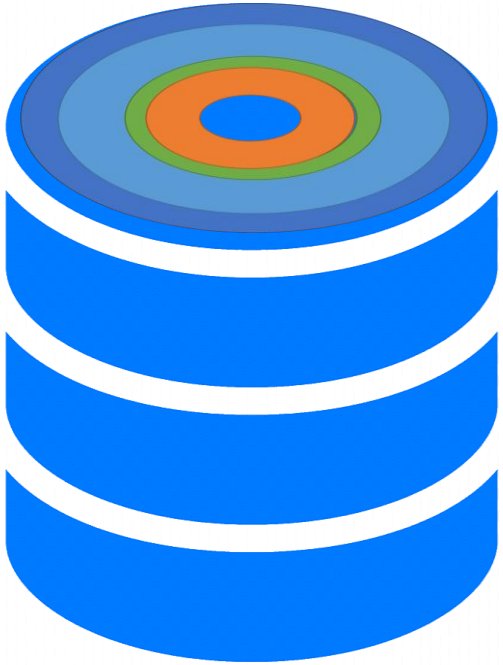


VERTICALLY STACKED HOSPITAL

(VSH)

By

KINGSMAN LTD (AUS)
Tel – 0488 061 292
neill@laurenson.com

WHO ARE WE?

We are mostly local team of professionals working with internationally renowned system providers to provide New Zealand and Australia with the most effective and sustainable hospital systems available globally.

TEAM ASSEMBLY AND CONCEPT INITIATOR

- Neill Laurenson (t/a - Kingsman Ltd)

FINANCE TEAM

CONFIDENTIAL

IN-HOSPITAL LOGISTICS

- Hänel Office and Industrial Systems
- Envac Group

CONCEPTUAL ARCHITECTURE

CONFIDENTIAL

ENGINEERING

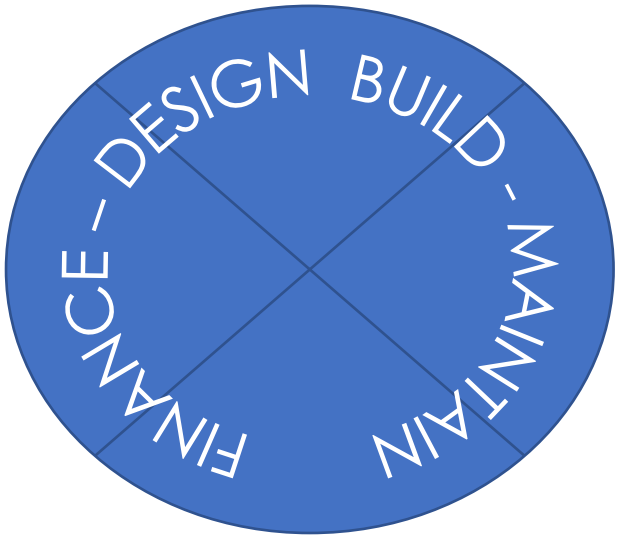
CONFIDENTIAL

CONSTRUCTOR

CONFIDENTIAL

SPECIALIST CONSULTANT LEAD

CONFIDENTIAL



INTRODUCTION TO A VERTICALLY STACKED HOSPITAL

What is it?

- A vertically integrated hospital, and specifically in this case, a circularly laid out facility, provides seamless operational efficiencies and operating cost reductions, vastly improved staff efficiencies and therefore vastly improved patient care. It costs less to operate and is extremely efficient from a 'used space' efficiency perspective, by having 'next to zero' wasted public or ancillary/connecting spaces.

How will it function?

- The layout of a circular VSH provides rapid provision of commonly required stock, medicines, documents, bedding/clothing across multiple floors and allows these items to be delivered to the 'coal face' without having to transport them through common areas where the public or lower levels of isolation or isolation are possible.
- **The fundamental difference in the design approach for this facility is that the built environment is entirely dictated by the operational needs of staff and the world class logistical 'inner workings' of the building, it is not deigned and then solution sought to service various locations.**
- The ability to isolate parts of wards or even bed by bed isolation is envisaged.
- The handling of all types of waste, as well as dirty linen and clothing is managed without transporting these items outraise of the ward environment by means of networked vacuum systems.
- The layout provides for self sufficiency and sustainability opportunities not able to be explored with low-rise structures, for example, integrated use of rainwater systems for grey water use and the inclusion of vertical farming for the supply of food to the kitchens.
- The intention is to have a commercially functional operator in place in each hospital that utilises the facilities

Why is it advantageous?

- Part of the need for a medium or high-rise hospital concept is the increasing co-location of clinical and research functions. This trend creates more travel between buildings and campuses, which then leads to an inconvenient and unproductive experience for staff, inefficient stock logistics and 'out of skill set' staff utilization, i.e., trained staff performing menial tasks instead of caring for patients.
- Tall hospitals can contribute to a better experience by minimizing the movement of patients throughout the building, locating key equipment and services closer to patients and bringing more services to a diverse population. As our hospitals are often located in urban environments, vertical hospitals can tap ancillary revenue streams like leasing out ground floor retail or building in conference or meeting space to bring retail and other services to neighborhoods.

What sort of scale would these be for Australian and New Zealand towns and cities?

- It is envisaged that hospitals like this for the likes of say Palmerston North and other medium to small towns and cities in New Zealand would be approximately 5 storey high and with a diameter of approximately 106 meters.

Reading: - LINK

VERTICALLY STACKED HOSPITAL

Identity

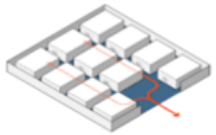
Simplified wayfinding, the ability to divide the building into 'villages' with their own identity and creating a sense of place for staff, visitors and patients.

LOW-RISE LAYOUT
Single entrance and single identity

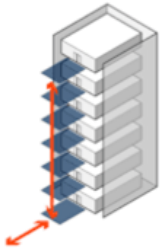
HIGH-RISE LAYOUT
Single entrance and multiple identities

Traveling Within the Building

Reduced, more efficient travel distances for patients and staff, with short vertical distances beneficial over long horizontal ones.



LOW-RISE LAYOUT
Longer horizontal journeys and departments deep within the building



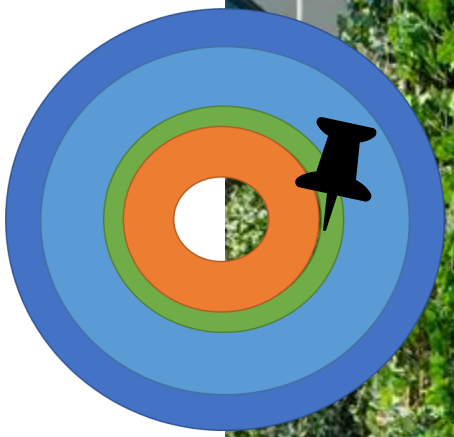
HIGH-RISE LAYOUT
Short horizontal journeys and easy-to-reach departments

Daylight and Views

Great, easy access to daylight and views to most of the floorplate, as well as improved air quality and reduced noise which benefit the healing process.

