of Healthy Ageing initiative, centres on the concept of **Intrinsic Capacity** (IC) – the composite of an individual's physical and mental capacities at any given point in time. The framework identifies five IC domains:

- locomotor capacity,
- sensory capacity,
- cognitive capacity,
- psychological capacity,
- and vitality.

Each domain declines at varying rates and in varying sequences in people living with dementia, and each has direct implications for how the built environment should be configured.

IC Domain	**Dementia-Related Decline**	**Architectural Design Implication**
Cognitive capacity	Impaired orientation, memory, executive function, and recognition	Spatial legibility, landmark-based wayfinding, consistent layout, predictable sequences
Locomotor capacity	Reduced gait stability, increased fall risk, altered spatial judgement	Non-reflective flooring, continuous handrails, elimination of level changes, safe wandering loops
Sensory capacity	Reduced contrast sensitivity, altered depth perception, auditory processing difficulties	High visual contrast at all functional junctions, acoustic absorption, optimised illuminance levels
Psychological capacity	Heightened anxiety, agitation, and emotional reactivity to environmental stimuli	Calm, predictable sensory environments; acoustic control; access to retreat spaces
Vitality	Fatigue, reduced circadian rhythm regulation, reduced appetite and engagement	Circadian lighting design, stimulating communal spaces, direct outdoor access, biophilic elements

This framework provides us, architects, medical planners, interior designers, with a clinical rationale for every environmental decision, moving design choices out of the realm of personal preference or inherited precedent, and into the domain of evidence-based response.

Yet, perhaps, equally important is the discipline of balance: **these components do not operate in isolation**, and over-addressing any one of them risks quietly undermining the others. The framework is only as strong as the equilibrium it maintains.

1.4. The Neurological Basis for Dementia Design

Evidence from cognitive neuroscience (and specifically from research into the functional roles of the brain regions most affected by Alzheimer's disease and related dementias) provides a complementary layer of design guidance that operates at a more granular level than the IC framework.

Three brain regions and their associated impairments have particular architectural relevance:

- **Parietal lobe impairment** disrupts spatial orientation, the perception of distance and depth, and the ability to construct a mental map of the environment.
  Architecturally, this requires buildings that are spatially simple, that offer clear sightlines to destinations, that avoid complex or ambiguous geometries, and that provide consistent, legible circulation routes without dead ends or confusing junctions.
- **Occipital lobe and visual processing impairment** alters the perception of contrast, colour, pattern, and surface reflectivity.
  Architecturally, this requires high tonal contrast at all functional boundaries, such as door frames, door handles, sanitary ware, floor-wall junctions, step edges, and seating, as well as the elimination of reflective surfaces, complex visual patterns, and high-contrast geometric flooring that may be misread as level changes or voids.
- **Temporal lobe impairment** affects recognition memory, language comprehension, and the capacity to process and interpret sensory information.
  Architecturally, this supports the use of familiar typologies and domestic spatial characters – spaces that draw on long-term, procedural, and associative memory rather than requiring active cognitive processing to interpret.

These neurological principles do not override clinical or operational considerations. Instead, they must be integrated with them. However, they provide a biologically grounded rationale for design decisions that might otherwise appear to be stylistic preferences.

Section 2: Methodological Principles for the Feasibility Study

Based on Arch'lab's tested approach to senior care projects, the feasibility and prioritisation study for a dementia nursing home should be structured around the following five principles, applied in sequence and in dialogue with one another.

2.1. Care Model as the Primary Generator of Spatial Brief

No spatial brief can be developed, evaluated, or tested until the intended care model has been clearly defined. First of all, the care model determines the spatial programme, the configuration of clinical and social spaces, the observation and security requirements, the staffing workflow, and the sensory environment strategy.

