



Canada Centre for Inland Waters Administration and Laboratory Building Laboratory Modernization Plan (LMP)

2015-08-08

PWGSC Project R.072688.001

Environment Canada

Burlington, Ontario

RS 2.1.2

Design Concept - Appendix C
Phasing & Accommodation Plan



Challenges & Strategies: Phasing & Accommodation

The most essential task in the planning process is to communicate with CCIW staff and users early on. This helps establish acceptance for the plan and lessen staff turmoil.

Health and Safety will be a priority for staff and users when conducting renovations within the occupied areas.

The Phasing & Accommodation Plan will try to undertake renovation in the largest area possible. In general, wherever possible, it makes sense to take out as large an area as possible, including full floors or wings which can constitute a phase. This allows for a discrete boundary between occupied space and construction areas. Issues to be addressed include noise, dust, disruption of engineering system, maintaining of safe egress paths etc

The Phasing & Accommodation Plan will be set up with logical breaks in work areas, such as intersecting corridors, zones and solid walls, elevator cores, shear walls or fire partitions as opposed to more easily demolished partitions.

The goal of the Phasing & Accommodation Plan is to minimize the impact to adjacent areas and to localize and compartmentalize work so that other areas are not unexpectedly affected.

The ultimate phasing strategy will be to try and arrange the renovations so most users will only need to relocate once, although the initial Block 5A users will likely have to move into temporary accommodation until the Block C areas are completed, but this will be offset because they will

be the first to be accommodated in a new lab and should not have to move again during the LMP.

A phased renovation will add costs to a project but doesn't add any value to the end product so the goal is to minimize the 'throw-away' costs for the completed project. These costs come from extended General Conditions and from the cost of creating temporary measures to ensure life safety, access and continuity of services to the occupied areas. Swing space can be hard to find, so it is important that all users understand and be as flexible as possible during the renovations.

For the LMP project, the phasing is accomplished by constructing the new areas in Block C first. These new areas along with Block 5A are then occupied, making the vacated areas available for renovation, block by block. This process of construction, renovation, occupying and vacating is done until all areas are completed. This process creates "swing space" that allows for leap frogging from construction to occupied space.

The LMP will use a modular approach to speed installation and reduce time on site. This approach is two-fold. First, using a modular layout for laboratory design as much as possible establishes economy and speeds fabrication time. Second, by prefabricating much of the work off site to a set modular dimension, the contractor's time on site can be reduced.

Work should be phased to minimize demobilizing and re-mobilizing trades. Work should be planned

ahead so that when trades are established on site they can continue to work as delays are more likely to occur in bringing trades back to the site. The best case is if a swing space can be established for the duration of the project, which eliminates multiple setups and takedowns.

If the project is undertaken by a Construction Manager, consideration for ordering long lead items during the early stages of the project should be considered allowing materials and equipment to be on order and available when required

The Phasing & Accommodation Plan will try to accommodate existing lab users wherever possible by consolidating functions on floors 4 to 7, utilize existing spaces without renovating, adjusting work patterns or time of work to reduce space needs, find available space in other areas of the CCIW, and lastly, generate swing space on-site by commissioning temporary laboratory space.

The Phasing & Accommodation Plan will try and facilitate the LMP phasing by reducing the amount of local swing space required to host the labs within the LMP scope. This may be achieved by identifying laboratories that are under-utilized and those which can be amalgamated within other lab space without detrimentally impacting either's workflow patterns. From on-site investigations it appears that three laboratories not slated for immediate renovation are serving largely or exclusively as storage rooms for other labs. These labs include L576, L676, & L682, which together total **66 m²**. Due to their under-use, it is likely these labs could be immediately turned

over to renovation status after other storage space is secured. Other laboratories have some portions of their area devoted to storage usages, which suggest they are under-utilized and may be able to be amalgamated with other laboratories during the LMP. These include L444, L469, L625, L634, & L678/680, which together total **265 m²**.

When considering space immediately outside the A&L Building, there are a number of laboratories on the 2nd floor the Warehouse building that are currently feasible options for swing space. Lab W246, W247, & W248, which used to belong to the former Aquatic Ecosystem Protection Research Division, have remained dormant since their principle activities regarding the rearing and study of toxicants on reptiles and fish were relocated to the Aquatic Life Research Facility. None of these labs have a fume hood, but each have a large sink, stainless steel countertops, metal cabinets, and emergency showers in generally satisfactory condition. In size they are **30m², 31m², & 30m²** respectively.

Lab W249 is presently being used as a storage space by the adjacent Aquatic Contaminants Research Division laboratories, however if alternate storage can be secured the space may be returned to laboratory use. Similar to the other labs, W249 contains no fume hood and similar casework and sinks in satisfactory condition, and is **81m²** in area.

Together, each of the four spaces total **172m²** (1,850 SF), or just under one sixth of the laboratory area on a typical A&L building floor. In order to serve as

swing space some transition construction would be required to add fume hoods and additional cabinetry necessary to support the general workflow of the labs within the LMP scope.