LOW-RISE LAYOUT
Multiple blocked views and low-level views

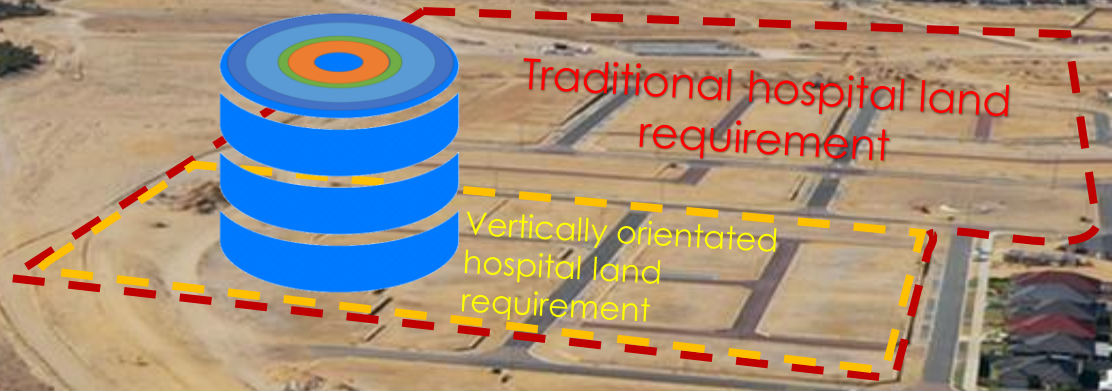
HIGH-RISE LAYOUT
360-degree views and high-level distance views



Design by Neill Laurenson. 19th June 2022 ©

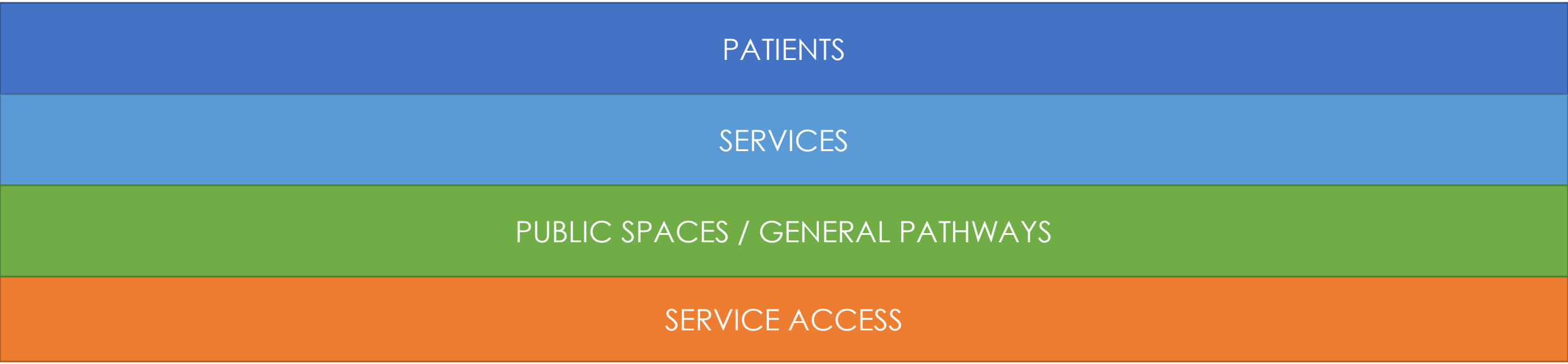
RELEVANCE TO POPULATION AND URBAN SPRAWL IN WA

As more and more pressure is put on all infrastructure to cope with WA's increasingly accelerating urban sprawl, new ways need to be found to assist the plans of urban infill housing and more high-density developments. The issue with expanding population and the increased requirement of hospitals services is that hospitals are traditionally very land 'hungry'. Going up with the likes of a circular hospital offers opportunity for inner city / urban hospital locations abut it also assist with more outlying hospital designs as it is less land hungry and can be scaled down to as many floors as is required, with the ability to simply add to the top in later years.



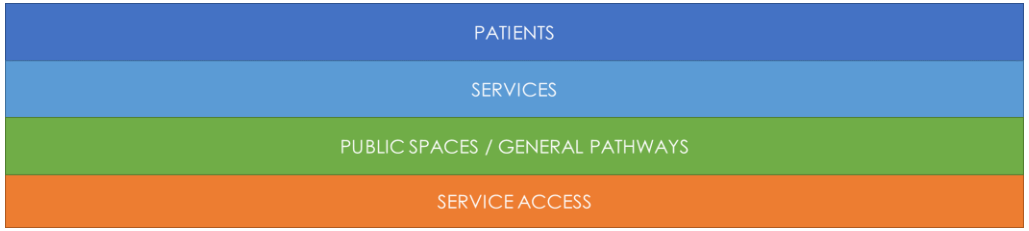
INTRODUCTION TO A CIRCULAR HOSPITAL LAYOUT

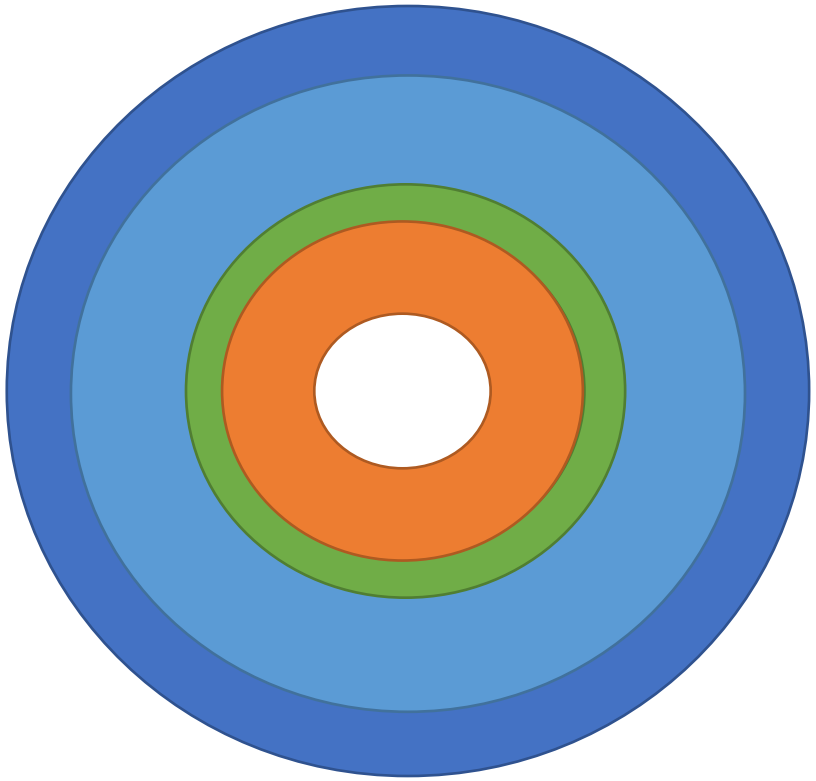
All zones are separated from other zones (Patients / Services / Public / Access), not dissimilar to what currently happens in any hospital, but using a circular layout there is a very large percentile increase of functional usage of floor area, therefore building footprints can be smaller.