The care model spectrum for dementia nursing home design includes:

Care Model	Spatial Implications	Design Priorities	Key Risks if Unaddressed
General dementia care	Domestic-scale clusters, shared living spaces, varied stimulus environments	Legibility, wayfinding, domestic character	Institutionalisation, disorientation
Advanced dementia	Reduced spatial complexity, high staff proximity, single-room focus	Sensory calm, ease of physical care, acoustic control	Overstimulation, falls, carer strain
High-dependency nursing	Clinical adjacencies, ceiling hoist infrastructure, infection control zoning	Operational efficiency, clinical access, dignity in care	Workflow failure, undignified care environments
BPSD-focused care (*BPSD – Behavioural and Psychological Symptoms of Dementia*)	Secure perimeter, de-escalation spaces, high ratio of retreat options	Acoustic separation, sensory regulation, staff safety	Inappropriate restraint, resident distress
Mixed frailty and dementia	Flexible spatial configurations, zoned acuity areas	Adaptability, clear zoning, dual-purpose spaces	Cross-acuity conflict, design compromise
Respite care	Short-stay orientation support, rapid familiarisation design	Immediate legibility, welcoming character	Disorientation on arrival, anxiety
Palliative/end-of-life care	Private rooms, family accommodation, spiritual spaces	Privacy, dignity, acoustic separation, domestic warmth	Undignified dying, family distress
Combination model	Modular or phased spatial organisation, adaptable infrastructure	Future-proofing, zoning clarity	Programme incoherence, operational confusion

Each care model also generates specific implications for staffing ratios, observation requirements, security configuration, and the balance between private and communal space, all of which must be resolved before spatial planning commences.

2.2. Evidence-Based Environmental Criteria Set Before Design Begins

The second methodological principle is that the environmental criteria specific to dementia design must be established as a formal component of the brief – not left to emerge during design development and not reduced to a checklist appended after concept design is complete.

Drawing on the neurological and IC frameworks described above, a minimum set of dementia-specific environmental criteria should address:

- **Spatial legibility and wayfinding:**

Every design decision point in the building must be differentiated through landmark elements, material changes, colour differentiation, or spatial variation. Destinations must be visible, not inferred. Signage must be supplemented with pictorial, object-based, or memory-cued aids that operate through long-term associative memory rather than requiring active reading or reasoning.

- **Visual contrast and surface specification:**

A minimum contrast ratio (typically Light Reflectance Value (LRV) differential of 30 points or greater) should be specified at all functional boundaries. All floor surfaces must be non-reflective and pattern-free. Sanitary ware must contrast with wall and floor surfaces. Door hardware must be distinguishable at approach.

- **Acoustic environment:**

Institutional reverberation is both disorienting and distressing for people with dementia. Acoustic absorption must be integrated from the outset through ceiling materials, spatial planning, soft furnishings, planting, and the separation of high-noise clinical areas from residential and social spaces.

- **Lighting:**

Both natural and artificial lighting strategies must be resolved during feasibility. Natural light should be maximised through building orientation, window placement, and the integration of courtyards or light wells. Artificial lighting must be designed to actively support circadian rhythm regulation, delivering brighter and cooler light during morning and mid-day hours, and transitioning to warmer, lower levels in the evening. This is particularly critical in dementia care, where the natural perception of day and night is frequently impaired, making the built environment's role in anchoring that rhythm essential. Glare must be controlled at all windows and luminaire positions.

- **Biophilic integration:**

Direct access to safe outdoor space is a clinical requirement, not an amenity. Gardens must be designed as genuine therapeutic landscapes featuring continuous walking loops, sensory planting, and seating at regular intervals, all held in clear visual connection with the interior. This principle extends indoors with equal urgency: wandering is a constant reality of dementia care, and looped circulation must be provided throughout the building just as deliberately as it is in the garden.

- **Domestic spatial character:**

The spatial typology of the building should draw on familiar residential forms (living rooms, dining rooms, kitchens, corridors of domestic scale) rather than institutional or hotel typologies that carry no associative resonance for the resident cohort.

2.3. Structured Engagement with People Living with Dementia

The third principle addresses the research and consultation methodology of the feasibility study itself. Co-design with people who have lived experience of dementia is not a procedural nicety but a methodological requirement. The spatial perceptions, functional priorities, and experiential responses of people living with dementia cannot be reliably inferred from proxy consultation with family members, care staff, or clinical advisors. These stakeholders provide essential operational input, but they cannot substitute for direct engagement with the people for whom the environment is being designed.

