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Laboratory Relocation

Yale New Haven Hospital
New Haven, Connecticut

Presented by:

Vassilios I. Nicolaou, AIA, NCARB
Vice President, Senior Laboratory Architect
Peter Marone
Director, Laboratory Services

Presenters

Vassilios I. Nicolaou

Vice President, Senior Laboratory Architect at Karlsberger

- 48 years of professional experience
- 20 years at Karlsberger
- Laboratory planning and design expert
- The American Institute of Architects (AIA) member and award winner
- Biotechnology Association of Alabama member
- National Council of Architectural Registration Boards (NCARB) certified
- University of Alabama in Birmingham, School of Engineering, Instructor

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Presenters

Peter Marone

MBA, MT(ASCP) Director, Laboratory Services Yale-New Haven Hospital

- 25 years in the clinical laboratory at Yale-New Haven Hospital
- Began career in Clinical Microbiology
- POCT Coordinator
- QA/Compliance Coordinator
- Assistant Operations Director
- Currently responsible for general technical and administrative functions of the laboratory
- Adjunct Professor of Biomedical Science, Quinnipiac University, Hamden, CT.

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Yale-New Haven Hospital
Department of Laboratory Medicine

Learning Objectives

- Learn how to go from Department boxes to Open Lab environment
- Learn the benefits of eliminating the physical space constrains

Desired Outcomes

- Learn how to indentify and evaluate needs, deficiencies and conditions of your lab and how to improve your operations.

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Yale-New Haven Hospital
Department of Laboratory Medicine

Relocation

- Performs all clinical laboratory testing for Yale-New Haven Hospital, a 944 bed teaching hospital affiliated with the Yale University School of Medicine
- YNH Children's Hospital, YNH Psychiatric Hospital, Smilow Caner Hospital (10/09)
- 263 FTEs
- 5.6 million tests/year
- 3000 accessions per day

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YNHH Department of Laboratory Medicine

Current Configuration:

- Department boxes
- Laboratories located on 3 separate floors and one located completely off campus
- Departments divided on different floors
- 10 separate testing laboratories
- Current net square footage of 32, 629

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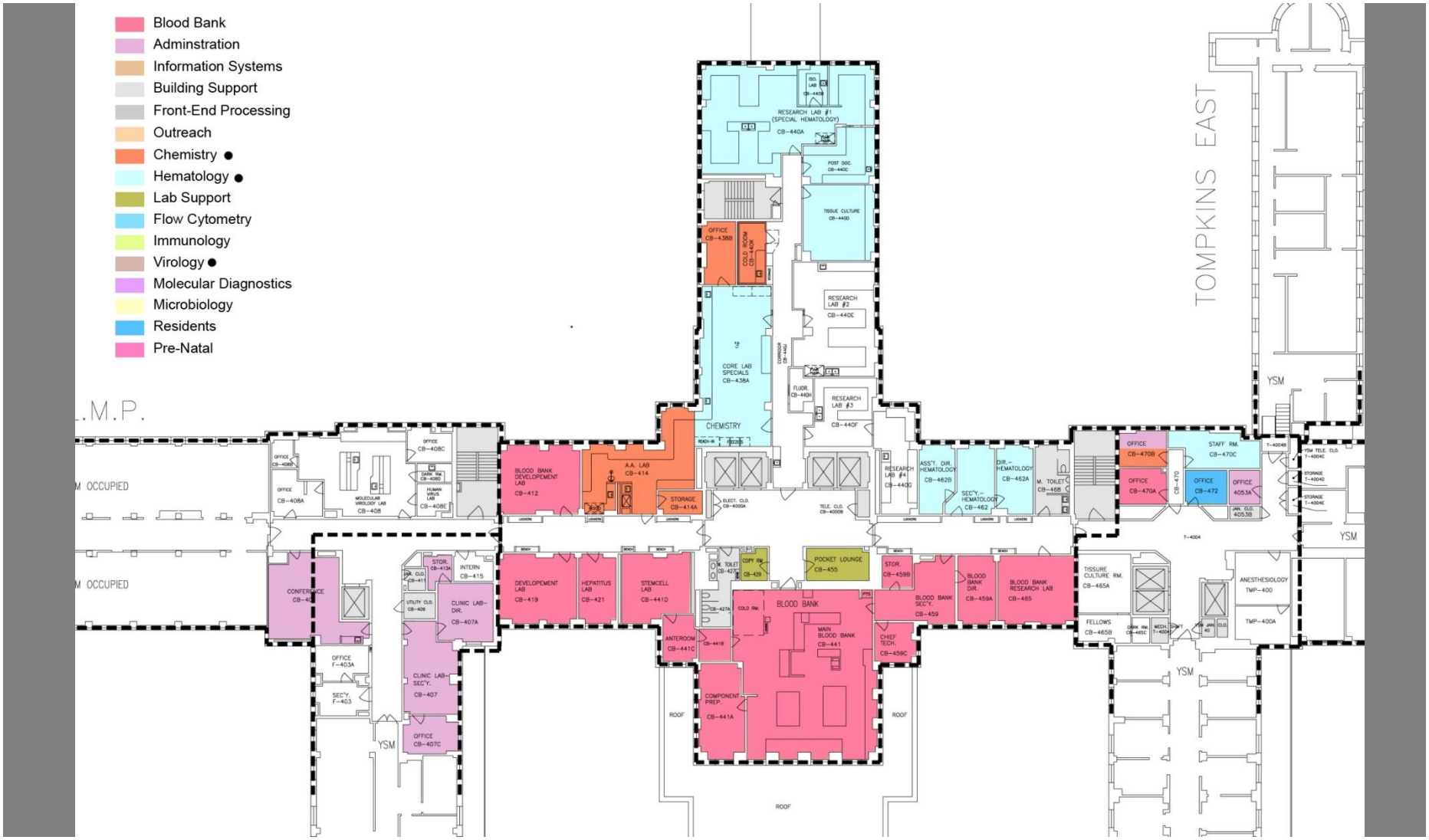
Existing Fourth Floor Functions



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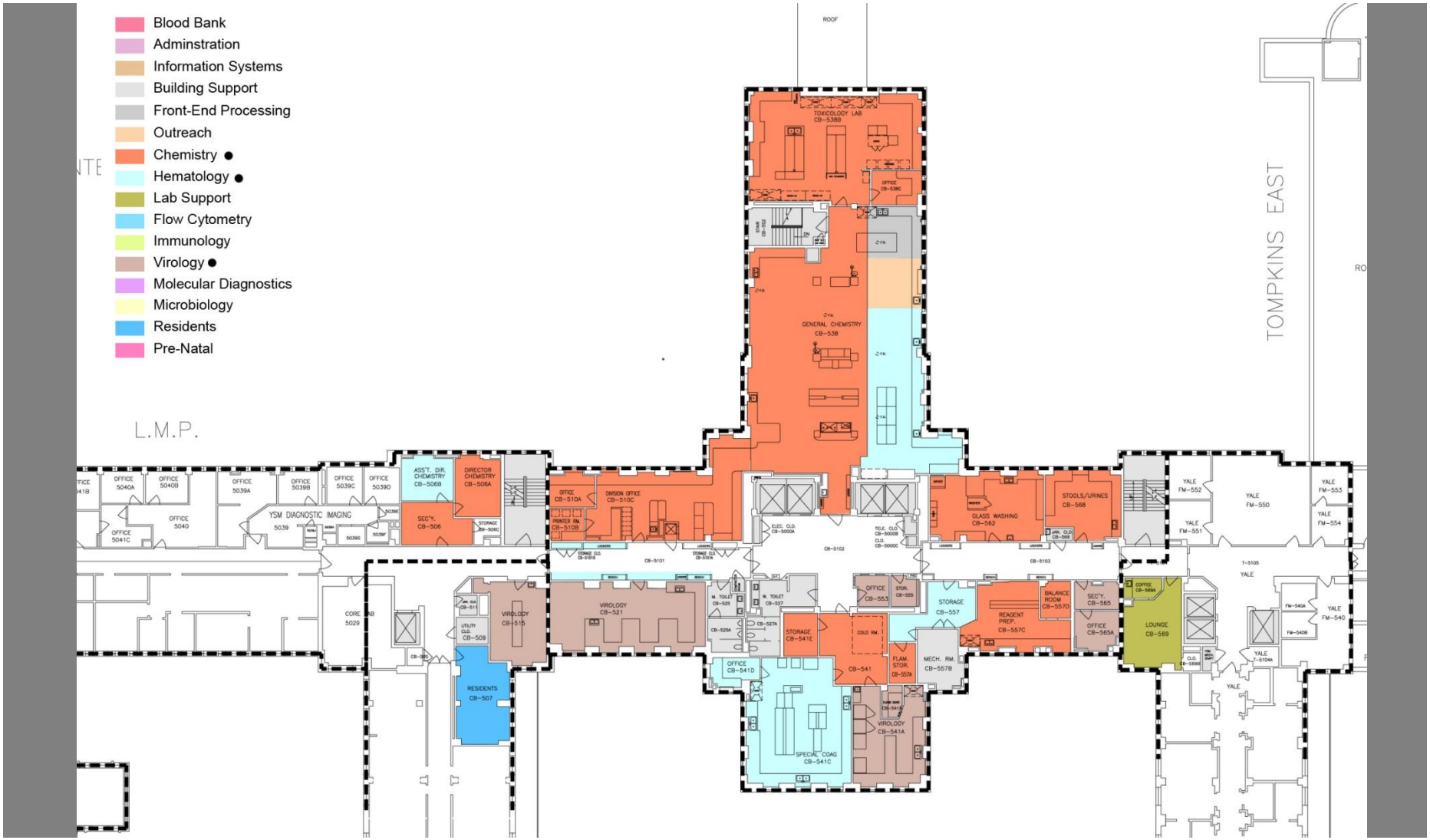
Existing Fifth Floor Functions