INTRODUCTION TO A CIRCULAR HOSPITAL LAYOUT

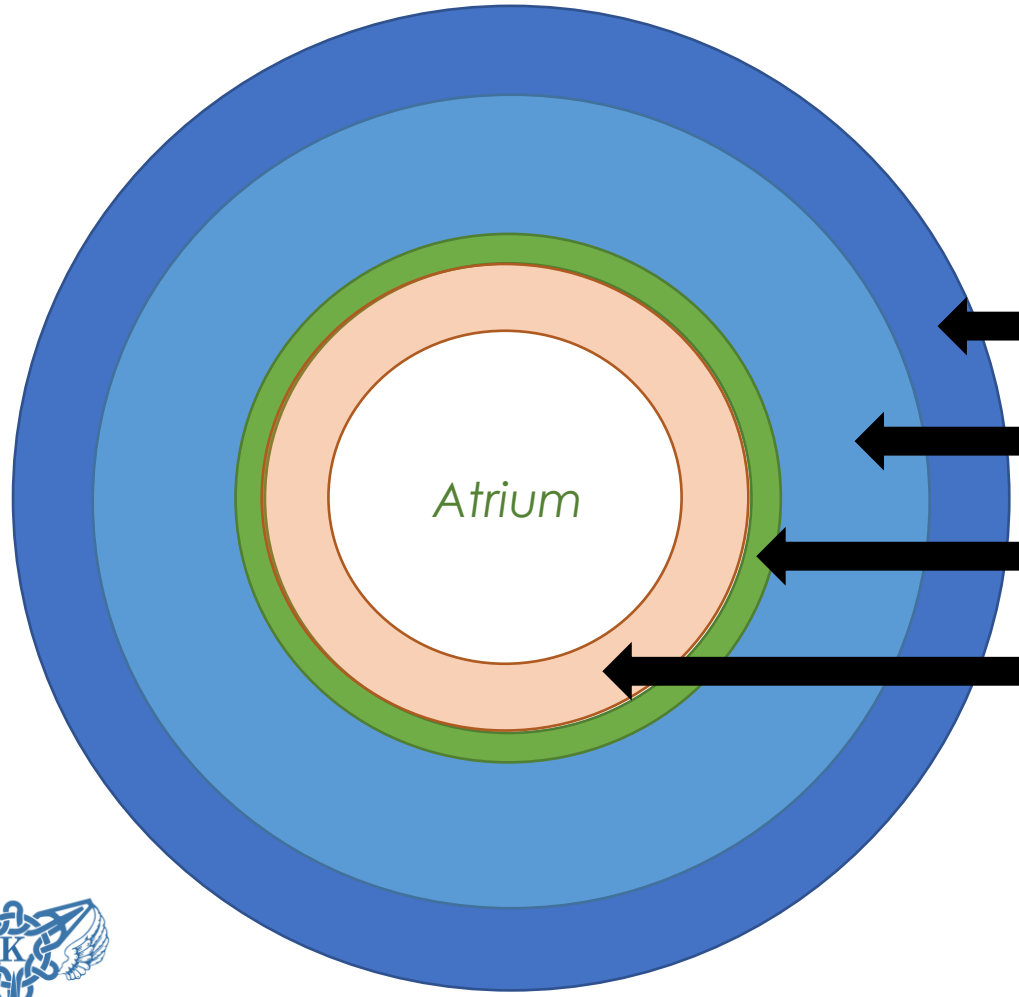
NOW TURN THIS FLAT LAYOUT INTO THIS CIRCULAR LAYOUT





This Vertically Stacked Hospital (VSH) improves functionality, lowers costs dramatically , lowers risks and improves health of patients and staff. Areas of functionality are proportional to their use, and areas that are simply convenience, are kept to a minimum for example public passageways. These areas are also kept sperate and therefore improve security, health/contamination and,

If fully adopted, a VSH can save up to 35% of a project's construction costs and 40% of non-procedural operational costs.



PATIENTS

ON FLOOR SERVICES / THEATRES

PUBLIC SPACES

ACCESS / STRORES (below)

THE FUNCTIONALITY

A Circular Hospital provides unapparelled staffing efficiencies and a uniquely ‘hyper-functional’ inwards goods-storage-dispensing system, serving ,multiple floor.
A building needs to be planned for it’s use and a hospital’s use for the care of patients, not need less moving of stores, equipment and paperwork.

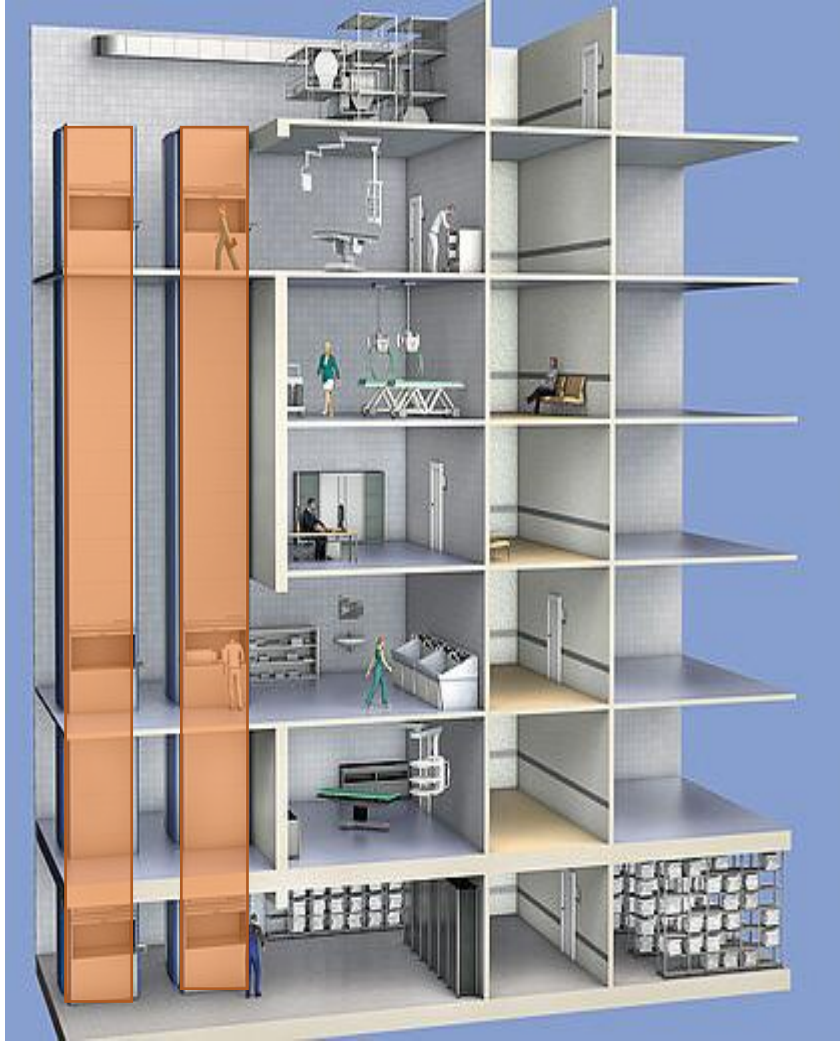
Utilising the Lean-Lift® as a central ‘nervous system’ of the hospital, the hospital profits from more efficient processes, patient care, staff health and efficiencies, plus providing less demand for back of house storage areas, by providing a much higher storage density

Sterile material as well as temperature-controlled facilities, and fully digitized inventory control is provided by the Hänel Lean-Lift® systems; they fully comply with temperature, ventilation and air replenishment requirements.

Access from separate ground floor storage rooms, can directly feed various specialist of general areas on all floors.