Effective co-design methods at feasibility stage include:

- **Accompanied building walkthroughs** with participants living with mild to moderate dementia, structured around specific functional sequences (finding the dining room, locating the bathroom, returning to a bedroom), with documented observations of orientation behaviour, hesitation points, and environmental confusion;
- **Sensory environment simulations** using material samples, lighting rigs, and acoustic recordings to test responses to proposed environmental conditions;
- **Scaled mock-up assessments** where specific room configurations or furniture arrangements are physically constructed and tested with participants before being committed to in the brief;
- **Narrative and photographic elicitation** – asking participants to identify and describe environments from their past that felt safe, familiar, and comfortable, as a basis for informing the sensory and typological character of the new facility;
- **Carer and family consultation** structured separately from resident engagement, addressing operational priorities, safety concerns, and the quality-of-life dimensions that residents may find difficult to articulate.

All co-design activities must be conducted within an ethical protocol that addresses capacity assessment, consent processes, communication adaptations, and the management of distress during sessions.

2.4. Explicit Resolution of the Safety-Dignity Tension

The fourth principle requires that the feasibility study explicitly addresses and resolves the tension between safety and dignity that is inherent to all dementia care environments.

This tension manifests as a series of recurring design conflicts:

Safety Priority	Dignity Priority	Resolution Framework
Secure door systems to prevent exit	Freedom of movement and autonomy	Differentiated access zoning; disguised egress rather than locked doors; GPS monitoring integrated with unlocked outdoor access; GPS-equipped wristbands, etc.

Safety Priority	Dignity Priority	Resolution Framework
CCTV monitoring for resident safety	Privacy rights and dignity in daily life	Zone-specific monitoring policies; no cameras in bedrooms or bathrooms; transparent resident and family communication protocols
High-contrast, slip-resistant flooring	Domestic aesthetic character	Selection of natural materials (timber, stone, textured vinyl) that achieve contrast and slip-resistance without institutional appearance
Bed-based clinical care for high-dependency residents	Social participation and engagement	Room configurations that enable clinical care without requiring permanent bed confinement; proximity of rooms to communal spaces
Acoustic separation of BPSD units (*BPSD – Behavioural and Psychological Symptoms of Dementia*)	Inclusion and social connection	Design of acoustic separation through material and planning means rather than physical isolation; graduated social access protocols

Each of these tensions must be actively resolved during the feasibility stage through explicit brief policy, spatial configuration decisions, and operational protocol design. Deferring them to later project stages introduces the risk that cost and engineering pressures will resolve them in favour of safety and operational efficiency at the expense of resident dignity and quality of life.

2.5. Maintaining Strategic Integrity Across the Project Lifecycle

The fifth principle addresses a failure pattern that recurs across dementia design projects regardless of the quality of the initial feasibility work: the progressive erosion of the care and design strategy under the cumulative pressure of cost management, engineering constraints, and the drive to maximise bed numbers.

To counter this, the findings and criteria established during feasibility must be formalised as an active audit instrument – a **Dementia Design Compliance Checklist** – that ensures physical environments reduce confusion, prevent accidents, and promote independence for individuals living with dementia, and is applied at each subsequent project stage: concept design, schematic design, detailed design, and procurement review.

Interior designers must be integral to the project team from the feasibility stage onward. Many of the environmental qualities that most directly affect the daily experience of people living with dementia, such as material character, surface contrast, lighting warmth, acoustic quality, furniture arrangement, and the overall sensory atmosphere of the space, fall within the interior design scope. Introducing the interior designer after architectural decisions have been made frequently results in these qualities being compromised by decisions that could have been avoided had they been present at the briefing stage.