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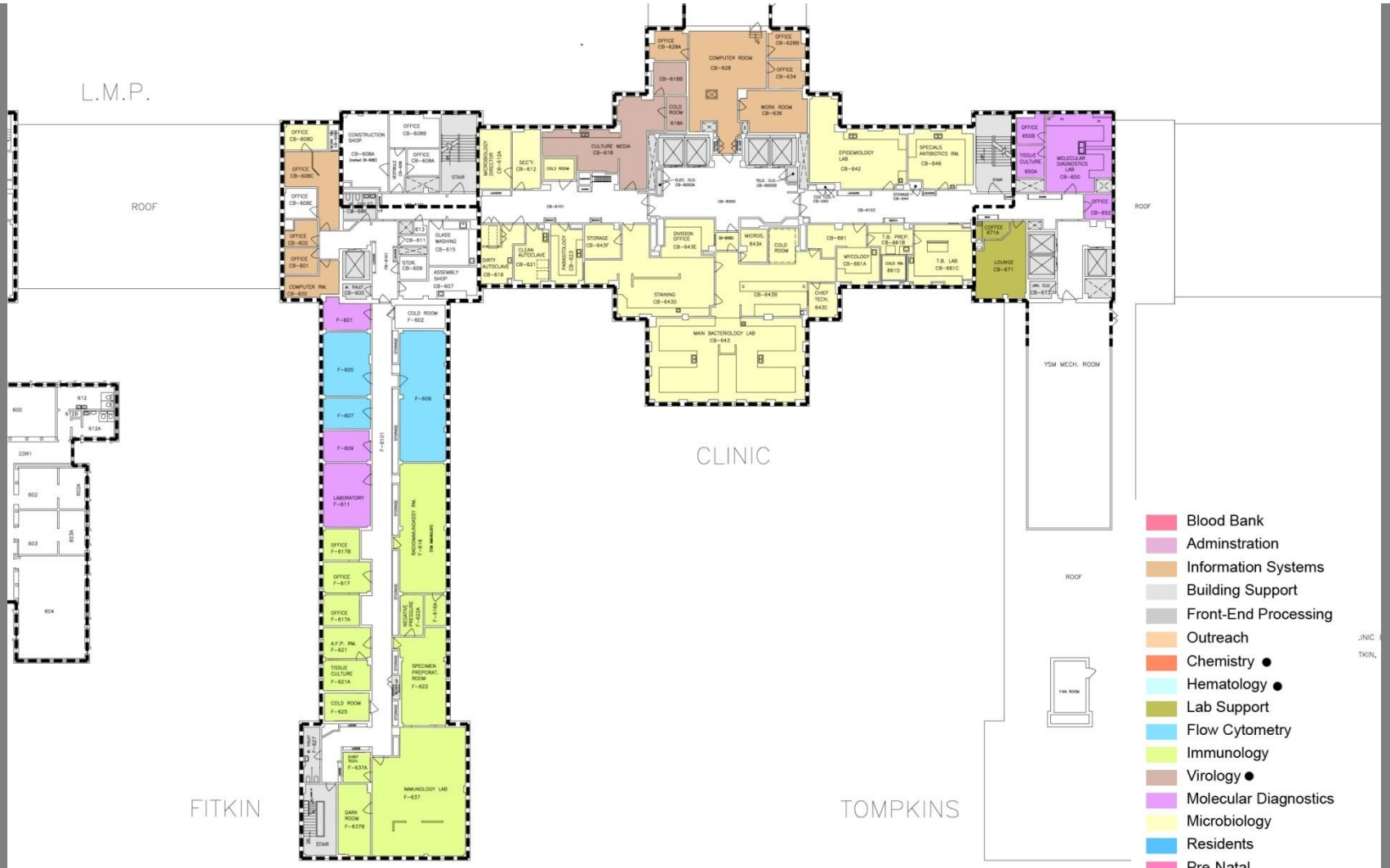
Existing Sixth Floor Functions



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Existing Seventh Floor Functions

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Images of Existing Facility
Hematology

Images of Existing Facility Chemistry

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Images of Existing Facility
Special Chemistry

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Images of Existing Facility Immunology

Images of Existing Facility Virology

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Images of Existing Facility
Molecular

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Images of Existing Facility Computer Room

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Images of Existing Facility Microbiology

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YNHH Department of Laboratory Medicine

Challenges of existing facility:

- Compartmentalized, small inefficient spaces
- Little or no interaction between different areas
- Compromised proximity between spaces
- Walking distances of between 100 -150 feet

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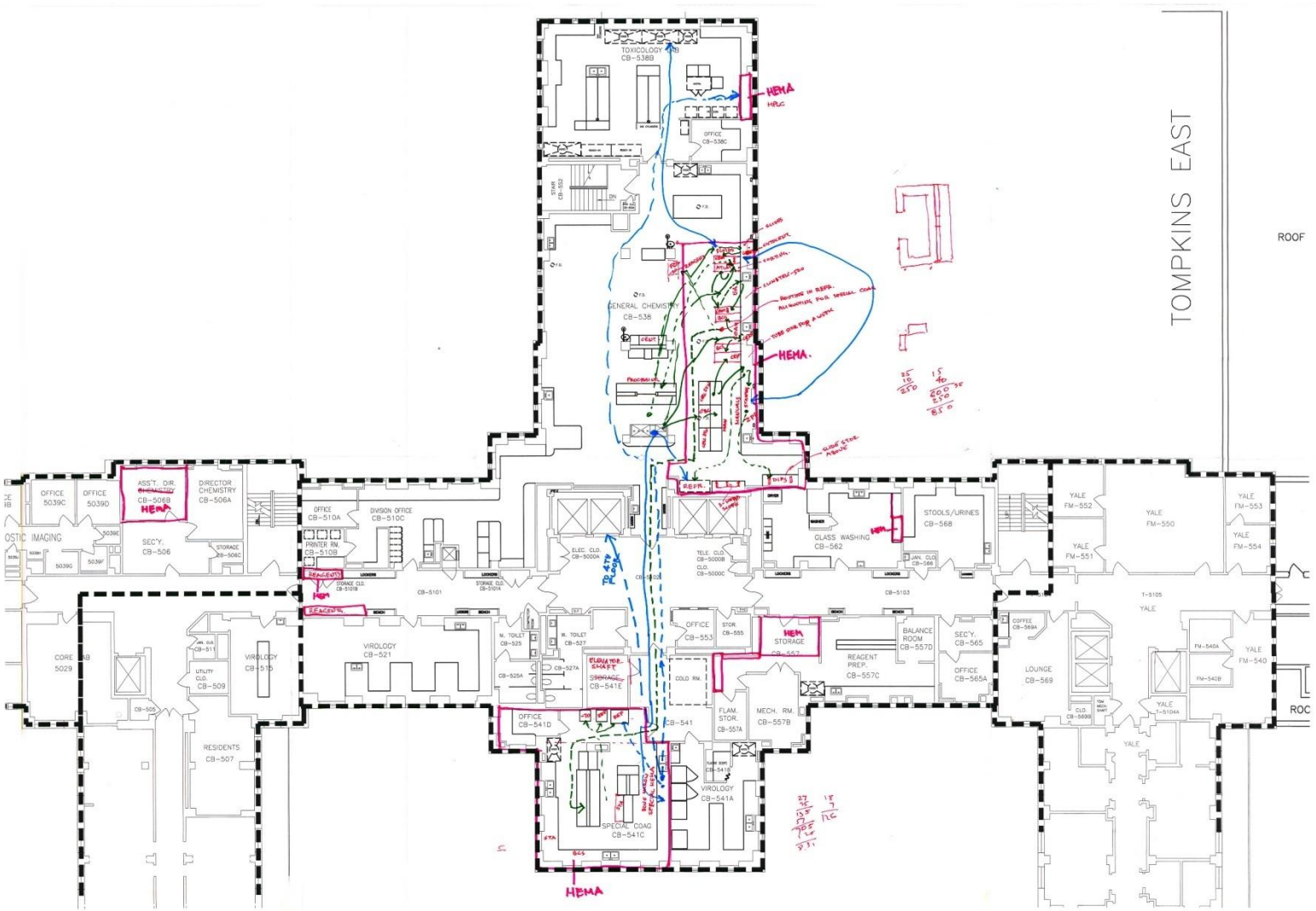
Existing Fifth Floor Travel Distances



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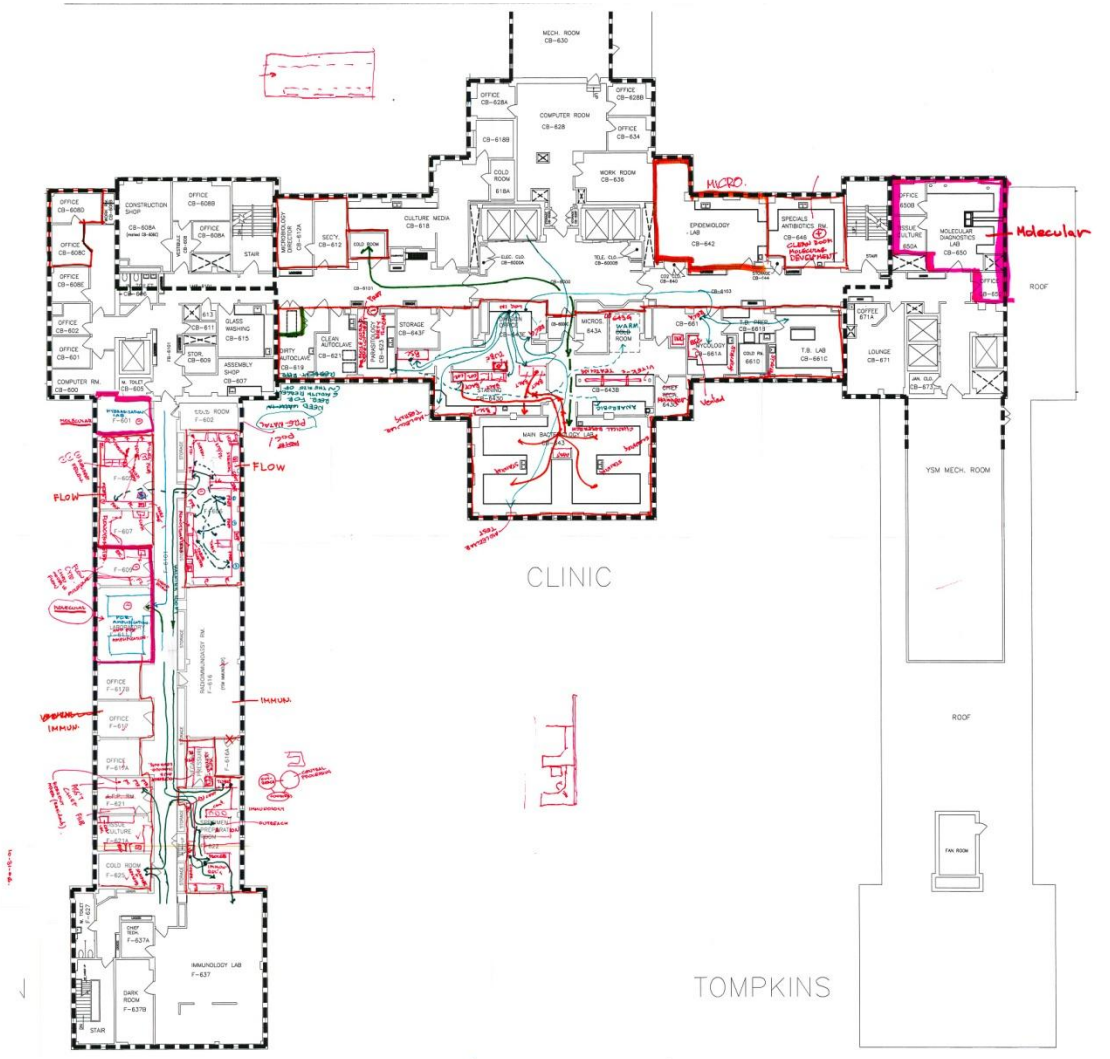
Existing Sixth Floor Travel Distances