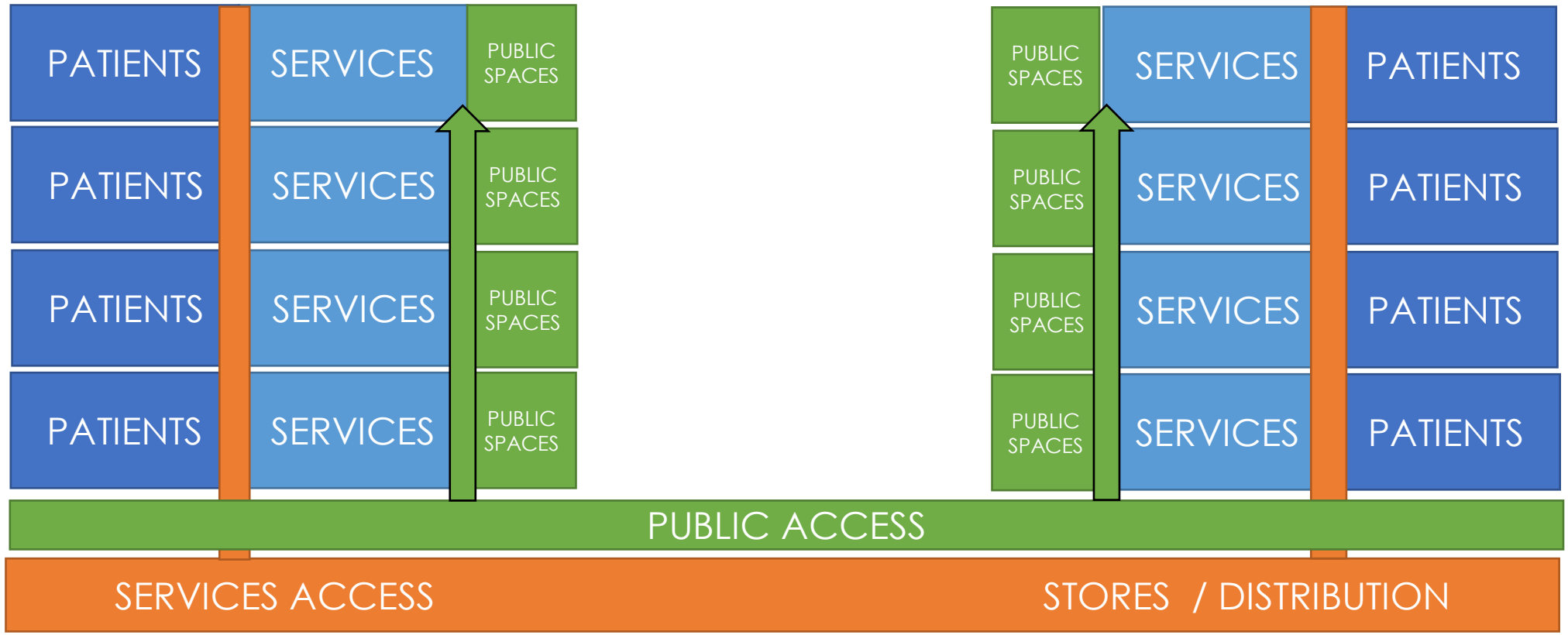
Lifts can be used for direct access into operating rooms, to provide fast access to surgical instruments and other products. The photo below depicts the retrieval points in the sterile storage area.

All access points are equipped with an air-lock system: Two doors separate users from the storage area, whereby one of the doors is always closed. This is necessary because of the differences in air pressure in the building – and this is required wherever sterile items are stored.



VERTICALLY STACKED HOSPITAL

NOW ADD LAYERS TO YOUR HOPSITAL TO APPRECIATE THE MULTI-LEVEL CIRCULAR LAYOUT



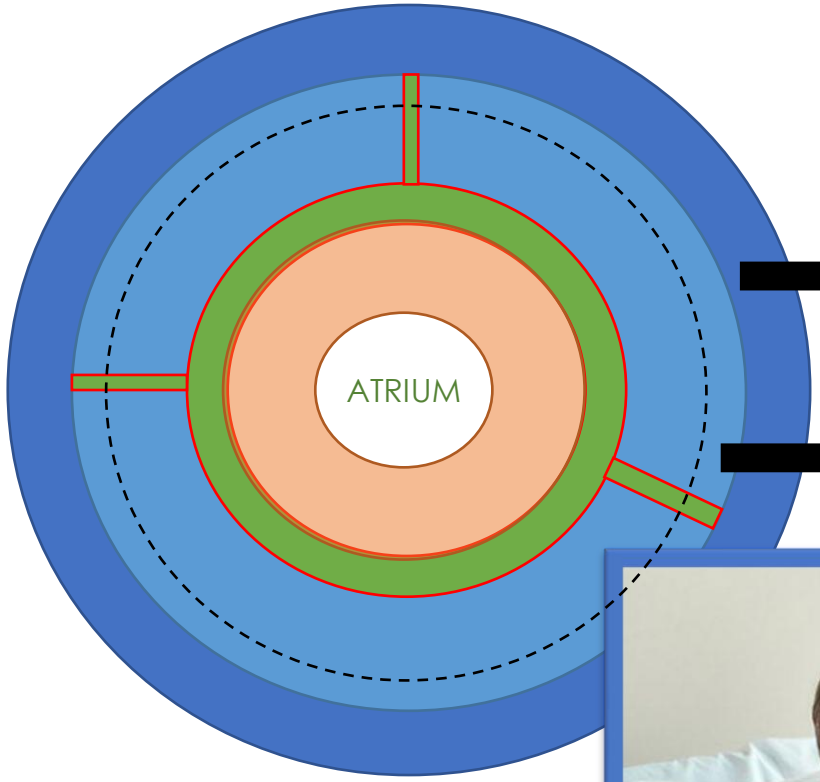
The Service Zone of the VSH is the epicenter or literally the heart of the VSH facility and everything runs through and around this zone.

It is the area that is vertically connected to all services and all functions.

VERTICALLY STACKED HOSPITAL

SERVICES

VERTICALLY STACKED HOSPITAL



A VSH improves patient focused time and thereby improves care, by automation and smart design in relation to access, logistics, services and operations.