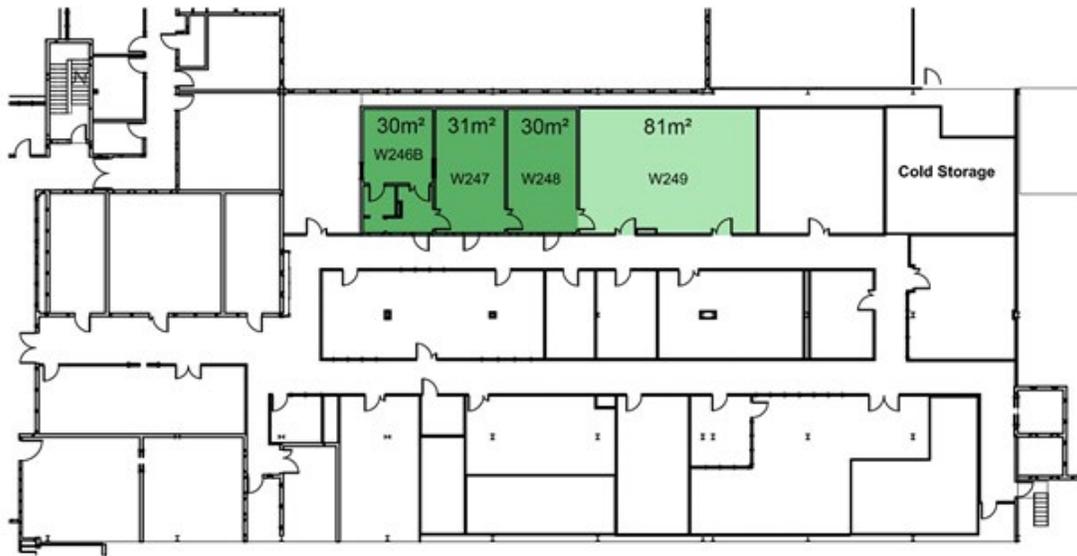


Figure 1.

The Wastewater Technology Centre has been mentioned as another feasible option for swing space for the LMP. The WTC has a series of 8 laboratories on the 1st floor and 4 on the second, run by the EOALRS and WHERD divisions.

The portion of the WTC that has been suggested as a possible swing space is an open region on the ground floor of the central multi-height space. This space was formerly used for storage, though it has recently been prepared for 3rd party lease. The space is roughly 4.3 m x 16 m, for a total of **75 m²**.



Figure 2.

Though available, there are multiple of challenges to overcome for this space to serve as swing space for the LMP. Firstly, as it has no laboratory equipment the space would require capital investment to enable the full range of laboratory functions. This would likely also include enclosing the space within new walls to segregate it from the main multi-height room.

Another challenge to successfully relocate the LMP labs to this space involves managing the level of environmental contamination imposed by the processes of the WTC. The WTC's mandate for research involving raw sewage is discernable by way of the very noticeable odour throughout the building's lower floors. This contamination would likely preclude this space hosting anything but the least environmentally sensitive labs within the LMP scope, or otherwise require a significant investment in mechanical infrastructure to establish a high degree of environmental control.

West Hydraulics is a large, multi-height space in the hydraulics wing that consists of an open lab simulation area with a platform that hosts a large rotating flume. The primary function of this space was to conduct physical hydraulic modelling experiments, instrument calibration, and some limited physical and chemistry analysis, however it has been unused for a number of years.

At approximately **755m²** (8,130 SF) of usable area, West Hydraulics has the volume to potentially host a significant portion of the laboratory area on a typical A&L building floor. However, this

would require removing the extensive hydraulic lab infrastructure currently occupying the space, and introducing infrastructure that could host the research and analytical labs within the LMP scope. The large equipment stations that would need to be removed include the 5m annular rotating flume, a 1m flume, a 30m demonstration flume, and an observation tank.

While the space is currently unused it is possible Environment Canada's future research plans involve resurrecting the aforementioned research activities within West Hydraulics. If this is the case, EC should be asked to provide a projected timeline when the resumption of West Hydraulics would begin, as it is possible to introduce temporary laboratory units within the not-fixed equipment areas of this space.

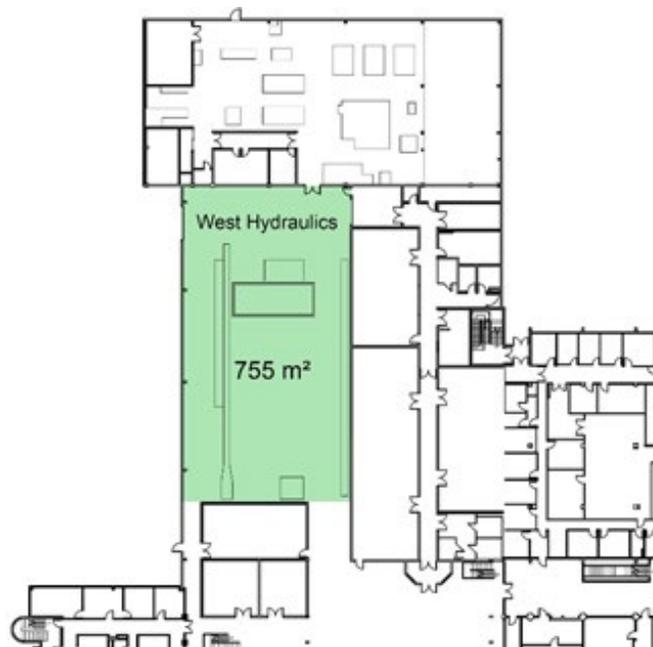


Figure 3.



Figure 4.

If laboratory swing space cannot be accommodated within the present infrastructure of CCIW's campus, another feasible option involves utilizing prefabricated portable laboratories. These lab units are factory built to the desired function of the user, ranging from simple dry labs to high performance BSL 3 containment levels, and arrive on-site ready for utility connections and immediate operation. Though they are also used for field-deployment, the primary use of portable laboratories is to create swing space during renovation projects like the LMP.

Portable laboratories can be designed to a variety of sizes, though 3.7m W x 15.2m L (12'W x 50'L) is common, resulting in approximately **46m²** (500 SF) of net lab area - equivalent to 2 lab modules within the CCIW A&L Building. At this size, the procurement of 10 portable laboratories would enable half of one floor of the A&L Building laboratories to be

relocated at any one time, assuming no other swing space was available and no contraction of existing space needs could be attained.