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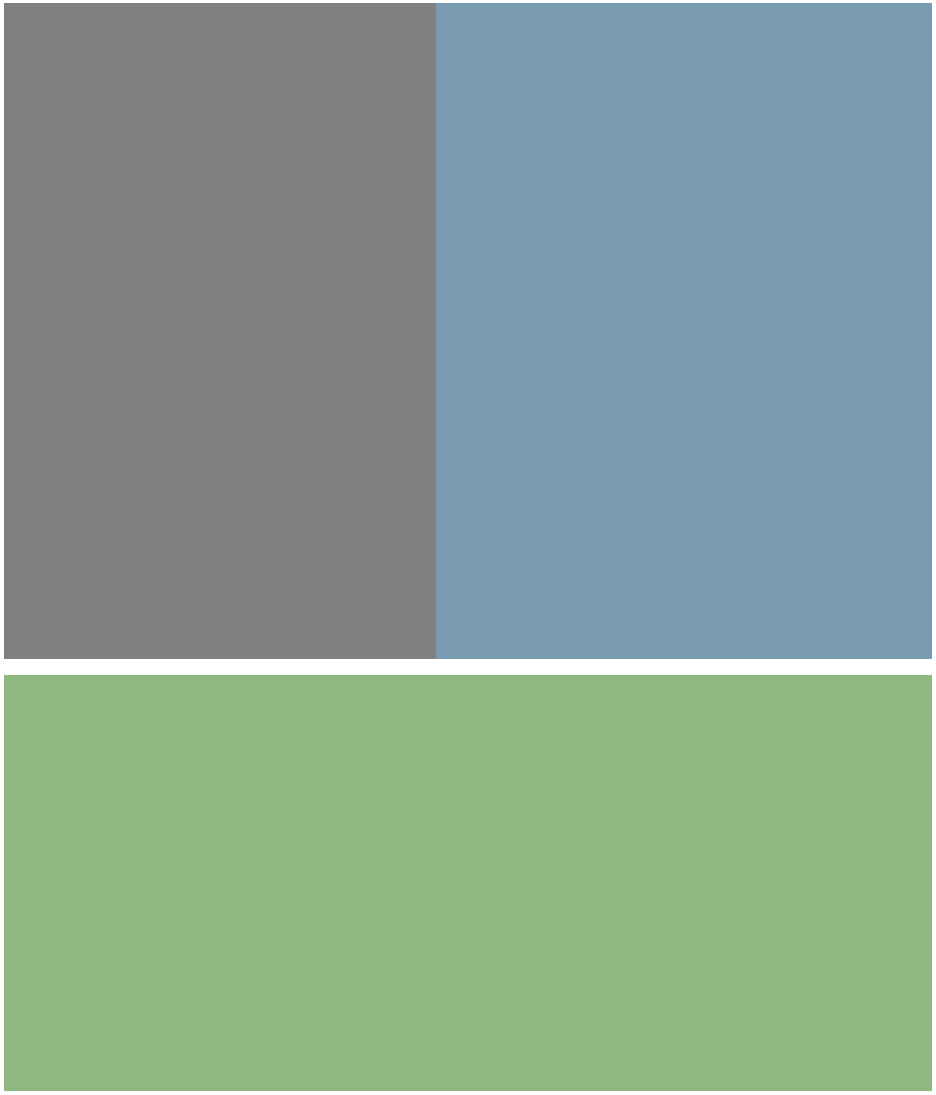
History of Six Sigma at YNHH
Start of Six Sigma

- Green Belt Training began in 2001 through partnership with GE
- Year Two appointed 4 part time Black Belts, trained 17 additional Green Belts.
- Engagement of senior management through 4 days comprehensive Executive Training sessions.
- Training and other performance management integrated into Health System Class offerings.



History of Six Sigma at YNHH
Present Status

- Deployment to:
  - Mission Critical Business Plan initiatives, Patient safety, regulatory, throughput, clinical quality
  - Optimize Lean applications
  - Departmental Specific Initiatives
- Regular updates/report outs to Senior Leadership

- Deployment overseen by Steering Committee and Master Black Belts
  - 87 Green Belts
  - 10 Black Belts/Master Black Belts
  - 157 Lean Trained

Lean

- Use an open lab concept to promote communications between staff and allow for flexibility and future changes.
- Create a physical environment with people in mind
- Design with the third shift in mind
- Plan for future expansion
- Provide sufficient storage space

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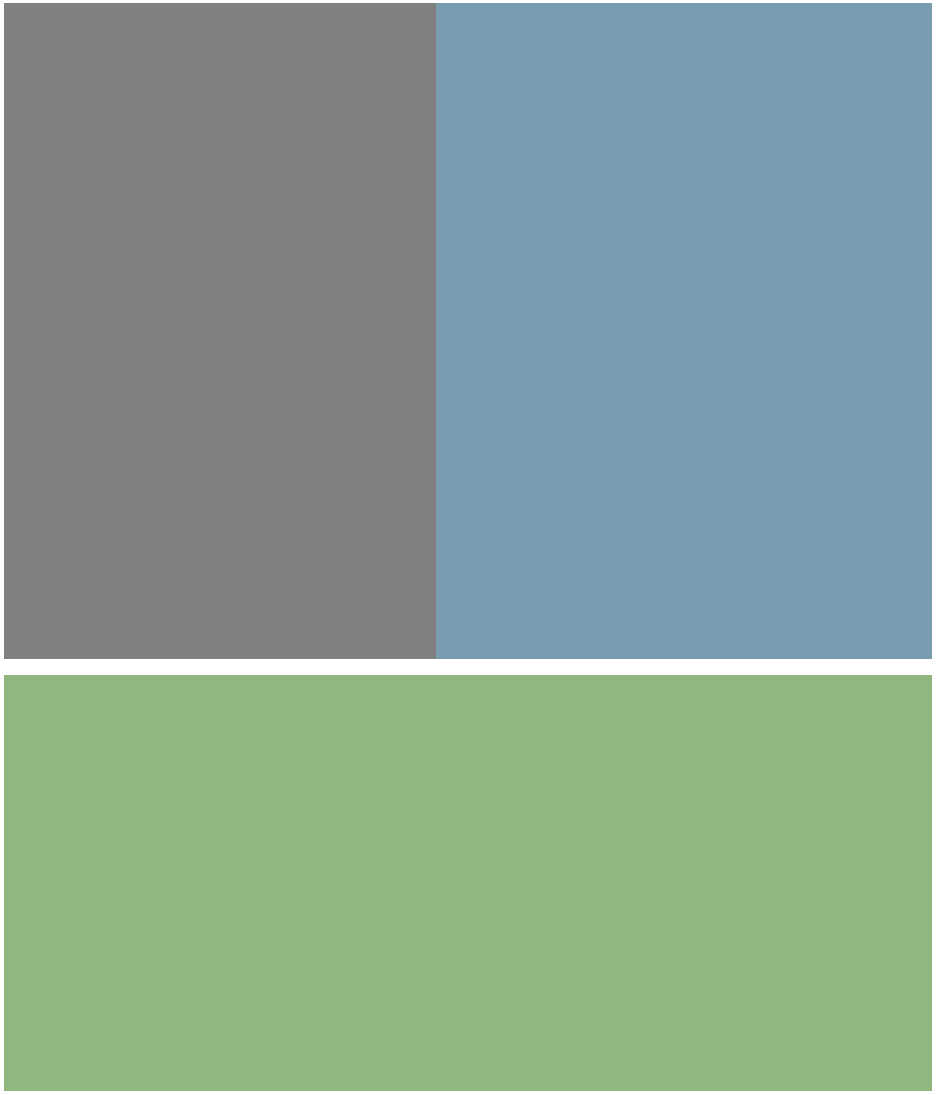
Planning Team

- Medical Directors
- Director of Laboratory Services
- Laboratory Managers
- Medical Technologists
- In-house Master Black Belt
- YNHH Facilities Group Project Manager
- Karlsberger Laboratory and Technology Team
- Interior Design Consultant



User Group Involvement
Visioning Sessions

User Group Involvement
Visioning Sessions

PROJECT GOALS

To CREATE . . .

A laboratory that is flexible and adaptable and can grow into the next decade;

A DESIGN . . .

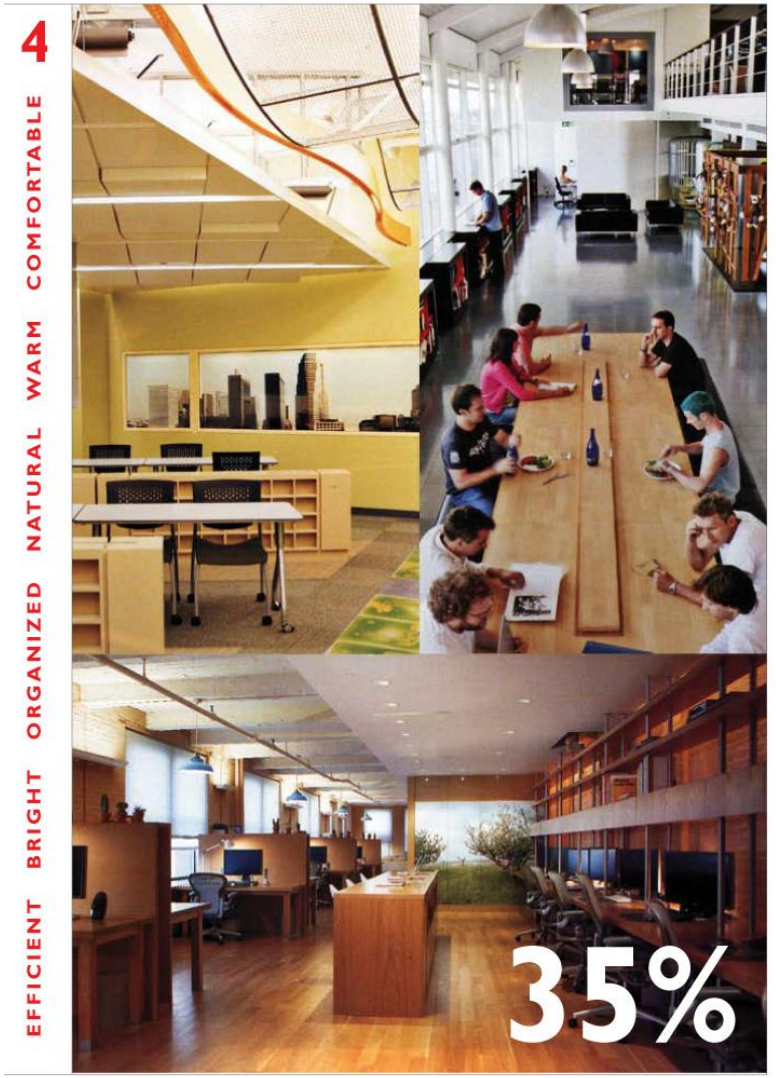
That creates a sense of unity as a department while maintaining each laboratory section's feeling of individuality and pride in their own work;

A SPACE . . .

That is ergonomically appropriate and aesthetically pleasing

FOR STAFF . . .

To have a comfortable work environment, which prospers productively.



At **STATION 4** staff were asked to identify individual needs, team needs, and departmental needs that must be met in order for Yale New Haven Hospital Laboratory Medicine to implement best practices.

Again and again, staff members listed ADEQUATE WORKSPACE as a critical need for individuals, the team, and the department. They explained how the current space no longer supports the growing laboratories. One respondent remarked, "I am in a consolidated lab and now we have no space. Essentially two labs were squeezed into one." For individual workstations, staff members requested "ample desk space", "enough space to call your own", and "enough space to work without being in each others way." The cramped conditions have elevated stress levels leaving one respondent feeling as a member of a "small pack," or for another as a "mouse in a maze." Beyond the individual workstation, more space must be allotted for circulation paths. One participant wrote, "I need a reasonable amount of space so I am not bumping into others constantly or having to go around in a circuitous route to avoid groups of people standing where I need to go."

EFFICIENT WORKFLOW also emerged as a need in all three areas. Staff members called for streamlined processes and the ability for greater automation. They called for new measures that expedite sample processing. Others explained the inefficiencies that result from laboratories distanced too far from each other, particularly from the main laboratory.