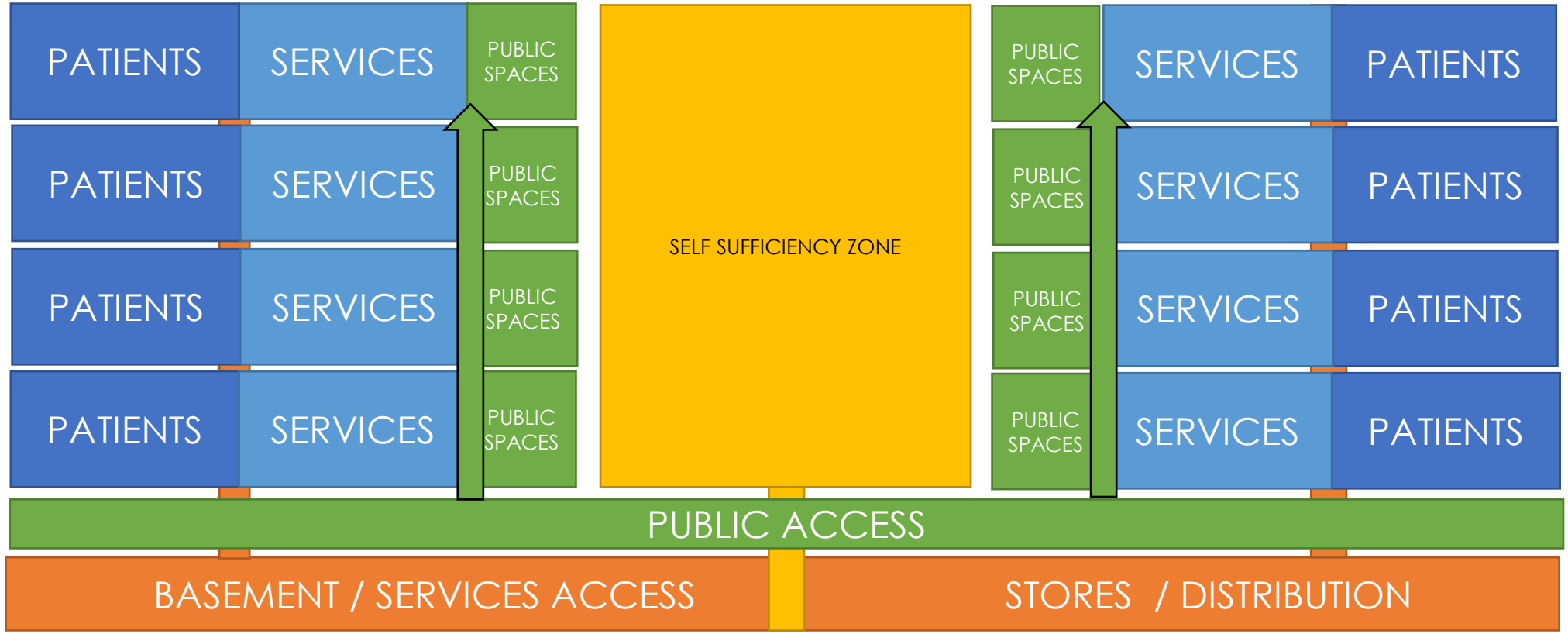
Public access to family and friends is 'naturally controlled by having pathways for all non-public areas entirely separate from operational and wards (red lines on image above)

Design by Neill Laurenson. 19th June 2022 ©

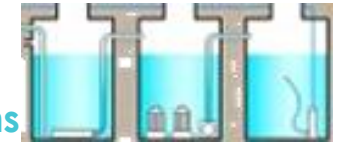
A VSH as proposed provides a tremendously better patient environment, ‘every bed has a view’, which means patients are happier, staff by default are enjoying the environment too, and therefore the caring suites are just a much more enjoyable place to be for all, this promotes more rapid recovery.
This approach along with a multitude of other ‘finer details, makes this hospital design a world leading concept. LINK

VERTICALLY STACKED HOSPITAL

NOW ADD THE 'ATRIUM'S 'SELF SUFFICIENCY' ZONE – (SEE NEXT SLIDE)

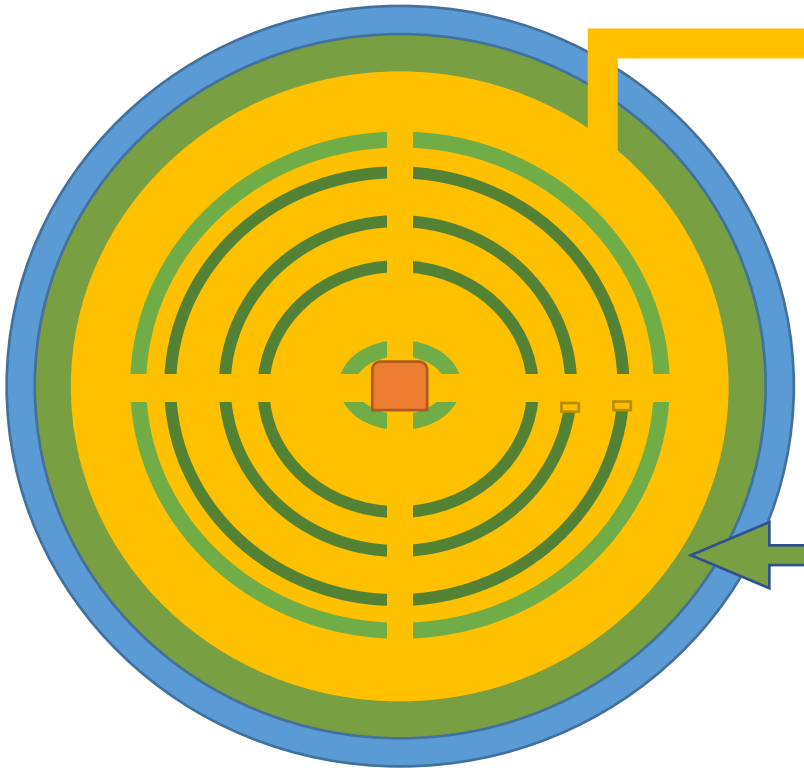


Underground water retention systems and geothermal heating systems



The intention is to have a commercially functional operator in place in each hospital that utilises the facilities for food production.

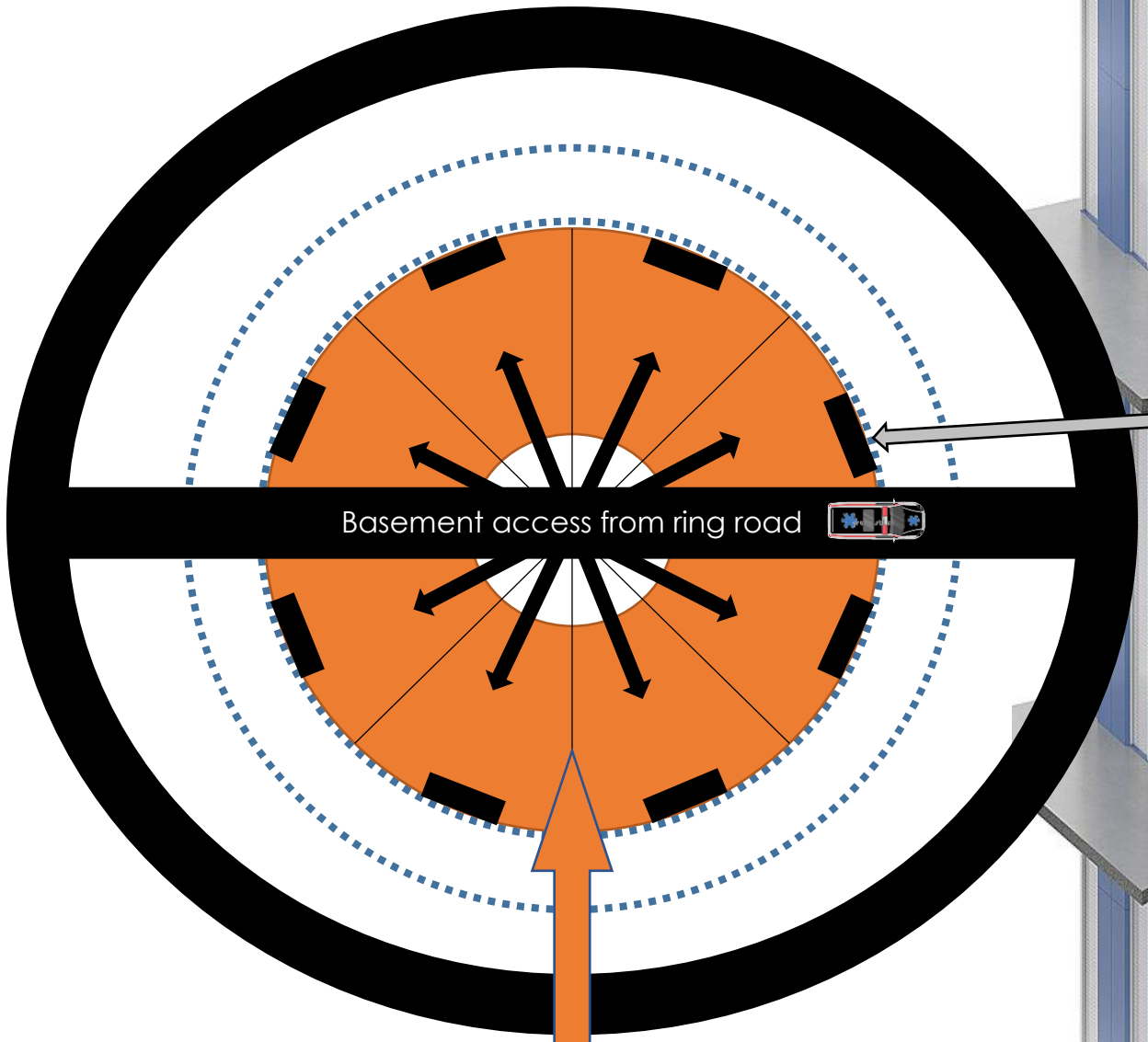
The public passageways on each floor, all face the glass wall between the passage and the indoor vertical farm which is 4 floors high.