Depending on the long-term needs for portable laboratories by Environment Canada, the units can be purchased outright or leased for the duration of the LMP construction through a variety of manufacturers, including CPM Labfab Inc., Certek[®], Lab-Pro Inc., and Germfree[®].

Should swing space need to be created on-site at CCIW, there are many benefits to the portable laboratory approach. With lead-times from procurement to on-site operation common within six weeks, portable laboratories offer an opportunity to large reductions in the time required for transitional construction work to establish full-functioning swing space. Furthermore, their off-site prefabrication ensures construction disturbance would be minimal.

One feasible location for the portables is the parking lot adjacent to the hydraulics wing, due to its proximity to the A&L Building and expected limited disruption to activity on the CCIW campus. Another viable location is inside the West Hydraulics space, if the equipment currently occupying the space can be removed. The room is large enough to fit 8 of the 3.7m W x 15.2m L units on the floor. Though not typical, due to the room's large clear height the units may be able to be stacked, enabling a maximum of 16 units. This approach would require the erection of stairs and a platform to gain access to the upper units.

Similar to portable laboratories, modular prefabricated laboratories may be a desirable option for the creation of swing space within underused interior areas within CCIW. However, as these units could be assembled on-site with modular wall, ceiling, flooring, & casework systems, as opposed

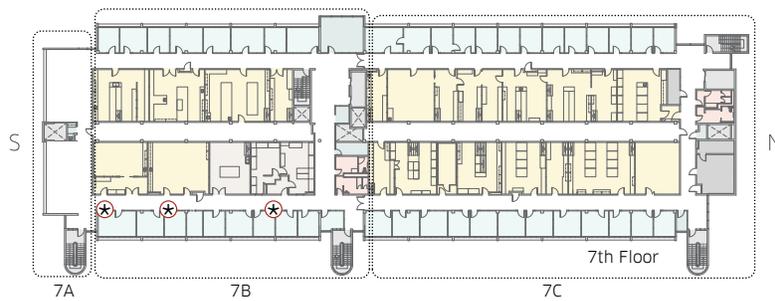
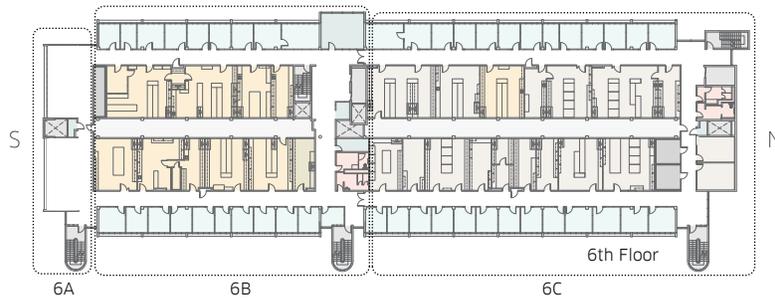
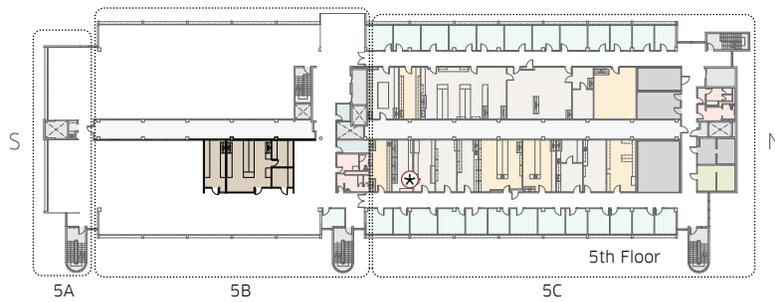
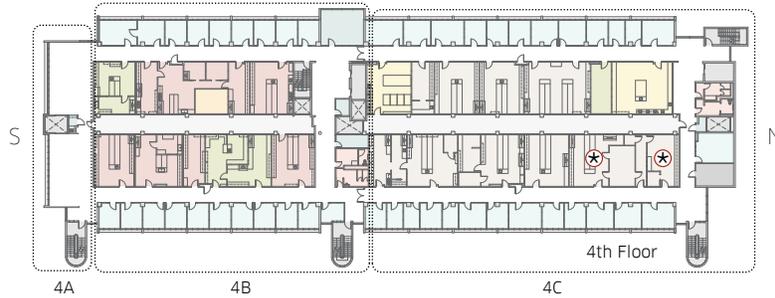
to arriving pre-assembled like the portables, they present a more nimble option for temporary interior swing space. In addition to West Hydraulics and the WTC open areas mentioned previously, these units may be configured within floors 4-7, either within relinquished laboratory space or the narrow perimeter band currently devoted to offices.



Figure 5.



Figure 6.