Laboratory growth has undoubtedly put a strain on space dedicated for storage. Staff listed ADEQUATE STORAGE SPACE as a critical need for both the individual and the team. Many people envisioned a "clutter-free" environment with "boxes and papers out of sight." One respondent wanted to avoid having "papers piled high and boxes piled higher. Others requested proper storage for equipment to ease circulation and to prevent the space from "looking like a warehouse."

Individuals and teams need UPGRADED TECHNOLOGY in order to do their best work. Many people complained about the computer systems and the lack of technical support when problems arose.

Laboratory staff listed EFFECTIVE COMMUNICATION as a need for teams and the department. This was bolstered by the high number of people calling for GREATER TEAMWORK and EFFECTIVE LEADERSHIP, the top responses in the team and department categories. In their own words, staff expressed a need for "open communication", "better methods of communication", and "more feedback." A handful of people suggested providing conference rooms or quiet meeting rooms away from noisy equipment.

INDIVIDUAL	ADEQUATE WORK SPACE	26:45	
	ERGONOMIC FURNITURE	14:45	
	CLEAN ENVIRONMENT	14:45	
	ADEQUATE LIGHTING	08:45	
	IMPROVED AIR QUALITY	08:45	
	UPGRADED TECHNOLOGY	08:45	
	ADEQUATE STORAGE SPACE	07:45	
	EFFICIENT WORKFLOW	06:45	
	QUIET	06:45	
TEAM	GREATER TEAMWORK	17:45	
	ADEQUATE WORKSPACE	09:45	
	UPGRADED TECHNOLOGY	07:45	
	EFFICIENT WORKFLOW	06:45	
	ADEQUATE STORAGE	06:45	
	EFFECTIVE COMMUNICATION	05:45	
DEPARTMENT	EFFECTIVE LEADERSHIP	15:45	
	EFFICIENT WORKFLOW	07:45	
	ADEQUATE WORKSPACE	06:45	
	EFFECTIVE COMMUNICATION	06:45	

Note: UNDERLINED issues appear in all categories.
RED HIGHLIGHTED issues appear in two categories.

STATION 2 asked laboratory staff to list three things that must happen in the work environment in order to have a GREAT DAY.

Participants listed FRIENDLY ATMOSPHERE as the number one factor contributing to an enjoyable day at work. They appreciated supportive and understanding colleagues, enjoying days in which there were no negative confrontations between coworkers and supervisors. Valued members of the staff come to work with cheerful dispositions and positive attitudes. For one participant, a great day is one in which she/he "works hard, but laughs a lot." Related responses, described a great day as having NO CONFLICTS. As in the words of one respondent, there were either "no problems, or a problem was solved."

The second most popular response was ACCOMPLISH A TASK. Most participants felt very satisfied crossing off an item from a To-Do List. In their own words, a great day involved "completing an assignment I set for myself"; "feeling that I've accomplished what I wanted to in the time allotted"; "meeting some challenge and accomplishing my task." Additionally, staff members appreciated days in which they had MANAGEABLE WORKLOADS. One respondent defined a manageable workload as "enough to keep me busy and challenged but not so much that it is near impossible to accomplish without mistakes."

Third, a great day at work contained NO INTERRUPTIONS. Most people identified ringing telephones as a major distraction.

EFFICIENT WORKFLOW and PROPERLY FUNCTIONING EQUIPMENT received an equal number of votes. On a great day, staff members do not have to overcome frustrating inefficiencies; in the words of one staff member, a great day must have "no bottle-necks." Many attributed delays to unreliable instruments and equipment including the computer system.

A great day at work was a day when people did not go home nursing a crick in their neck. ERGONOMIC FURNITURE that the work environment could provide included:

- Fatigue mats for areas in which staff stand for long periods of time.
- More comfortable task chairs.
- Workstations that accommodate body proportions.

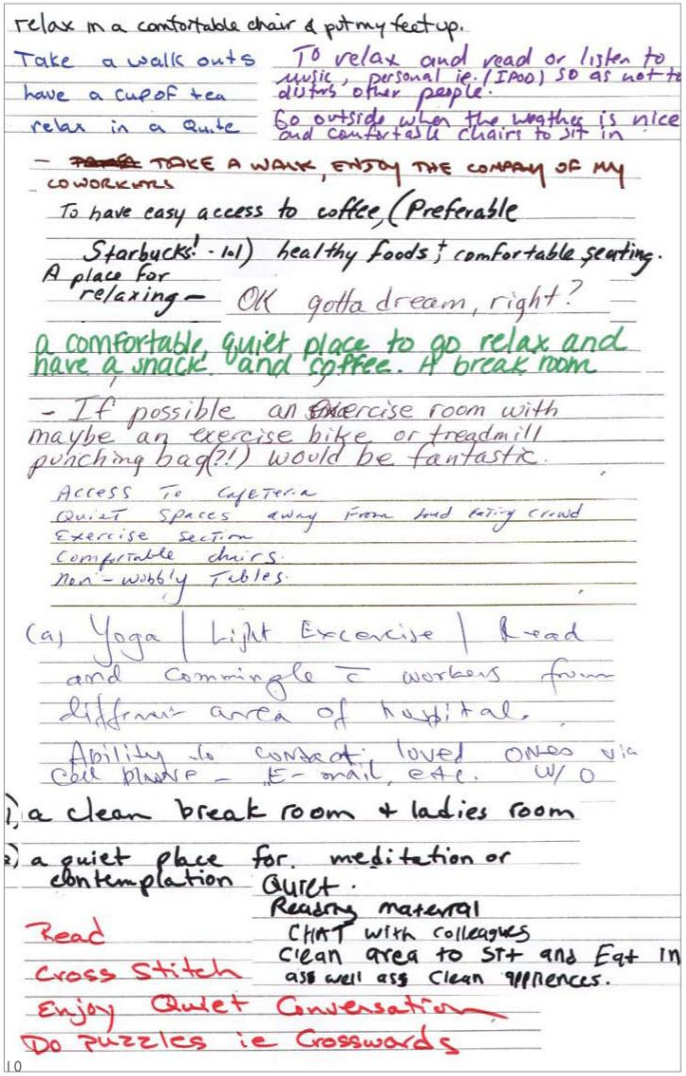
One respondent wrote that she wished for a workstation in which she/he did not have to "stand on stools or kneel on floors to accomplish work and reach supplies."

ADEQUATE WORKSPACE, ACCESSIBLE SUPPLIES, and RECOGNITION OF A JOB WELL DONE received equal attention. Overcrowding is contributing to greater "feelings of tension and confinement." Others admitted to becoming quite frustrated when supplies were not "close-at-hand." A handful of people wished that their efforts were recognized more frequently.

HELPED SOMEONE/MADE A DIFFERENCE, SATISFIED WITH THE QUALITY OF WORK, and ENJOYABLE BREAK also received the same number of votes. In the words of one respondent, on a great day she/he had "the feeling that my work helped somebody." Another wrote, "I must feel useful and needed; what I did was important." Others emphasized the quality of their work, taking pride when they completed tasks "efficiently yet meticulously." Finally, another contributing factor to a great day was whether or not staff members were able to make the most of their break time.

Ratios indicate the number of responses to the total number of participants.

FRIENDLY ATMOSPHERE	24:45	||||||||||||||||||||||||
ACCOMPLISH A TASK	15:45	||||||||||||||||
NO INTERRUPTIONS	12:45	||||||||||||
EFFICIENT WORKFLOW	11:45	||||||||||||
PROPERLY FUNCTIONING EQUIPMENT	11:45	||||||||||||
ERGONOMIC FURNITURE	08:45	||||||||
MANAGEABLE WORKLOAD	08:45	||||||||
NO CONFLICTS	07:45	|||||||
ADEQUATE WORKSPACE	06:45	||||||
ACCESSIBLE SUPPLIES	06:45	||||||
RECOGNITION OF A JOB WELL DONE	06:45	||||||
HELPED SOMEONE/MADE A DIFFERENCE	05:45	|||||
SATISFIED WITH THE QUALITY OF WORK	05:45	|||||
ENJOYABLE BREAK	05:45	|||||


relax in a comfortable chair & put my feet up.
Take a walk outs — To relax and read or listen to music, personal ie. IPOD) so as not to disturb other people.
have a cup of tea
relax in a quite — Go outside when the weather is nice and comfortable chairs to sit in.
- ~~PROPER~~ TAKE A WALK, ENJOY THE COMPANY OF MY COWORKERS
To have easy access to coffee, (Preferable Starbucks! - lol) healthy foods & comfortable seating.
A place for relaxing — OK gotta dream, right?
a comfortable quiet place to go relax and have a snack, and coffee. A break room
- If possible an exercise room with maybe an exercise bike, or treadmill punching bag(?!) would be fantastic.
Access To Cafeteria
Quiet Spaces away From loud eating crowd
Exercise Section
Comfortable chairs
Non-wobbly Tables
(a) Yoga | Light Excercise | Read and Commingle w workers from different area of hospital.
Ability to contact loved ones via Cell phone - E-mail, etc. w/ O
1) a clean break room + ladies room
2) a quiet place for meditation or contemplation Quiet.
Reading material
Chat with colleagues
Clean area to sit and Eat in as well ass Clean appliances.
Read
Cross Stitch
Enjoy Quiet Conversation
Do puzzles ie Crosswords
10

Stress-reduction was the topic at **STATION 3** where participants completed the statement, "During break time, I would like . . ."

The majority of people desired more ACCESSIBLE FOOD AND DRINK. Many of the respondents wasted precious break time in search of food service. A handful of people expressed the need for healthier alternatives to vending machine food such as "nuts, fresh fruit, and veggies." Others recommended that coffee and tea be made available.

Results indicated that most people wished to spend their break RELAXING. Especially on stressful days, staff members relied on breaks to take a necessary "sigh of relief," resting both "mind and body." One respondent wrote, "During break time, I would like to recharge my batteries." Another person desired "a quiet place for meditation or contemplation" such as a chapel. To many, a relaxing environment was a QUIET ENVIRONMENT. They requested that spaces be reserved for quiet activities, separate from social spaces and away from ringing telephones.

For one staff member, an enjoyable break involved "sitting in a comfortable chair and putting my feet up." The surveys indicated that the availability of COMFORTABLE SEATING OPTIONS contributed to a satisfying break. Some simply wished for softer chairs and sofas; others dreamed of recliners and massage chairs. Naturally, many people wished to sit and READ the newspaper, a magazine, or a good book. Limited noise and appropriate lighting were listed as important environmental conditions. The ability to EXERCISE received equal attention, with many expressing a desire to walk. One respondent suggested yoga or light exercise. Others had grander ideas envisioning an exercise room equipped with a treadmill, stationary bike, and even a punching bag.

Many people viewed their breaks as an opportunity to SOCIALIZE with coworkers. Similar to those seeking quiet, socializers desired their own space in which they could freely chat and laugh with colleagues at tables large enough to accommodate a number of people. One respondent expressed that she/he would like to "commingle with workers from different areas of the hospital."

CONCLUSION

Survey responses indicate that laboratory staff genuinely want to perform their jobs better, yet experience difficulty overcoming current environmental conditions. Demanding workloads cause stress, but these feelings are compounded by a number of design issues such as overcrowding, clutter and disarray, uncomfortable furniture, and noise. Furthermore, it appears that for many, break time does not offer the necessary respite.