Deliverables from this methodological phase:

- A formally adopted **Design Strategy Document** that records all care model decisions, environmental criteria, co-design findings, and safety-dignity resolutions
- A **Dementia Design Compliance Checklist** structured for application at each project stage
- A **Design Readiness Review** confirming that all strategic questions are resolved before concept design commences

Section 3: Clinical and Regulatory Context

3.1. Regulatory Framework (Singapore context)

Dementia nursing homes in Singapore operate within a regulatory environment that directly shapes the design brief. The key instruments are:

- **Ministry of Health Licensing:** MOH licensing requirements for residential care facilities specify minimum bedroom areas, staff-to-resident ratios, clinical support spaces, and operational standards. For dementia-specific facilities, enhanced requirements apply to security configurations, observation provisions, and outdoor access. Feasibility studies must demonstrate compliance with current licensing standards and anticipate likely revisions given the pace of policy development in this area.
- **SCDF Fire Safety Requirements:** The Fire Code imposes requirements on compartmentalisation, egress design, smoke detection, and sprinkler provision that have direct implications for dementia-specific design. The resolution of these matters must be agreed with SCDF through online or physical consultations during the feasibility stage.
- **BCA Barrier-Free Access Code:** The BCA Code specifies minimum standards for accessible design that form a floor, not a ceiling, for dementia-inclusive design. Dementia-specific requirements, such as contrast, wayfinding, spatial scale, and sensory environment, substantially exceed BCA minimums. The feasibility study should document where dementia design standards diverge from and exceed BCA requirements.
- **PDPA and Monitoring Provisions:** The use of electronic monitoring systems, such as CCTV, wearable GPS, and sensor-based location systems, in dementia facilities must comply with the Personal Data Protection Act and with MOH guidelines on resident rights and dignity. Monitoring proposals must be addressed in the brief with explicit policy positions on scope, consent, and data governance.

3.2. Financial Sustainability and Design Quality

The financial viability of a dementia nursing home is a design determinant, not a separate commercial consideration. Facilities that are undersized, over-specified in capital terms, or structured around unsustainable staffing models will not survive long enough to deliver the care quality their design intends. Feasibility studies must therefore include:

- A capital cost model that tests the proposed programme against realistic construction and fit-out costs per square metre;
- A recurrent cost model that tests the proposed staffing configuration against occupancy projections and funding sources;
- A sensitivity analysis that identifies the design elements most vulnerable to value-engineering pressure, and establishes a brief policy position on which elements are protected from scope reduction.

Section 4: Co-Design as a Formal Methodology

4.1. Theoretical Basis

The case for co-design in dementia facility development rests on a straightforward empirical observation: the experiential world of a person living with dementia differs from that of a person without cognitive impairment in ways that cannot be fully understood through observation, clinical literature, or professional intuition alone. Spatial disorientation, sensory misperception, and the functional consequences of memory loss create a phenomenology of the built environment that is genuinely different from the normative design assumption.

Co-design does not require people living with dementia to act as design consultants or to articulate spatial requirements in professional terms. It requires the design team to create structured conditions in which the lived experience of dementia can be observed, understood, and translated into design decisions by professionals equipped to do so.

4.2. Ethical Protocol Requirements

All co-design activities involving people living with dementia must operate within a formal ethical protocol addressing:

- **Capacity and consent:** Assessment of decision-making capacity for each participant and each activity type; supported decision-making where full capacity is absent; ongoing consent review throughout each session;
- **Communication adaptation:** Use of simplified language, visual communication aids, and non-verbal response options; avoidance of complex questions or unfamiliar abstract concepts;

- **Distress management:** Identification of distress indicators specific to each participant; clear protocols for pausing or ending sessions; debrief support for participants and accompanying carers;
- **Data governance:** Clear policies on recording, storage, and use of participant responses; anonymisation protocols; participant rights to withdraw;
- **Inclusivity:** Active recruitment of participants across the range of dementia types, severity levels, cultural backgrounds, and first languages relevant to the anticipated resident cohort.

Architecturally, this opens genuine creative possibilities. Wayfinding, for instance, can move away from the clinical language of numbers and ambiguous icons toward something far more instinctive – animal mascots, bold colour coding, and other immediately associative cues that speak directly to memory and recognition in ways that conventional signage simply cannot.

Section 5: Recommended Sequence of Work

The following ten-stage sequence is recommended for design teams undertaking a dementia nursing home feasibility and prioritisation study. The sequence is iterative rather than strictly linear. Findings at later stages may require revisiting earlier decisions, but the ordering reflects the logical dependency structure of the key decisions.