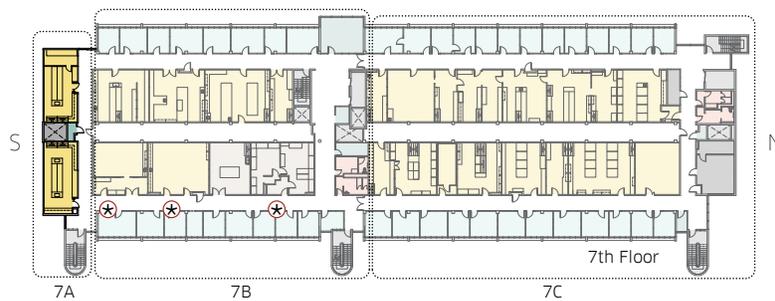
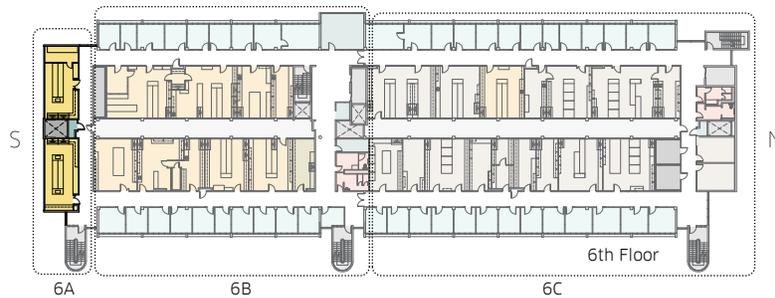
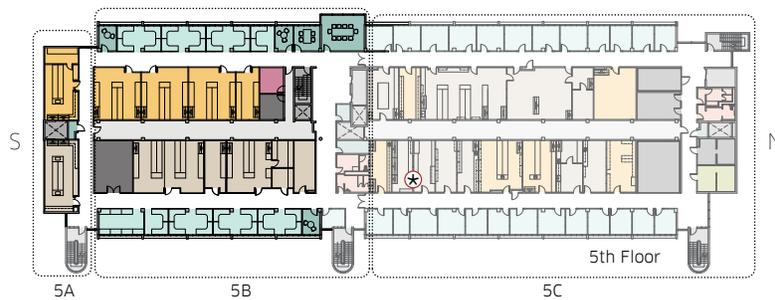
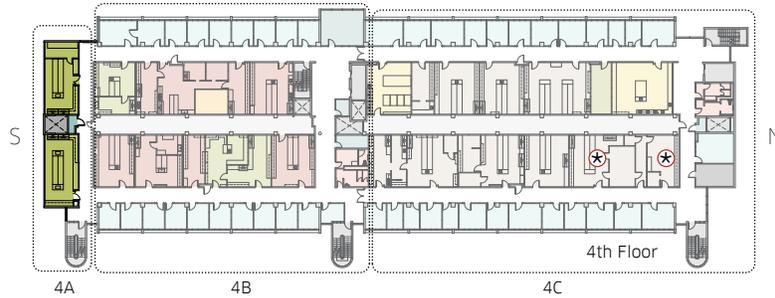


Legend

- WHERD
- WQMS
- ACRD
- DFO
- EOALRS
- MDSB
- EWHD
- Unassigned

Note: Existing Labs are represented in halftone

Denotes certified Biosafety/ Laboratories (BSL or CALA) that will require additional coordination for inclusion in phasing

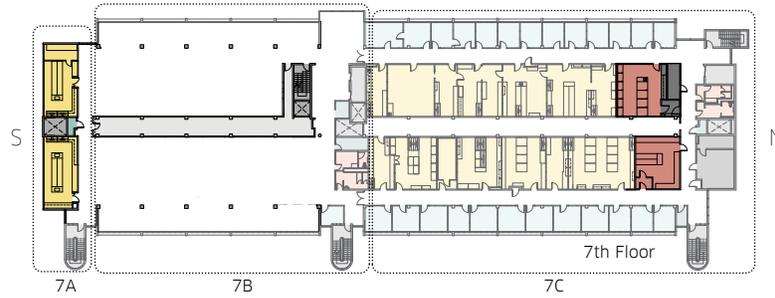
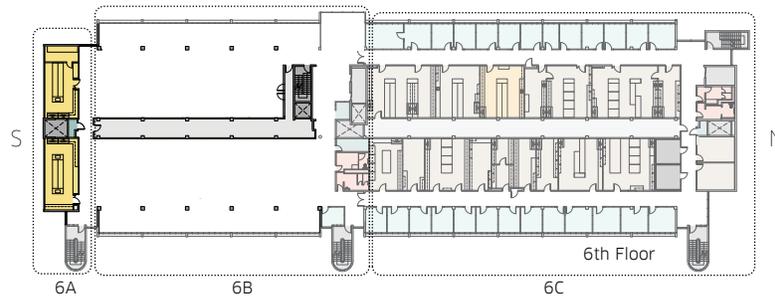
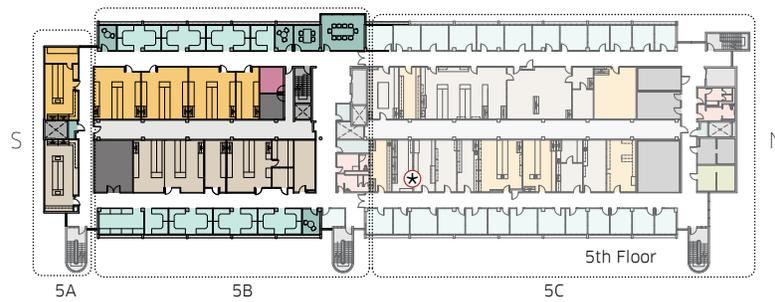
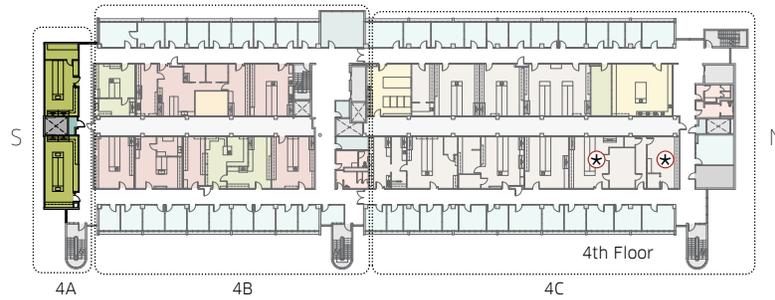