Many of the issues brought forth by laboratory staff relate to new WORK REQUIREMENTS. The programming design phase currently underway by Karlsberger will help determine appropriate space requirements and adjacencies. This updated space analysis will address staff concerns dealing with:

- Adequate Workspace
- Adequate Storage Space
- Circulation
- Efficiency - Adjacency to supplies/equipment; upgraded technology; lean workflow; clarity of front end and specimen flow

Another category of issues defined by laboratory staff concern achieving the appropriate DEGREE OF INTERACTION/PRIVACY. This category contains the following issues:

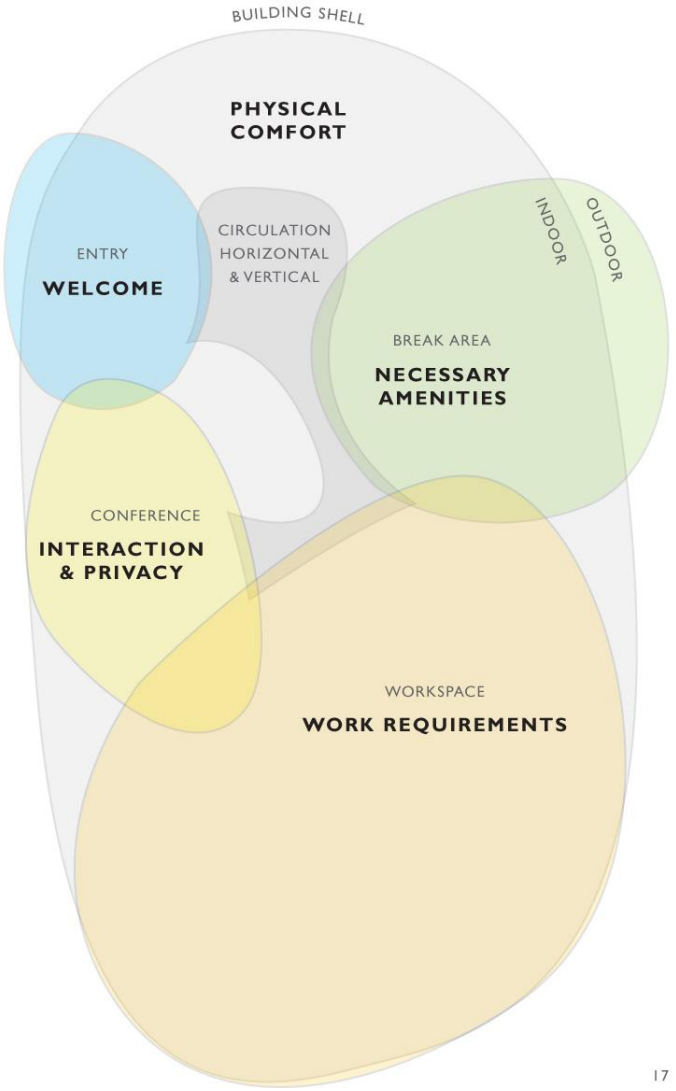
- Acoustics - quiet work environment, equipment noise, phone calls, areas for effective communication
- Communal Spaces - conference rooms, areas for effective communication
- Social Spaces - break areas

The next category addresses PHYSICAL COMFORT and includes the following issues:

- Air Quality
- Lighting - natural light, appropriate light levels
- Cultural Organization - clean, organized workspaces
- Ergonomic Furniture - task chair, counter heights, reachable storage, computer accessories

The final category, NECESSARY AMENITIES, outlines needs that most often arise during break time such as:

- Accessible food and drink
- Variety of break experiences - quiet, interactive, outdoor
- Appropriate Furniture - comfortable seating, variety of table sizes
- Appliances - microwave, refrigerator, ice machine
- Restrooms - quantity, proximity



New Design

- Maximize productivity/minimize TAT
- Minimize walking distances
- Improve visibility to access the operations
- Improve communication and interaction between staff
- Flexibility to accommodate advanced technologies
- Provide a quality work environment

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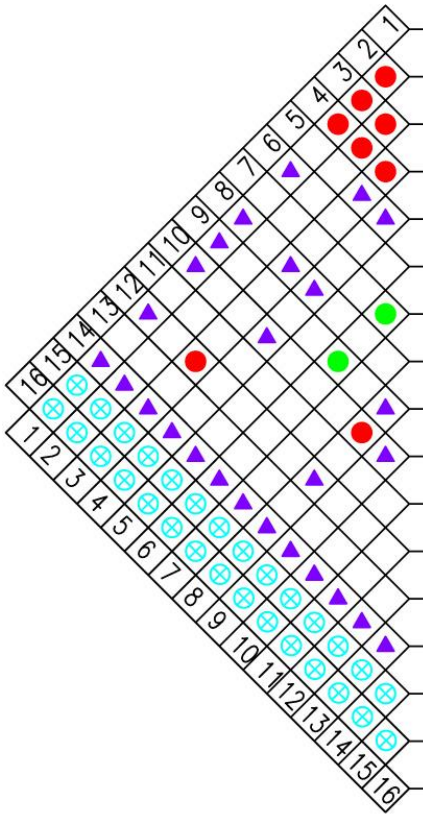
Proximity Matrix



		NSF
FRONT END	1	3,240
OUTREACH	2	1,281
CHEMISTRY	3	4,790
HEMATOLOGY	4	5,646
SPECIAL CHEMISTRY	5	3,431
MICROBIOLOGY	6	6,415
VIROLOGY	7	4,877
IMMUNOLOGY	8	2,391
MOLECULAR DIAGNOSTICS	9	3,037
FLOW CYTOMETRY	10	2,391
BLOOD BANK	11	4,640
PRE–NATAL	12	791
RESIDENTS	13	628
LAB SUPPORT	14	9,121
INFORMATION SYSTEMS	15	1,633
ADMINISTRATION	16	3,240

- ADJOINING
- PROXIMITY
- POSSIBLE PROXIMITY
- SEPARATED

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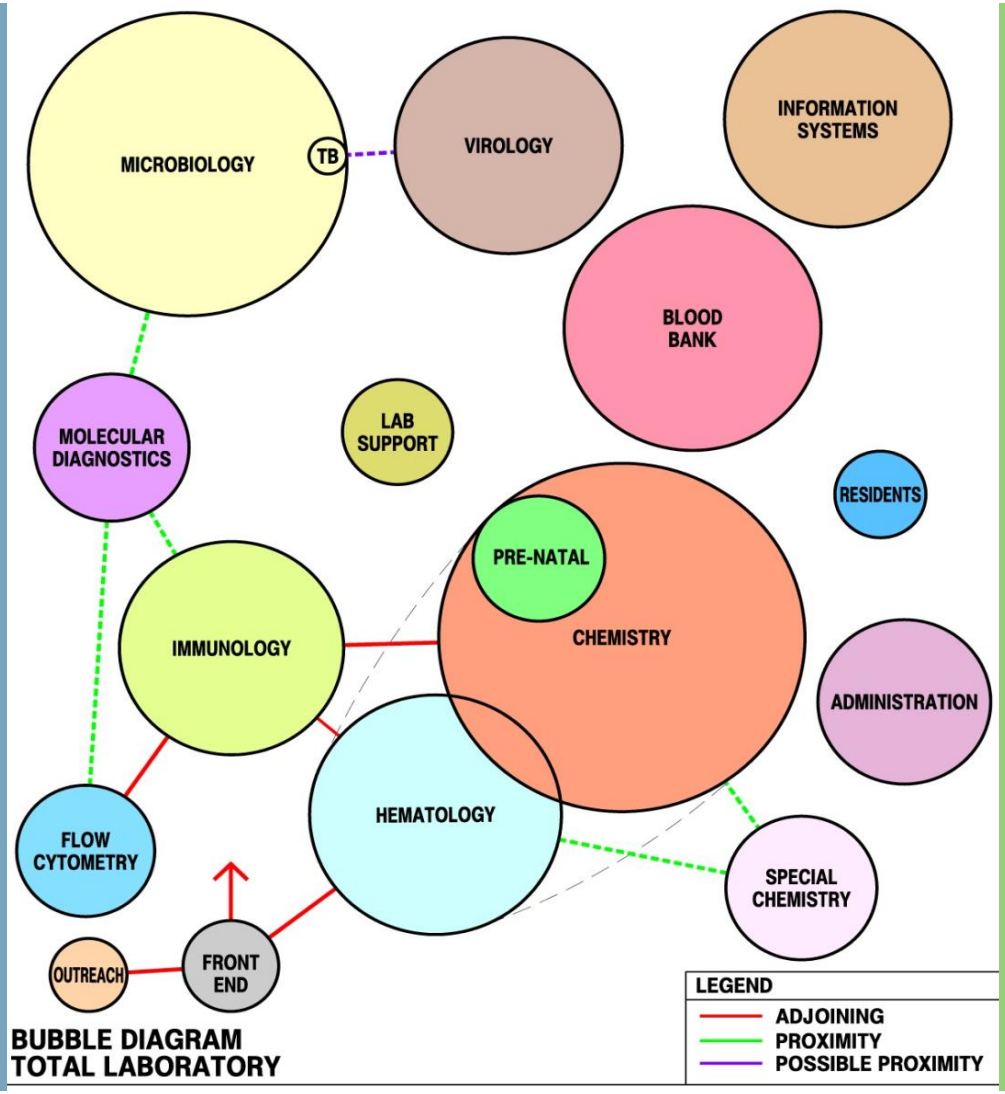
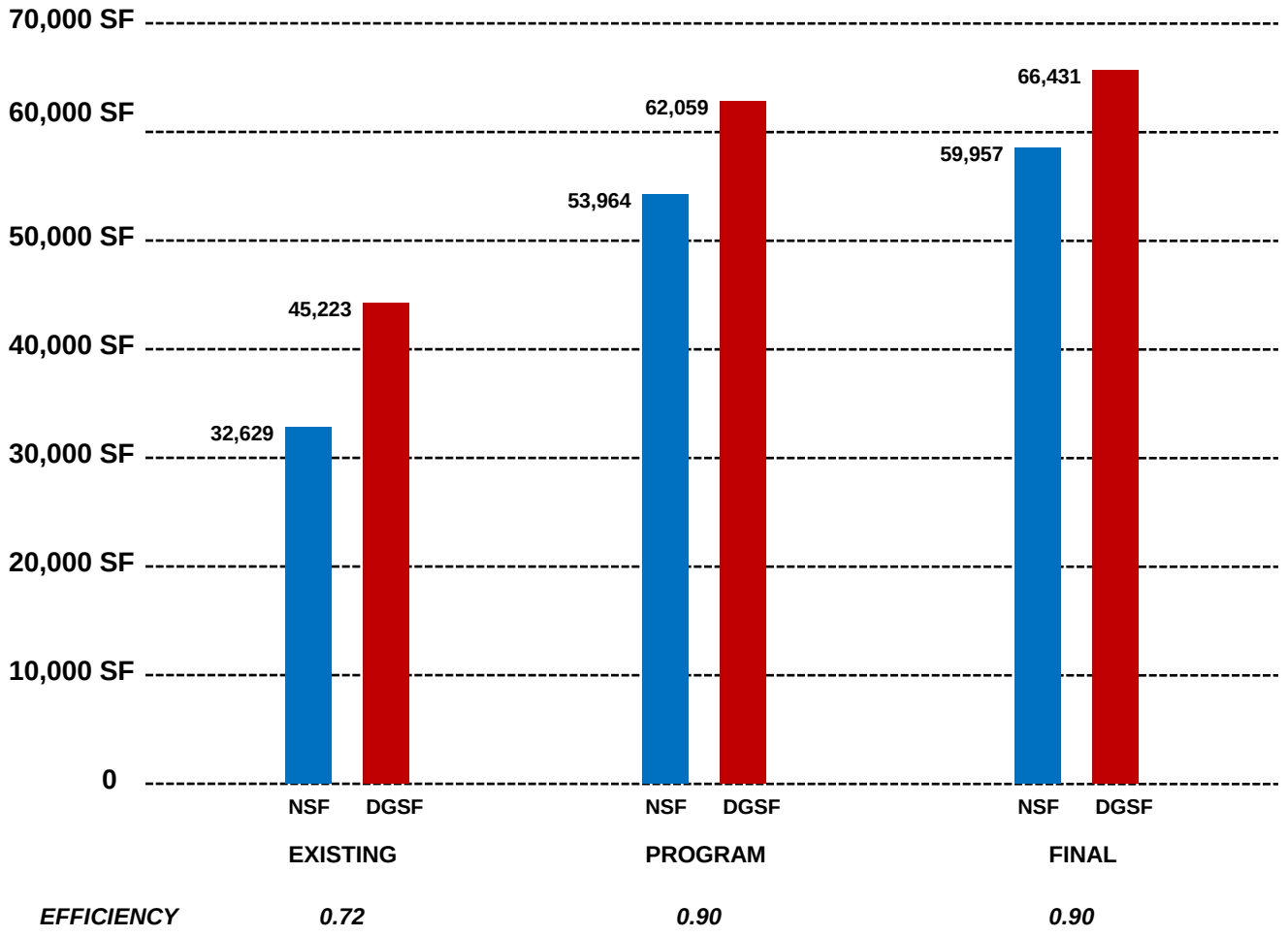
Bubble Diagram