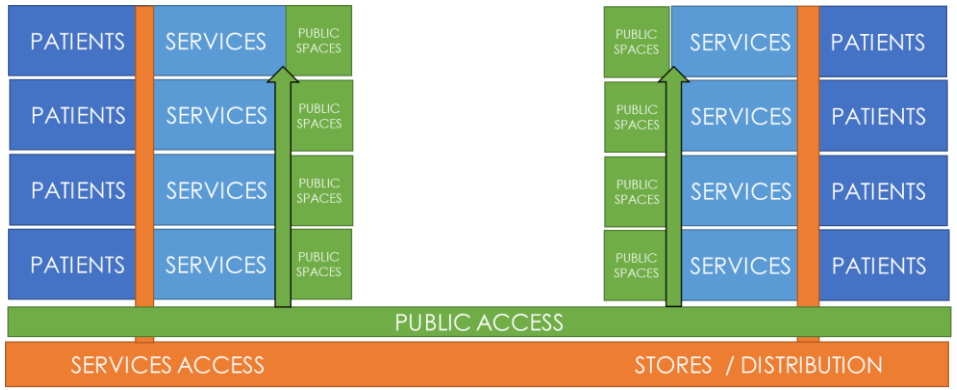
SELF SUFFICIENCY ZONE

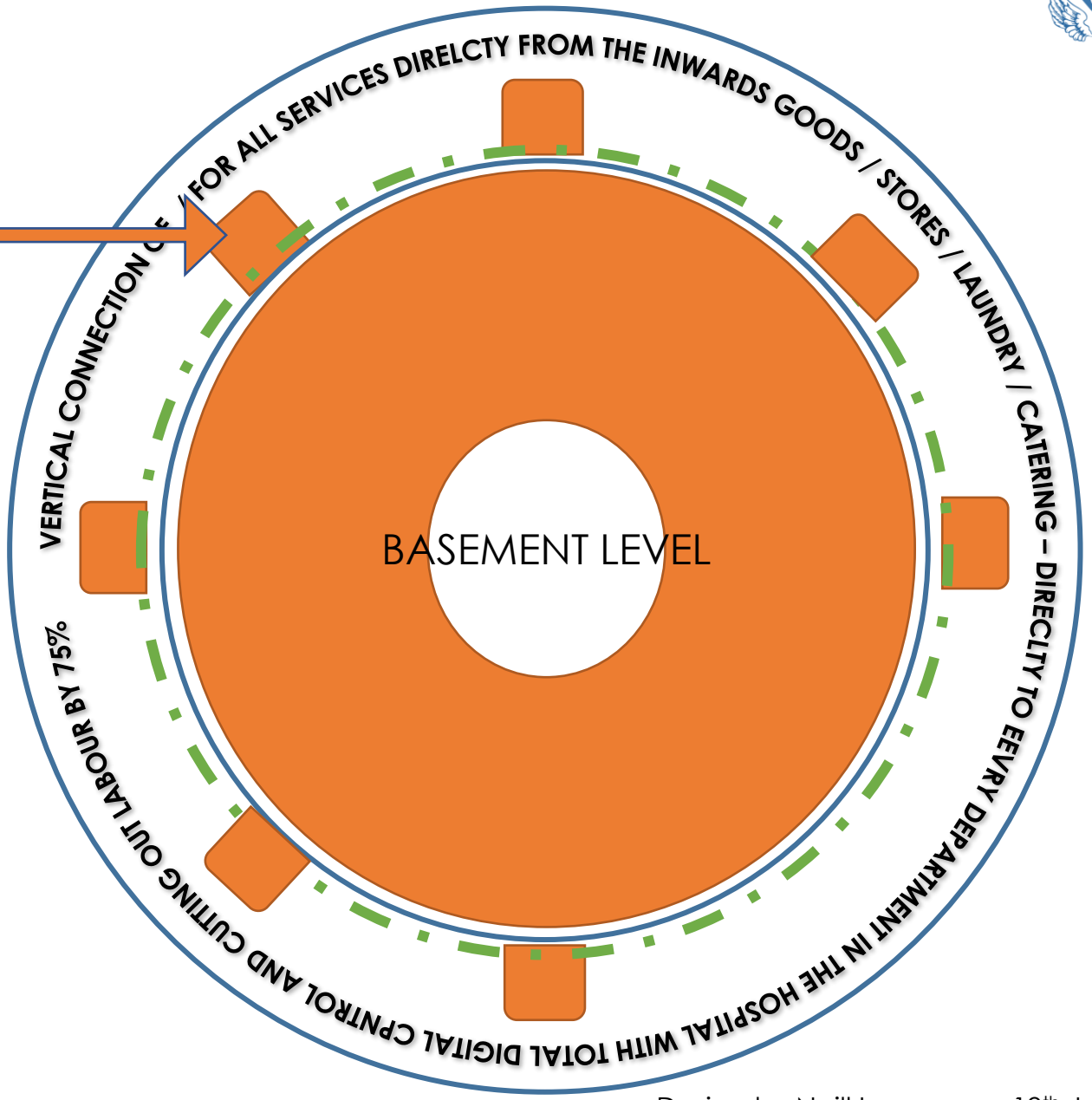
VERTICALLY STACKED HOSPITAL

The basement Zone, receives and dispatches everything and vertically connects everything from catering to hazardous waste, beds to patients, etc.