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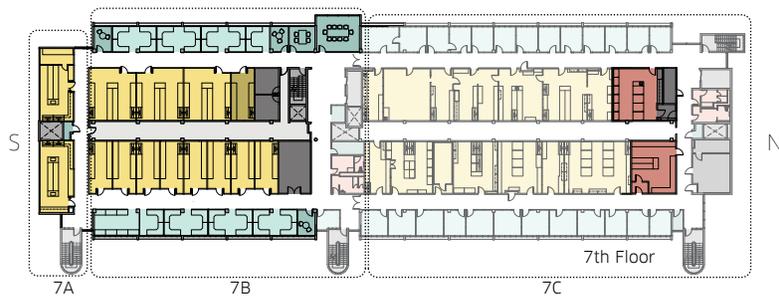
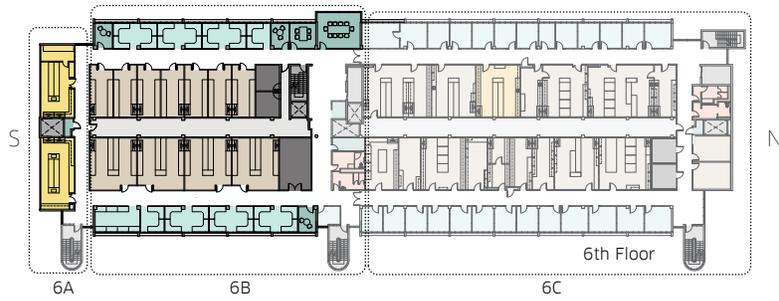
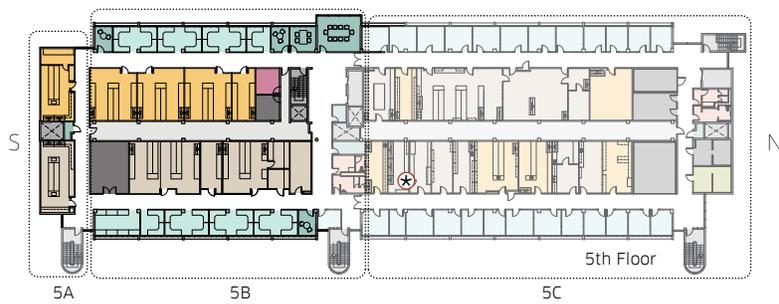
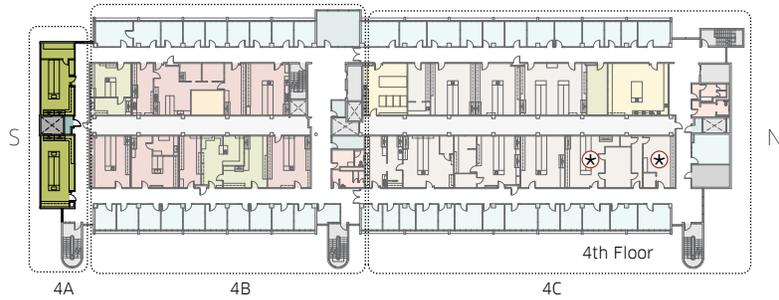


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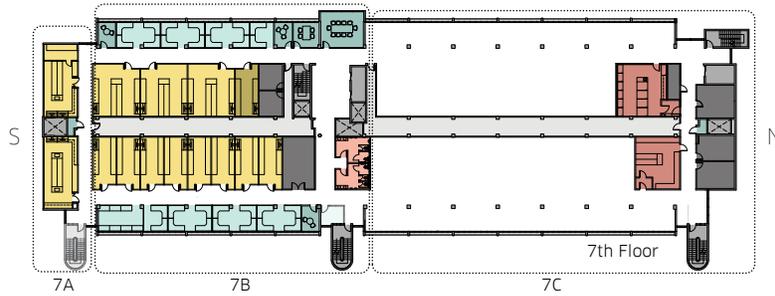
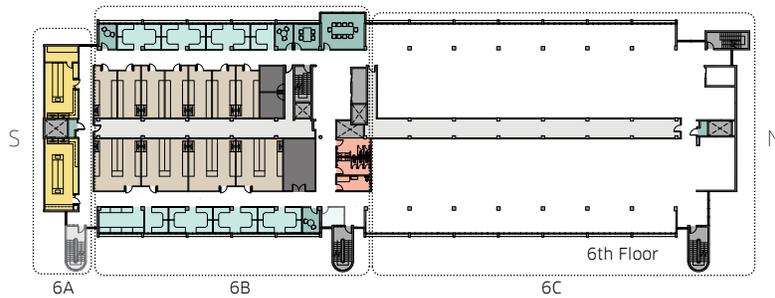
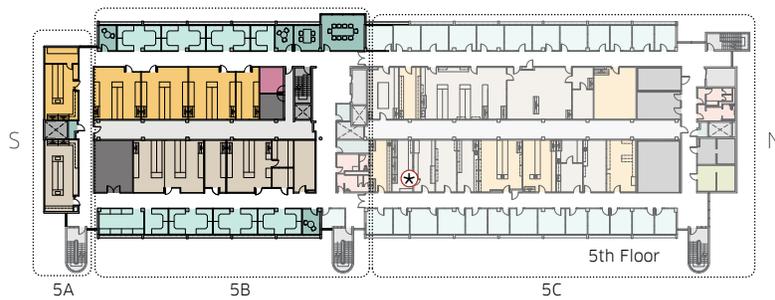
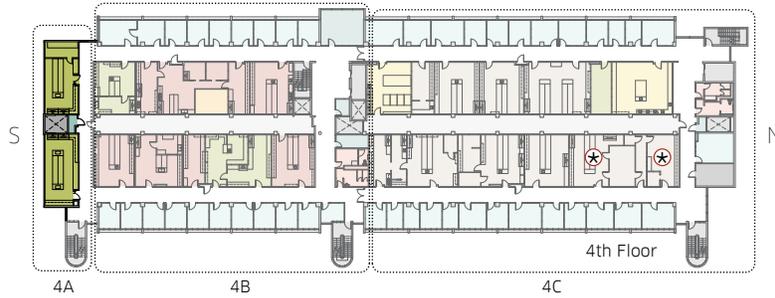