Area Analysis



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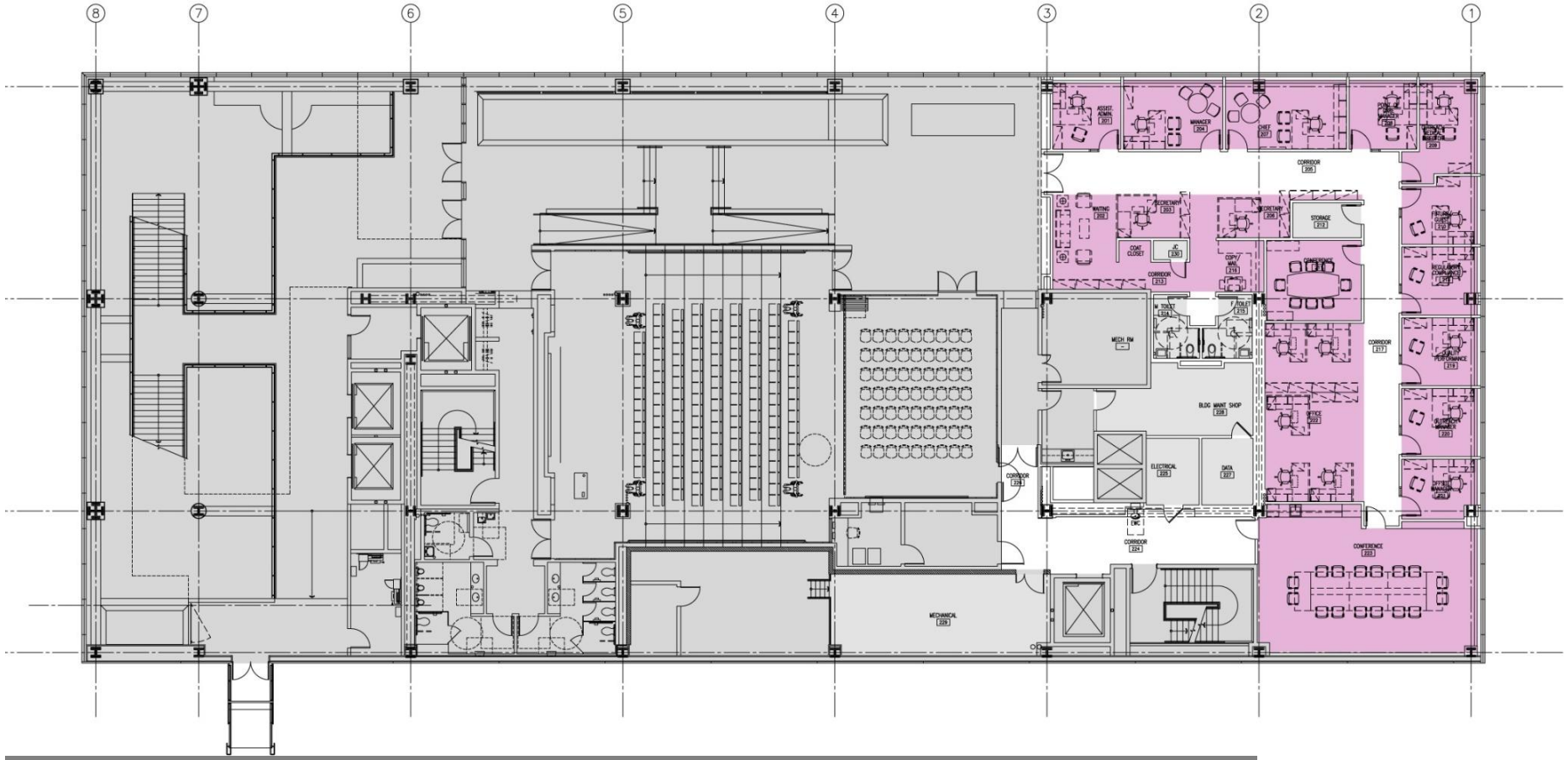
New Design
Second Floor



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New Design
Third Floor

Blood Bank
Information Systems
Lab Support
Building Support

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New Design
Fourth Floor

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New Design
Fifth Floor

- Hematology
- Chemistry
- Outreach
- Building Support
- Lab Support
- Front-End Processing
- Pre-Natal

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New Design
Fifth Floor Future Robotic Line

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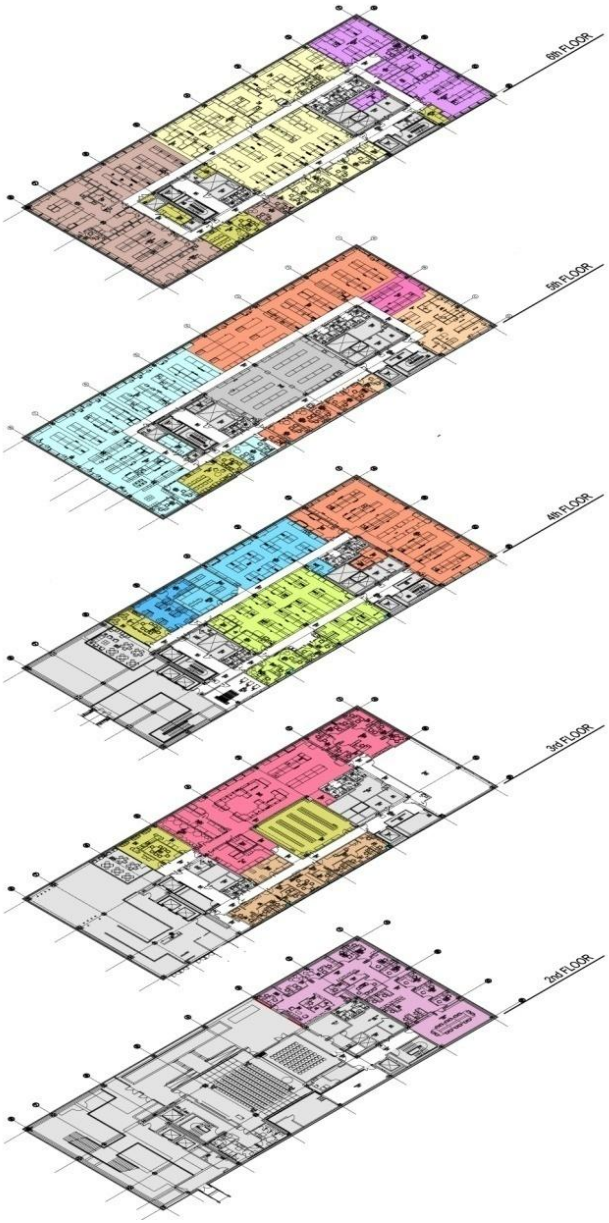
New Design
Sixth Floor

New Design
Stacking Diagram



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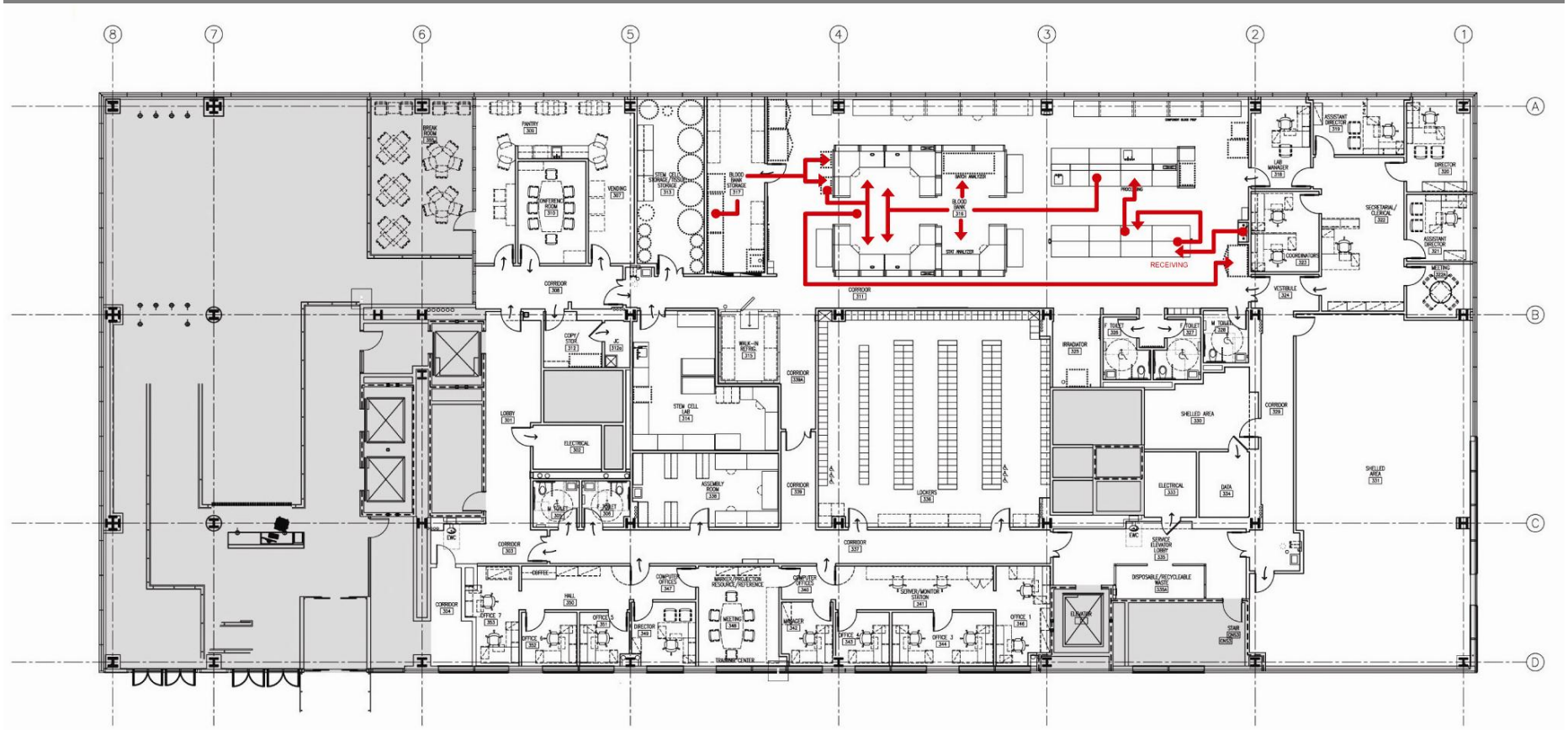
New Design
Third Floor Flow