❖ **Stage 1: Interrogate the Strategic Premise**

Before any analytical or design work commences, the fundamental strategic premise of the project must be examined. This stage asks: why is this project being proposed, for whom, and on what basis has the decision to proceed been made?

Key questions include:

- What is the identified gap in care provision that this facility addresses?
- What is the intended resident profile in terms of dementia type, severity, and co-morbidities?
- What is the operational model? Standalone facility, integrated care campus, or expanded existing facility?
- What are the funding sources and financial sustainability assumptions underpinning the project?

Output: A Strategic Premise Document confirming the project rationale, resident profile, and operational model, or identifying the questions that must be resolved before the project can proceed.

❖ **Stage 2: Define the Care-Operational Brief**

Translate the care model into specific operational requirements, and those operational requirements into spatial and infrastructure needs.

Key questions include:

- What staffing ratios and configurations are required by the care model and regulatory framework?
- What clinical support functions must be accommodated within the facility?
- What are the observation, security, and emergency response requirements?
- What does the daily routine of a resident look like, and what spatial sequence does it require?

Output: A Care-Operational Brief setting out all functional requirements as spatial generators, including adjacency requirements, circulation logic, and security zoning.

❖ **Stage 3: Engage with People Living with Dementia**

Conduct co-design activities as described in Section 4, structured around the specific spatial and experiential questions raised by the Strategic Premise Document and Care-Operational Brief.

Output: A Co-Design Findings Report documenting observed behaviours, elicited preferences, and specific design implications, with recommendations for integration into the environmental criteria.

❖ **Stage 4: Establish Dementia-Specific Environmental Criteria**

Drawing on the neurological and IC frameworks, co-design findings, and evidence-based design literature, establish the full set of environmental criteria that will govern the design brief.

Output: An Environmental Criteria Schedule, structured as a series of testable design requirements, suitable for use as a compliance checklist at subsequent design stages.

❖ **Stage 5: Test Site or Building Suitability**

Apply the Care-Operational Brief and Environmental Criteria Schedule to the proposed site or existing building to assess suitability and identify constraints.

Key assessment dimensions include:

- Building orientation and natural light availability
- Floor plate configuration and its compatibility with dementia-appropriate cluster planning
- Circulation structure and its capacity to support legible, domestic-scale wayfinding
- Outdoor space availability, quality, and accessibility
- Structural capacity for proposed programme modifications

- Services infrastructure and its implications for design flexibility

Output: A Site Suitability Assessment identifying enabling conditions, constraints, and the design responses required to resolve each constraint.

❖ Stage 6: Test Spatial Fit Against the Care Model

Generate and test spatial options against the Care-Operational Brief and Environmental Criteria Schedule. This is not concept design but a spatial testing, using diagrammatic plans and area schedules to evaluate whether the building can accommodate the required programme without compromising dementia design quality.

Output: A Spatial Feasibility Report confirming the maximum bed number and programme that can be achieved within dementia design quality standards, with documentation of any care model compromises required.

❖ Stage 7: Prioritise Essential versus Desirable Components

Not all components of an ideal dementia design brief will be achievable within every project's capital and spatial constraints. This stage requires an explicit prioritisation exercise distinguishing between the environmental qualities that are clinically essential and those that are desirable but negotiable.

The prioritisation framework should be structured around the clinical and operational consequences of absence, not around cost or design preference.

Output: A **Scope Prioritisation Matrix** classifying all programme components and environmental qualities as **Essential**, **Highly Desirable**, or **Desirable**, with documented rationale for each classification. Each project's matrix will differ based on the care model and other requirements.

While working on Prioritisation Matrix, we keep in mind the ten most consequential risks we defined in dementia nursing home design, with mitigations structured around the methodology described in this paper.