VERTICALLY STACKED HOSPITAL





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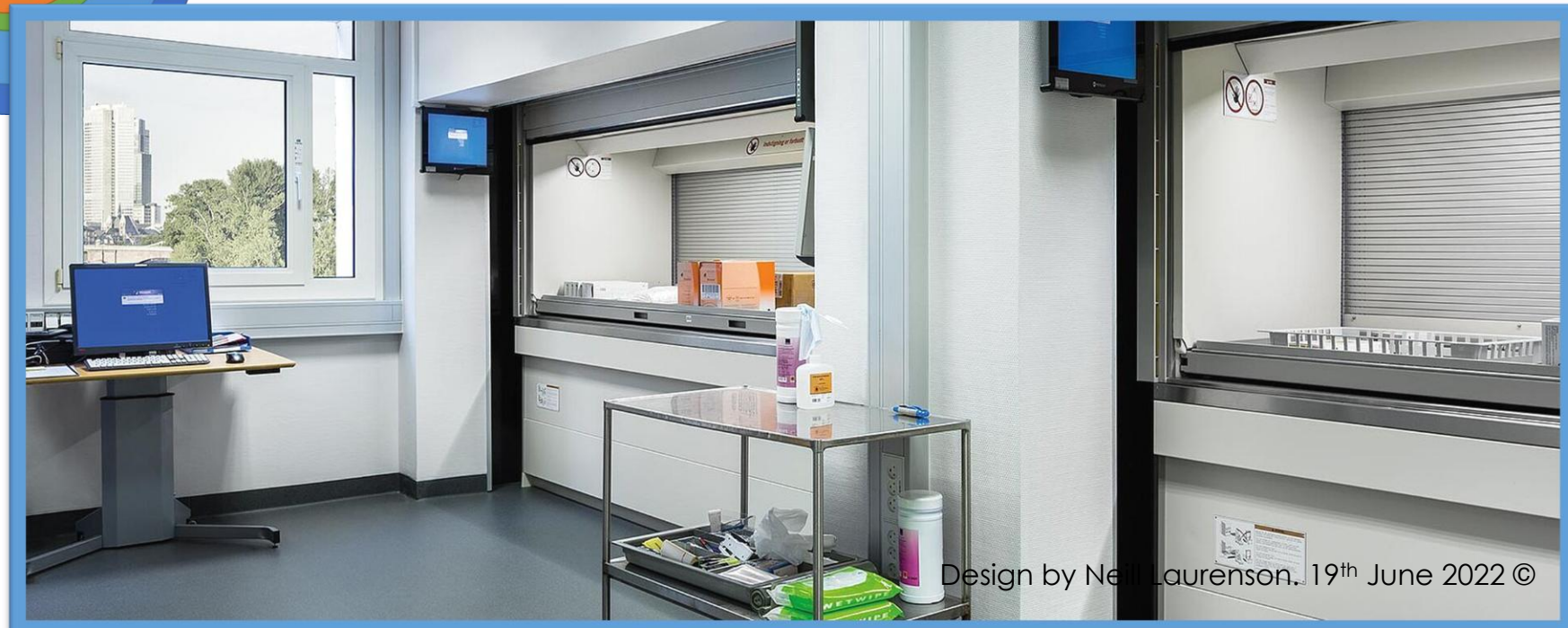
VERTICALLY STACKED HOSPITAL

BASEMENT LOGISTIC OPERATIONS / ACCESS / STRORES

ON FLOOR SERVICES



Whakaaro-Kingsman

VERTICALLY STACKED HOSPITAL

ON FLOOR CLINICAL SERVICES SEND SAMPLES ETC. DIRECLTY TO THE STAFF MEMBER RESPONSIBLE FOR DESPATCHNG IT, WITHOUT LEAVING THE CLINICAL ZONE

BASEMENT LOGISTIC OPERATIONS / ACCESS / STRORES

VERTICALLY STACKED HOSPITAL

Prescriptions, sterile surgical equipment, temperature-controlled drugs, consumables, records, materials, equipment etc. delivered directly to the floor that it is required on without transiting through public areas or other areas.

Beds directly to the floor required automatically

All records/ consumables etc. directly and accurately accessible.

VERTICALLY STACKED HOSPITAL

Storage down to –80°C

We can store various and numerous types of materials equipment and drugs in our **ClimateStore® systems**. We can also store at extremely low temperatures, down to – 80° C. For this purpose, Hänel storage containers with the electrification function are used.

These enable cold boxes to be put into storage and supplied with power while in the lift, ensuring constant cooling of the stored items.
It also allows stocks of donated blood, for example, to be kept safely.

CleanStore

Temperature-controlled storage even in the clean-room

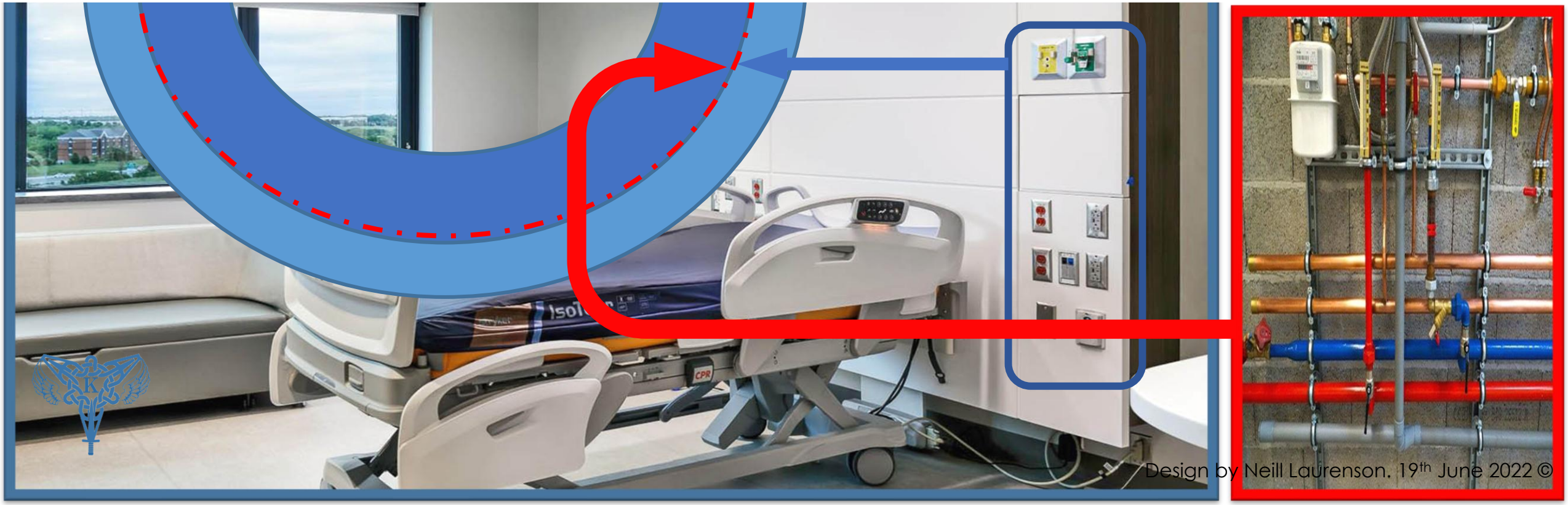
Temperature-controlled environment

Optimum use of floor space while ensuring constant temperatures
High economic efficiency and cost savings
Can be used in different temperature ranges depending on the device type , from – 20° to + 60° C OR from 0° to +60° C
Reliable temperature constancy to ± 1° C, Recording of measured values with data loggers.