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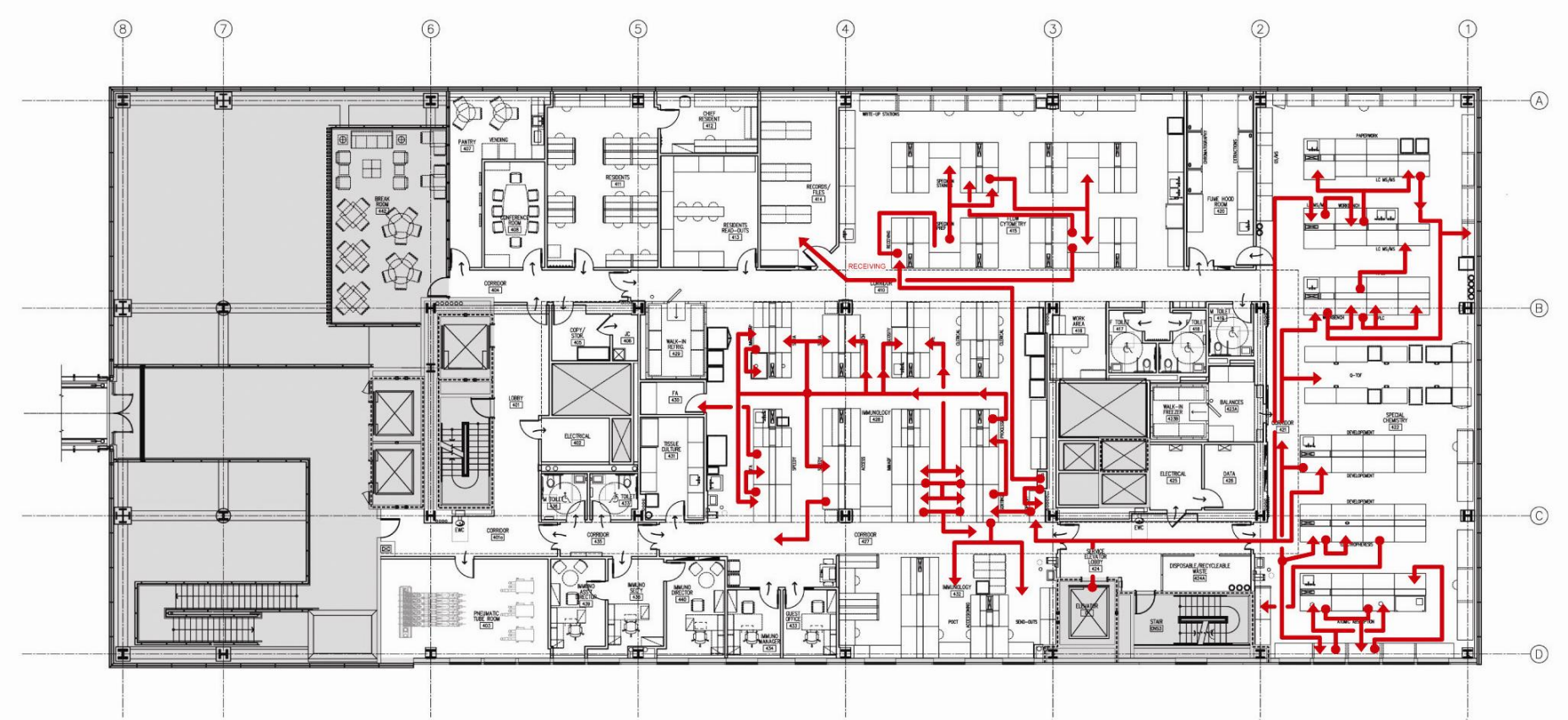
New Design
Fourth Floor Flow



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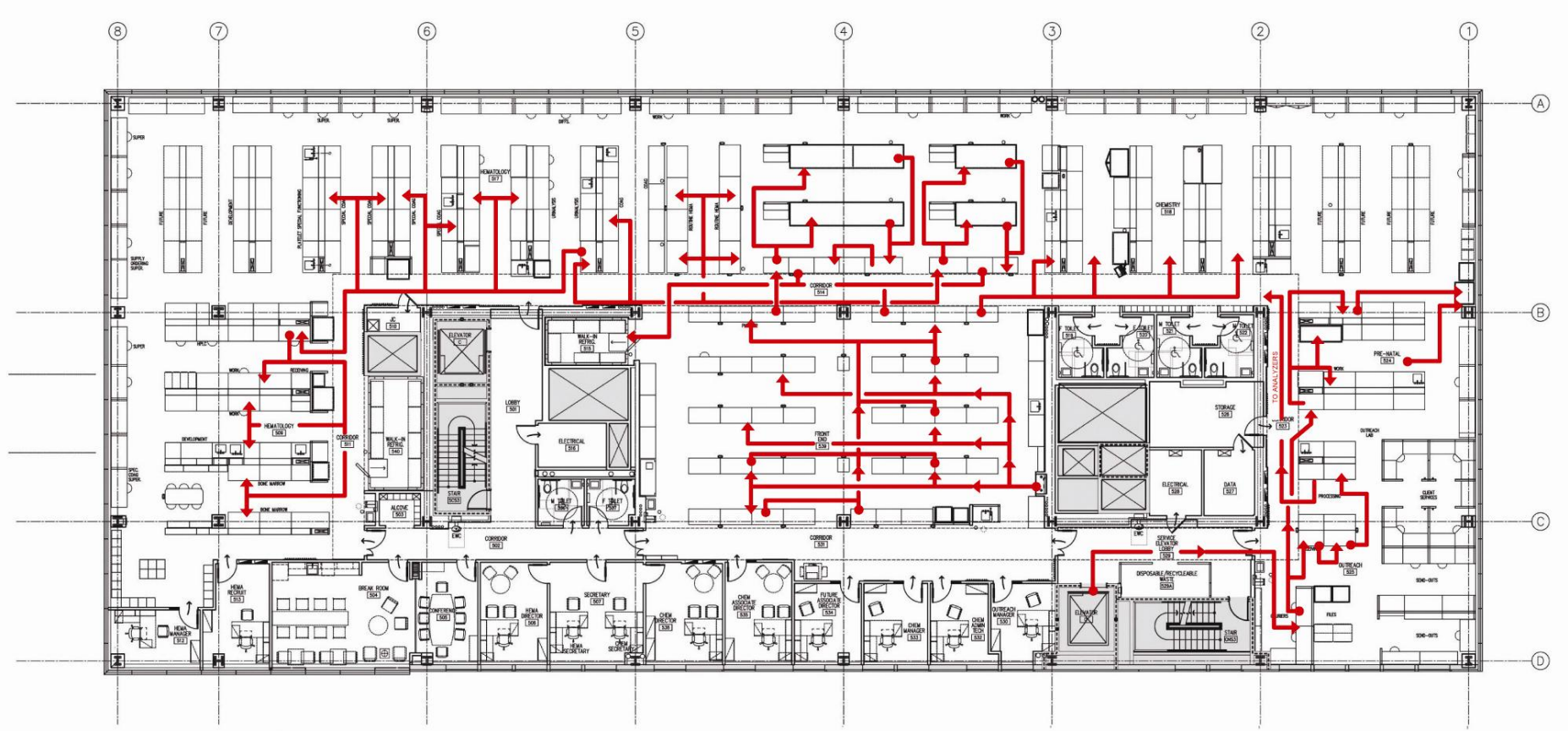
New Design
Fifth Floor Flow



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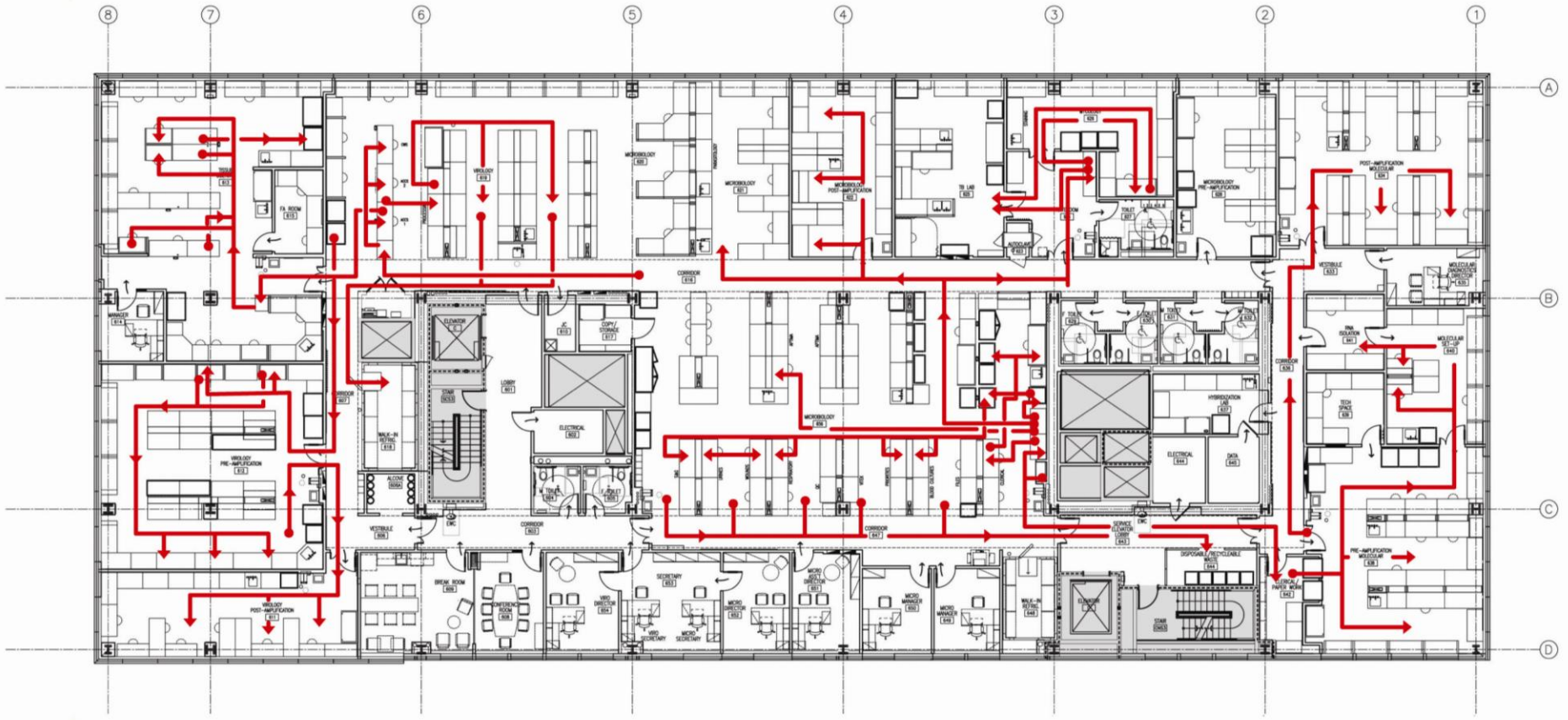
New Design
Sixth Floor Flow