Risk	Consequence if Unmitigated	Mitigation
Care model undefined at project outset	Spatial brief without clinical foundation; design that cannot be validated	Stage 2: Define Care-Operational Brief before any spatial work
Bed maximisation overrides dementia design quality	Spatial configurations that disorient and distress residents	Stage 6: Test spatial fit against care model; Stage 7: Protect essential components in Scope Prioritisation Matrix
Co-design omitted or replaced by proxy consultation	Design based on assumed rather than observed resident experience	Stage 3: Mandatory co-design with ethical protocol; co-design findings formally integrated into brief

Risk	Consequence if Unmitigated	Mitigation
Interior designer introduced at late stage	Sensory environment, contrast, and material quality compromised by prior decisions	Interior designer involvement mandated from feasibility stage onward
Safety-dignity tension unresolved at brief stage	Cost and engineering pressure resolves tension in favour of safety, eliminating dignity provisions	Stage 2: Explicit resolution of safety-dignity conflicts as brief policy
Regulatory requirements misunderstood or deferred	Design requires late-stage revision; compliance risks; cost overrun	Section 3.1 (regulatory audit): MOH, SCDF, BCA, PDPA requirements mapped at feasibility
Feasibility findings not maintained as design audit tool	Strategy erosion under design development pressure	Dementia Design Compliance Checklist active at every project stage
Phasing creates transitionally unsafe conditions	Resident disorientation, falls, or distress during construction	Stage 8: Phasing Strategy structured around care integrity
Financial model not integrated with design brief	Capital cost overrun leads to value-engineering of essential dementia design qualities	Financial sensitivity analysis identifies protected scope before design begins
BPSD requirements not specified in brief (*BPSD – Behavioural and Psychological Symptoms of Dementia*)	Spatial configuration inadequate for behavioural complexity; staff safety compromised	Resident acuity profile including BPSD prevalence specified in Stage 1 and Stage 2

❖ Stage 8: Structure Phasing Around Care Integrity

Where the full programme cannot be delivered in a single construction phase, our approach requires that phasing be structured to ensure that each phase delivers a functionally coherent and care-safe environment. No phase should create a transitional condition that compromises the safety, orientation, or dignity of current residents.

Output: A Phasing Strategy Document setting out the phase boundaries, the care-safe conditions required for each phase, and the design provisions needed to maintain operational continuity throughout construction.

❖ Stage 9: Validate the Design Brief Before Concept Design Commences

Before any concept design work begins, all findings from Stages 1 through 8 must be consolidated into a formally adopted Design Brief or Feasibility Report. At Arch'lab, we treat this consolidation stage as one of the most critical points in the entire process – all unresolved strategic, clinical, regulatory, or financial questions must be documented and resolved here, before design begins.

The Design Brief or Feasibility Report is not a starting point for negotiation during design but a fixed reference against which design options will be evaluated.

Output: A formally adopted Design Brief or Feasibility Report, including the Care-Operational Brief, Environmental Criteria Schedule, Scope Prioritisation Matrix, and Phasing Strategy.

❖ **Stage 10: Apply Feasibility Outputs as a Continuous Review Framework**

Throughout concept design, schematic design, detailed design, and procurement, the feasibility outputs – particularly the Environmental Criteria Schedule and Scope Prioritisation Matrix – should be applied as a structured design review instrument. At Arch'lab, we apply these documents actively at every design stage gate, not retrospectively. Each design decision that affects the dementia design quality of the facility should be evaluated against the established criteria before it is confirmed.

Output: A Dementia Design Compliance Checklist updated at each project stage, with a Design Readiness Review conducted at the completion of each stage.

Section 6: Summary of Evidence-Based Design Recommendations

The following table consolidates the key design recommendations arising from the evidence base and principles presented in this paper. It is structured as a design reference instrument and should be used in conjunction with the full methodology described above, not as a substitute for it.

Design Domain	Typical Failure Mode	Evidence-Based Recommendation
Spatial legibility	Uniform, undifferentiated corridors with no navigational cues	Create landmark differentiation at all circulation decision points through distinctive furniture, art, material changes, and spatial variation
Wayfinding	Abstract or text-heavy signage that requires active cognitive processing	Supplement or replace text signage with pictorial aids, object cues, and visible destination design that draws on long-term associative memory
Colour and contrast	Insufficient tonal contrast between functional surfaces and adjacent backgrounds	Specify LRV differential of 30+ points at doors, frames, handles, sanitary ware, floor-wall junctions, and step edges
Acoustic environment	High reverberation coefficients in corridor and communal spaces	Integrate acoustic absorption through ceiling materials, soft furnishings, spatial planning, and planting; separate high-noise clinical areas from residential zones
Lighting – natural	Insufficient natural light penetration; glare from uncontrolled windows	Maximise natural light through building orientation and window placement; control glare through solar shading and diffusing materials