THE LIFE SYSTEMS

Multi-Service Headwalls

All bed position services are reticulated directly through the wall, from an entirely open and available/serviceable position, not built into the walls where pipes and manifolds are not accessible.



THE WASTE, UTILITERIAN AND POWER SYSTEMS

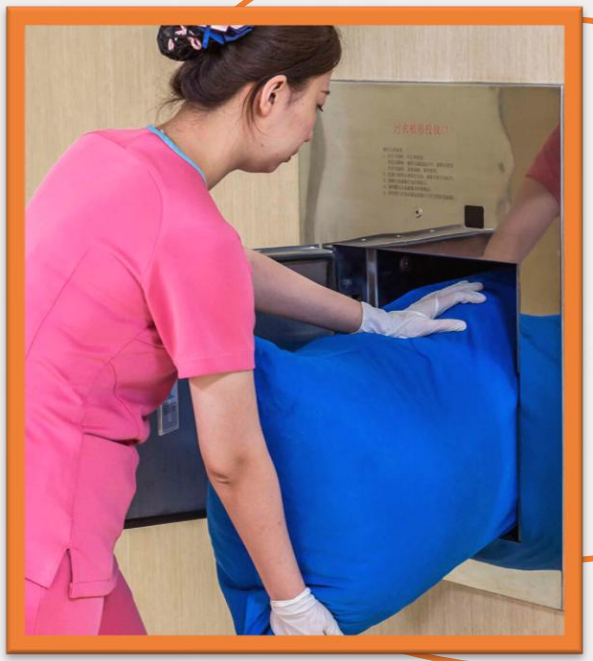
VERTICALLY STACKED HOSPITAL

FULLY AUTOMATED MANAGEMENT OF INFECTIOUS WASTE – HAZARDOUS WASTE – RADIOACTIVE WASTE – GENERAL WASTE

Clean burning multi-waste incinerators provide heating and power the building.

Solar power is installed wherever feasible however the roof is also a heliport so requires safe landing and operation space, so solar systems would be installed at ground level over car parking areas etc.

Geothermal heating is also installed.

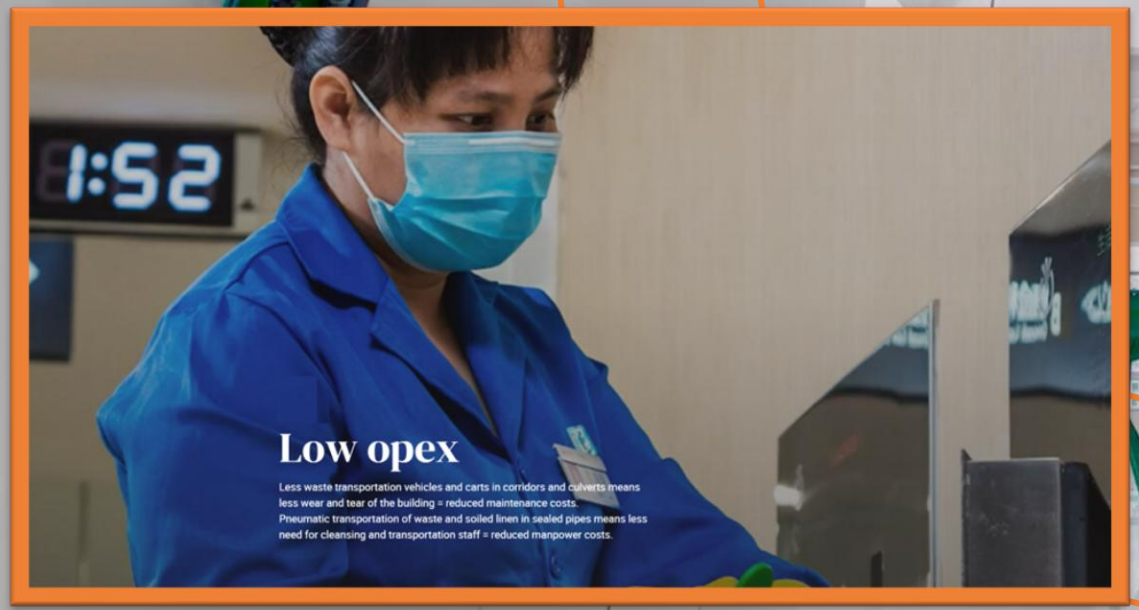


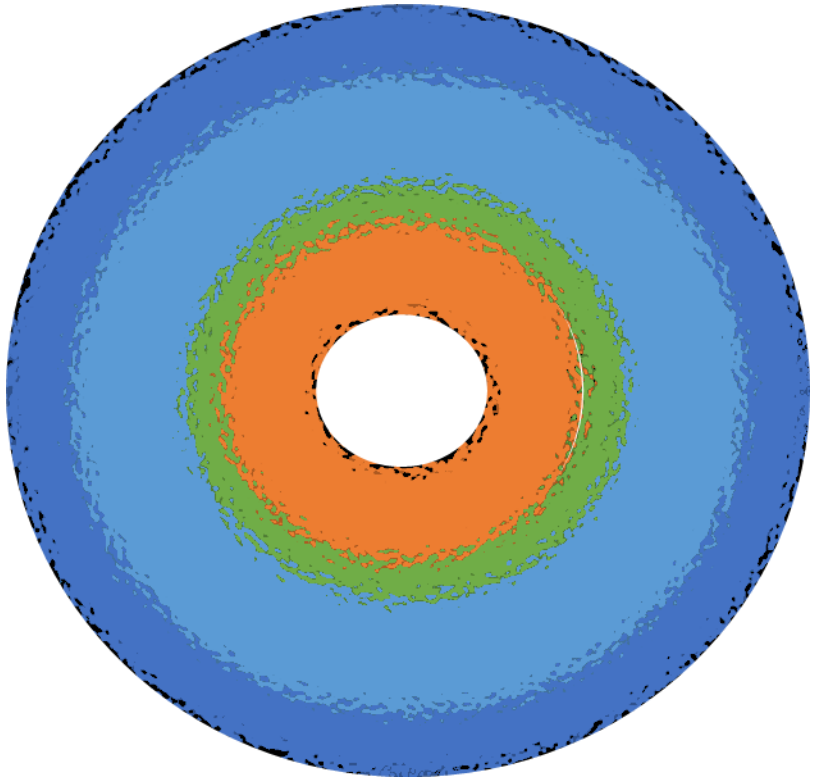
FULLY AUTOMATED MANAGEMENT OF BEDDING / LINEN AND SOILED CLOTHING WITHIN SEALED VACUUM SYSTEMS FROM THE WARD DIRECLTY TO THE BASEMENT

VERTICALLY STACKED HOSPITAL

FULLY AUTOMATED MANGEMENT OF LINEN & LAUNDRY – NO BAGS OR TROLLEYS OF DIRTY LAUNDERY PASS THROUGH OTHER PATIENT, STAFF OR PUBLIC SPACES LIKE ELEVATORS.

Less waste transportation vehicles and carts in corridors and culverts means less wear and tear of the building = reduced maintenance costs. Vastly improved Health & safety. Pneumatic transportation of waste and soiled linen in sealed pipes means less need for cleansing and transportation staff = reduced manpower costs.





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