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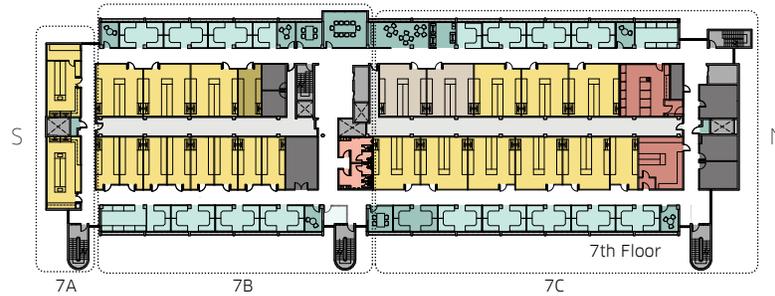
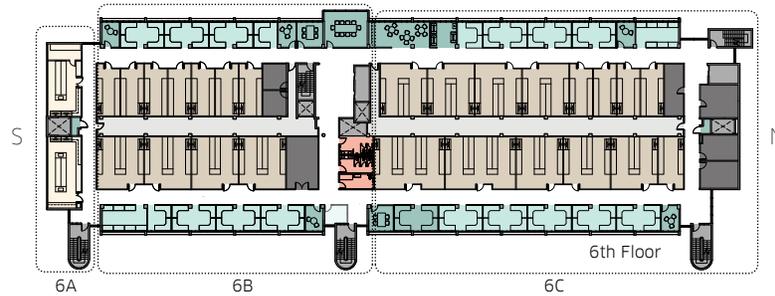
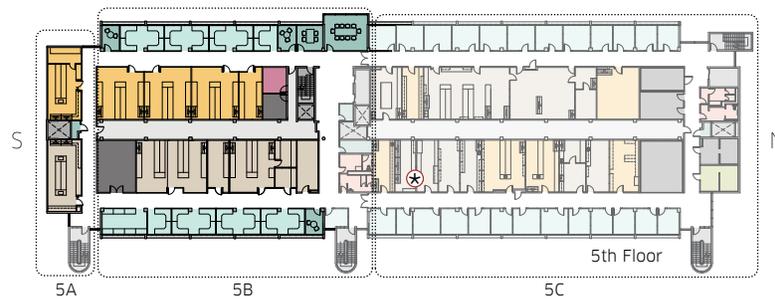
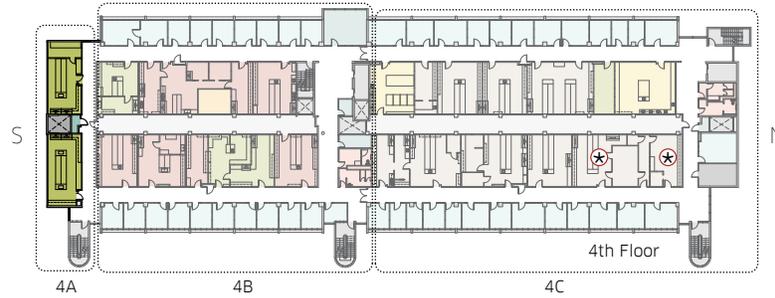


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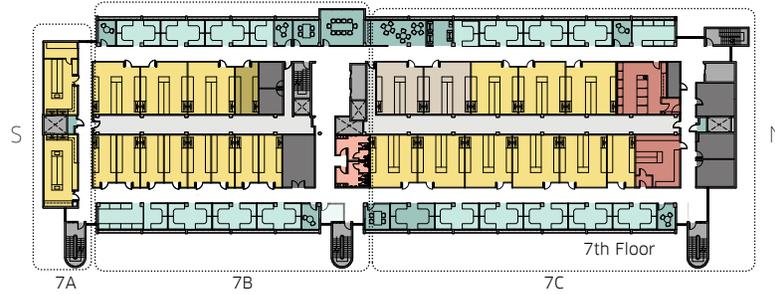
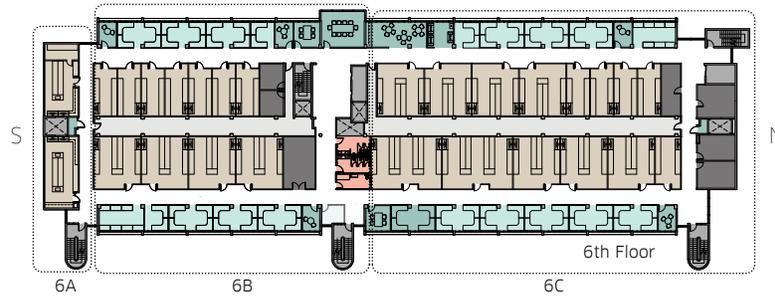
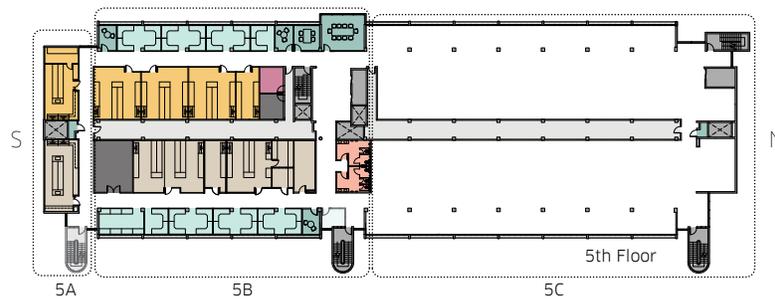
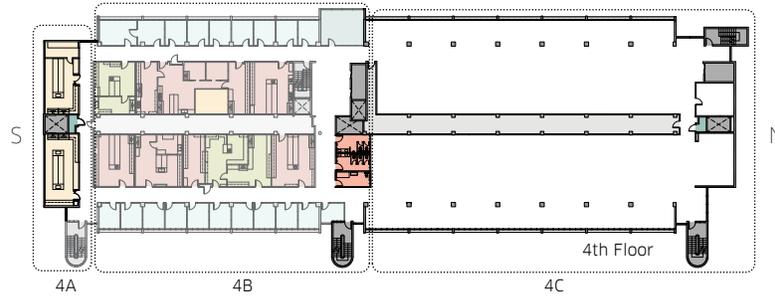