Design Domain	Typical Failure Mode	Evidence-Based Recommendation
Lighting – artificial	Flat, undifferentiated artificial light without circadian variation	Design circadian-responsive artificial lighting systems with higher cool illuminance in morning/mid-day periods and warmer, lower illuminance in evening
Biophilic design	Absence of natural elements; no direct outdoor access	Integrate planting, natural materials, water features, and direct garden access; design therapeutic gardens with continuous walking loops and sensory planting
Flooring and surfaces	Reflective, patterned, or high-gloss flooring misread as voids or level changes	Specify non-reflective, pattern-free flooring with consistent tonal value across horizontal surfaces; use tactile differentiation only at intended thresholds
Domestic spatial typology	Institutional spatial character without residential precedent or associative resonance	Design common areas as recognisable domestic typologies — living rooms, dining rooms, kitchen areas — at domestic scale, using furniture and material selections drawn from long-term memory associations
Sensory design for BPSD (*BPSD – Behavioural and Psychological Symptoms of Dementia*)	Overstimulating environments that exacerbate agitation and distress	Provide de-escalation spaces with controlled acoustic and visual stimulation; design sensory gradient from active communal to calm retreat within each residential cluster
Outdoor and garden design	Outdoor spaces that are inaccessible, unsafe, or unused	Design safe, supervised outdoor access as a therapeutic programme component; ensure visibility from internal staff positions; integrate sensory and horticultural therapeutic activities
Co-design integration	Proxy consultation substituted for direct resident engagement	Conduct structured co-design activities with people living with dementia; document and formally integrate findings into brief
Dignity and quality	Environments designed around safety and efficiency at the expense of resident experience	Design for meaning, beauty, and engagement as clinical objectives alongside functional and safety requirements

Conclusion

Feasibility and prioritisation work in dementia nursing home projects carries a weight and consequence that we at Arch'lab believe is entirely unlike its role in any other building type. In most projects, a feasibility study asks whether something is commercially and physically viable. In a dementia nursing home, it asks something far more searching: whether the environment that results from this process will support or quietly undermine the humanity of the people who live within it. That question has never left us throughout the course of this work, and we hope it never does.

If this paper leaves its reader with anything, we hope it is these:

- ✓ **The care model must always come first.** No spatial decision is neutral in a dementia environment: every corridor width, light source, threshold carries clinical consequence. A brief that is written before the care model is fully understood will produce a building that works against the very people it was designed to serve.
- ✓ **Dementia gives us a biological brief.** The neurological realities of the condition – its effects on spatial orientation, sensory processing, memory, and the perception of time – are not abstract considerations, but precise, well-documented, and entirely actionable. Designers who understand them make better buildings. Those who do not will, however unintentionally, may cause harm.
- ✓ **The people who will live there must help design it.** Co-design with people living with dementia is not a gesture of inclusion, but a methodological necessity. The insight that comes from genuine engagement with future residents cannot be sourced anywhere else, and no amount of research or precedent study is a substitute for it.
- ✓ **Dignity and safety must be reconciled before design begins.** If it is not resolved explicitly (named, debated, and agreed upon at brief stage), it will be resolved later, under cost pressure, and almost always at dignity's expense.
- ✓ **Therapeutic ambition must be protected by process.** Good intentions do not survive a poorly structured design process. The sequence this paper describes exists precisely to shield what matters most from the pressures that so routinely and so silently erode it.
- ✓ And finally: **design should be the last thing that begins, not the first.** Establish whether the conditions exist for a humane, legible, safe, and operationally coherent dementia environment. Engage future inhabitants with genuine intent. Set evidence-based criteria with precision and resolve strategic and regulatory questions with rigour. Only then should a single line be drawn.

We offer this framework as a disciplined starting point – one that we hope will be tested, challenged, and improved by every practitioner who encounters it.

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