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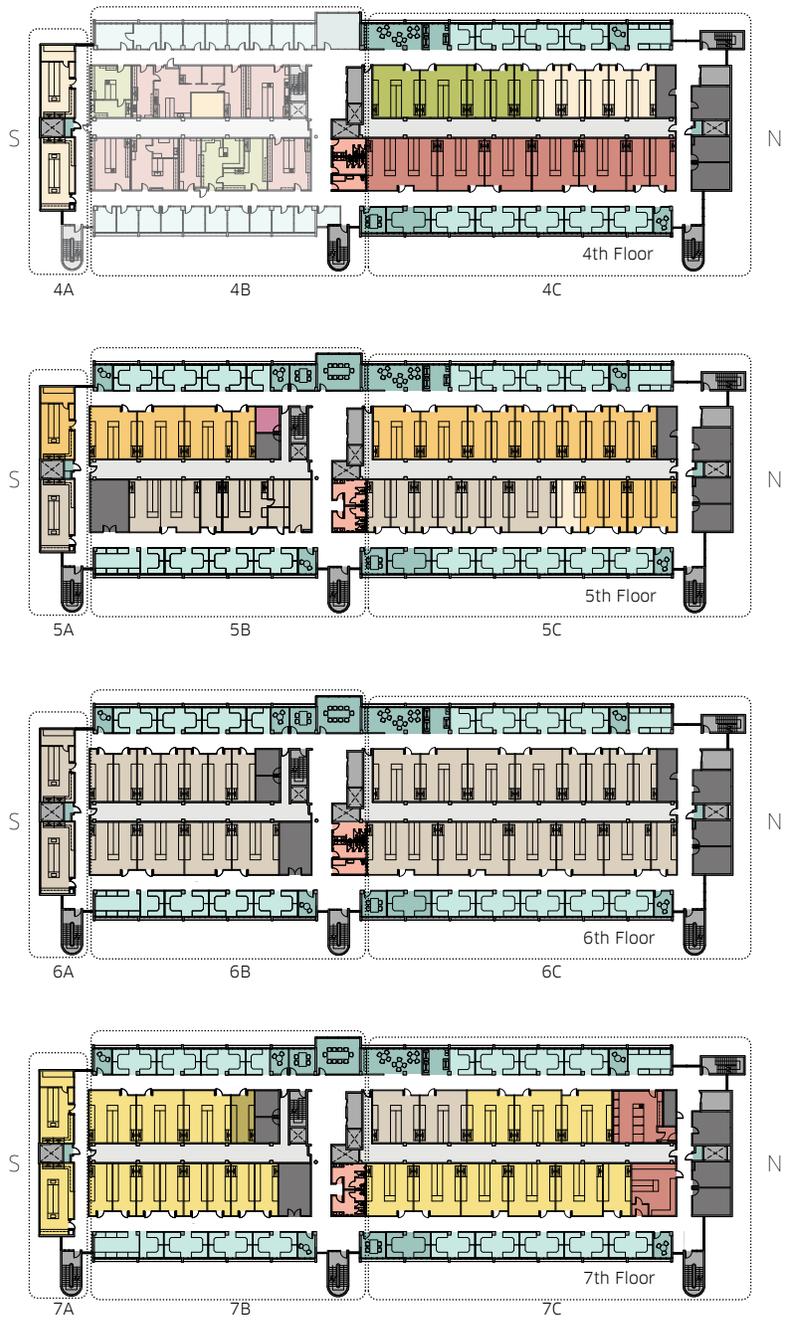
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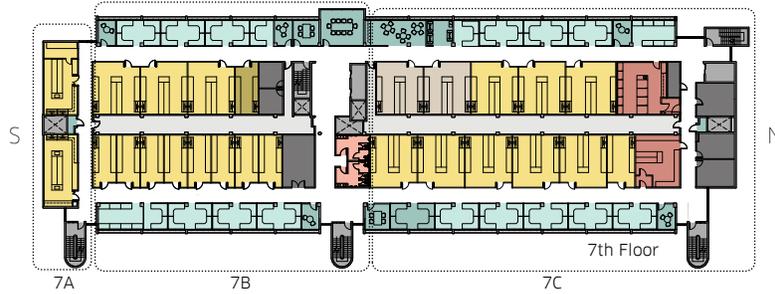
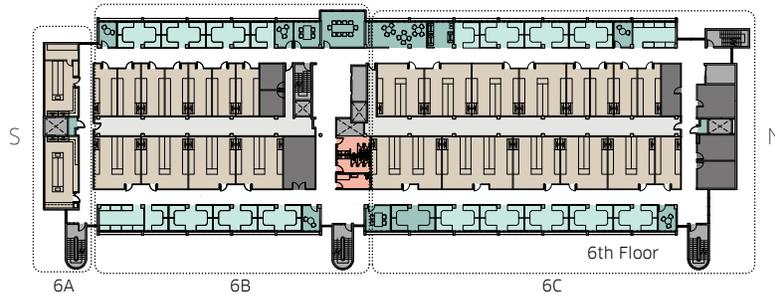
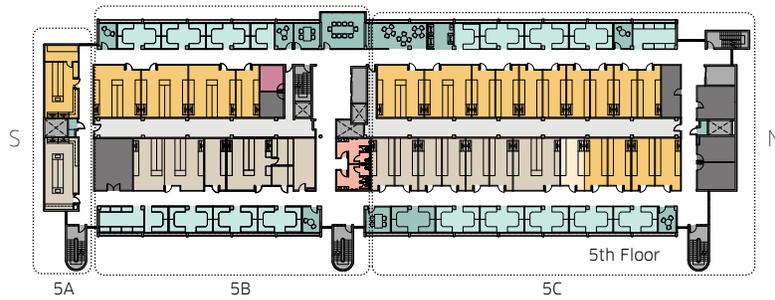
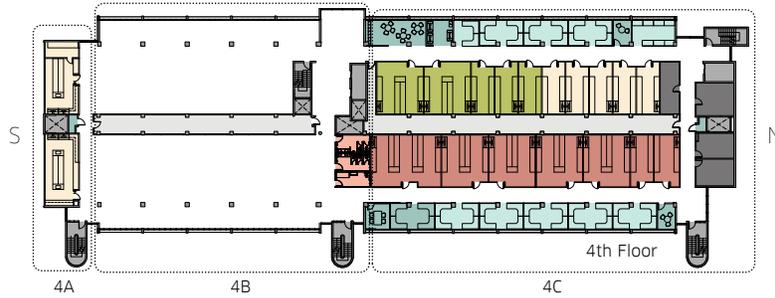
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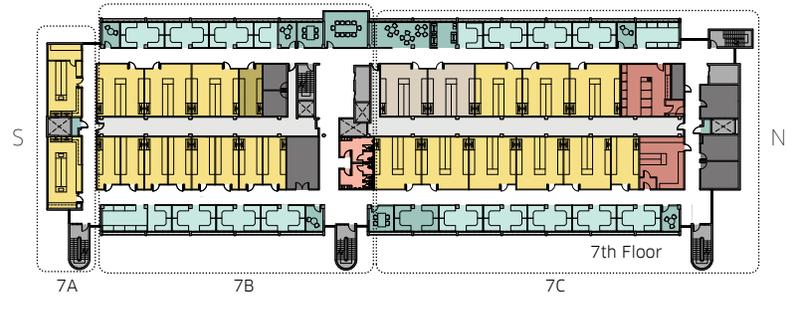
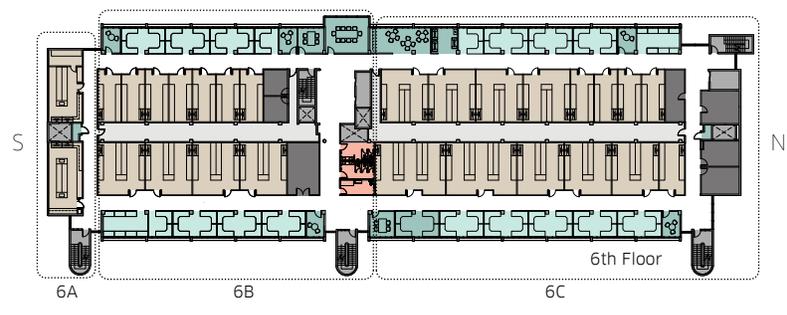
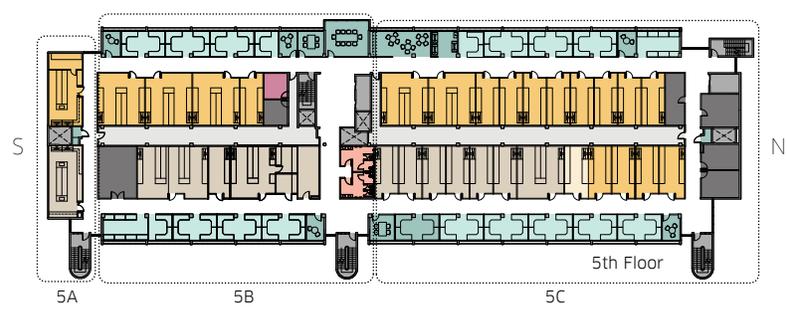
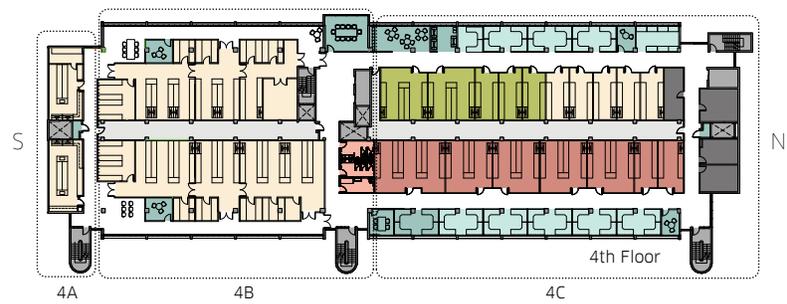
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