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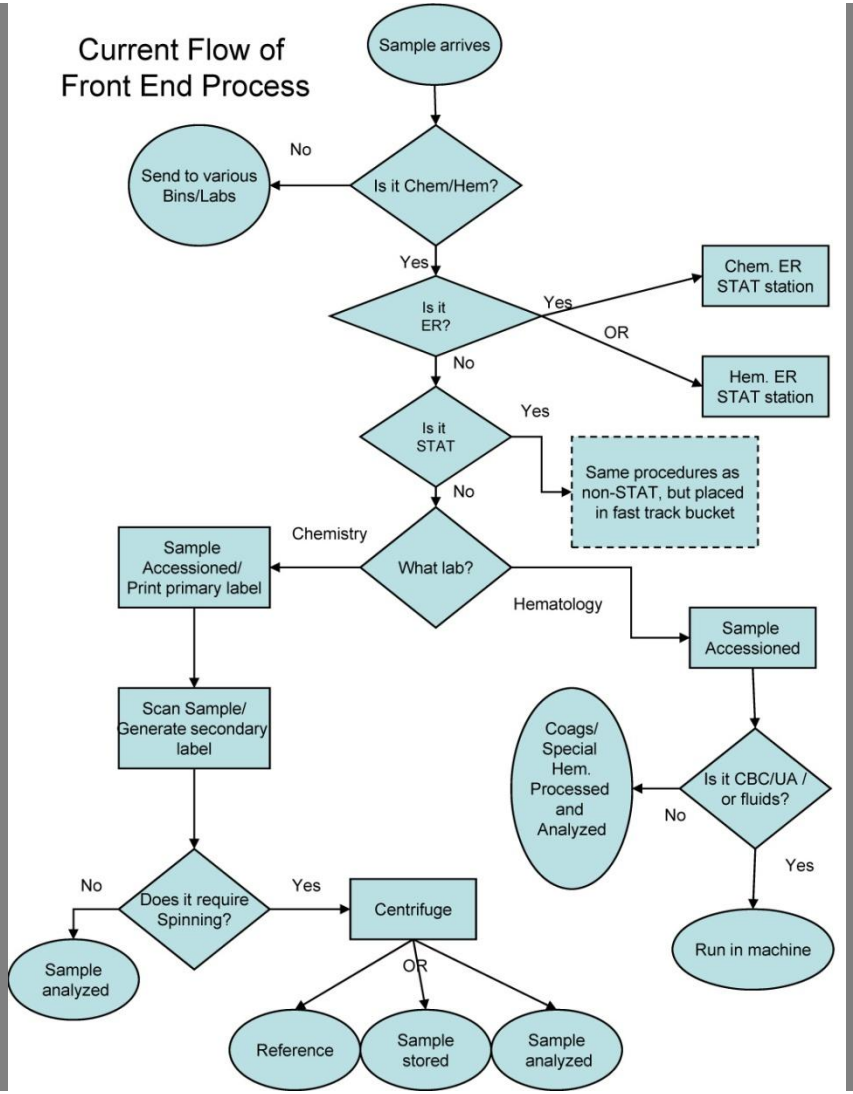
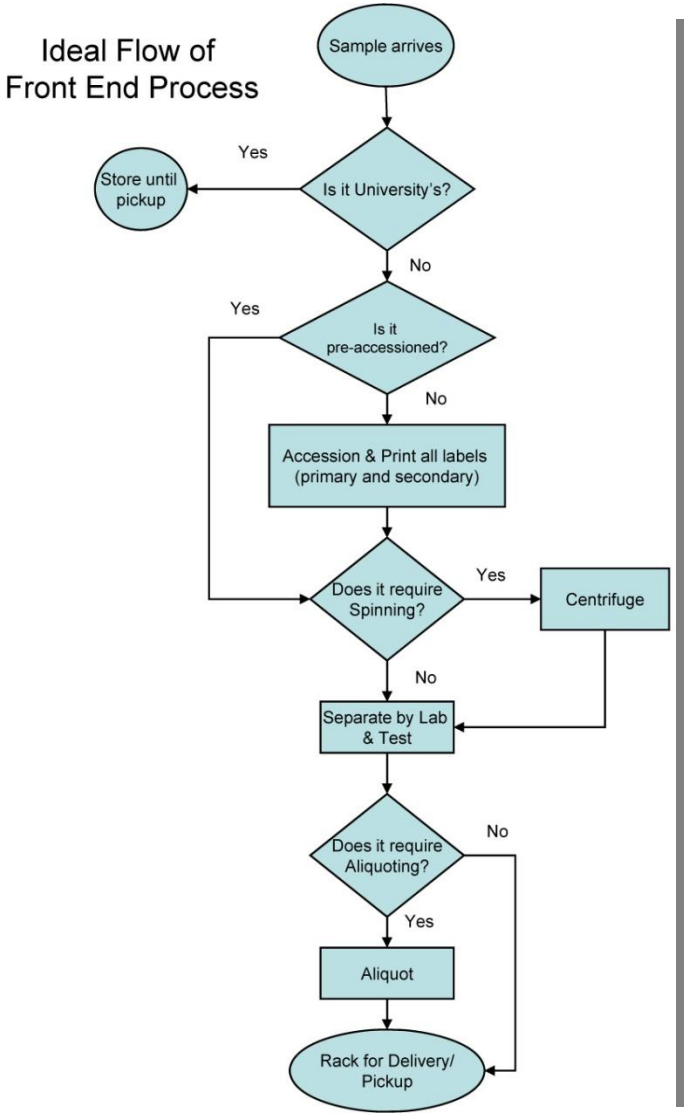
Flow Process





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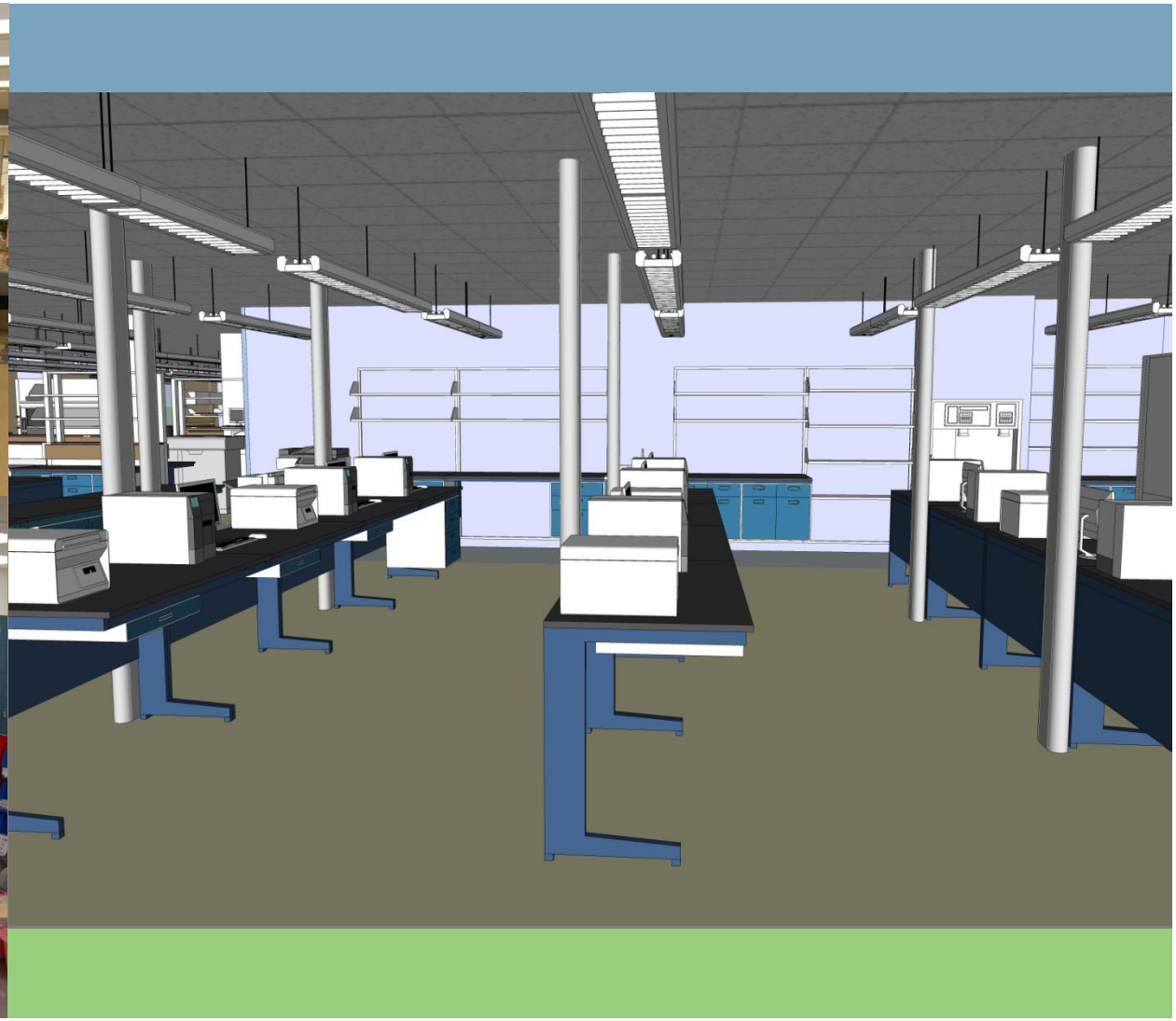
Front End
Existing

New



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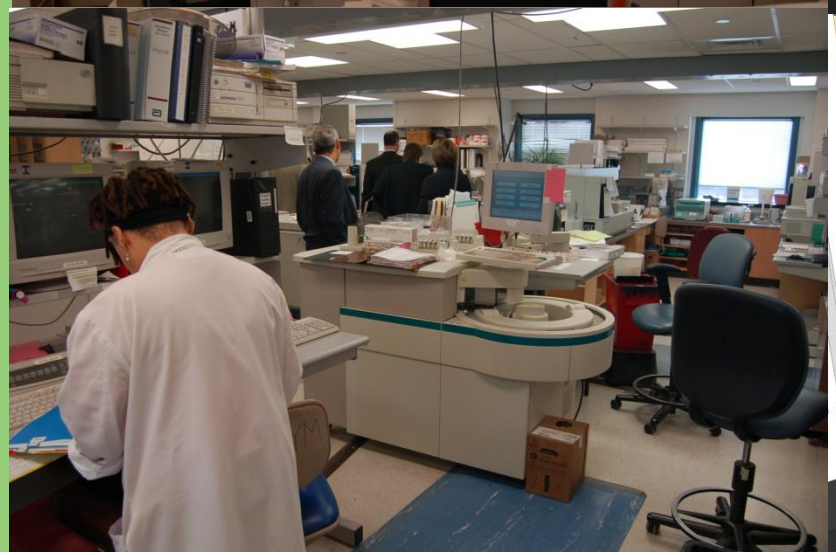
Hematology and Chemistry

Existing



New

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Computer Assembly Room

Existing

New

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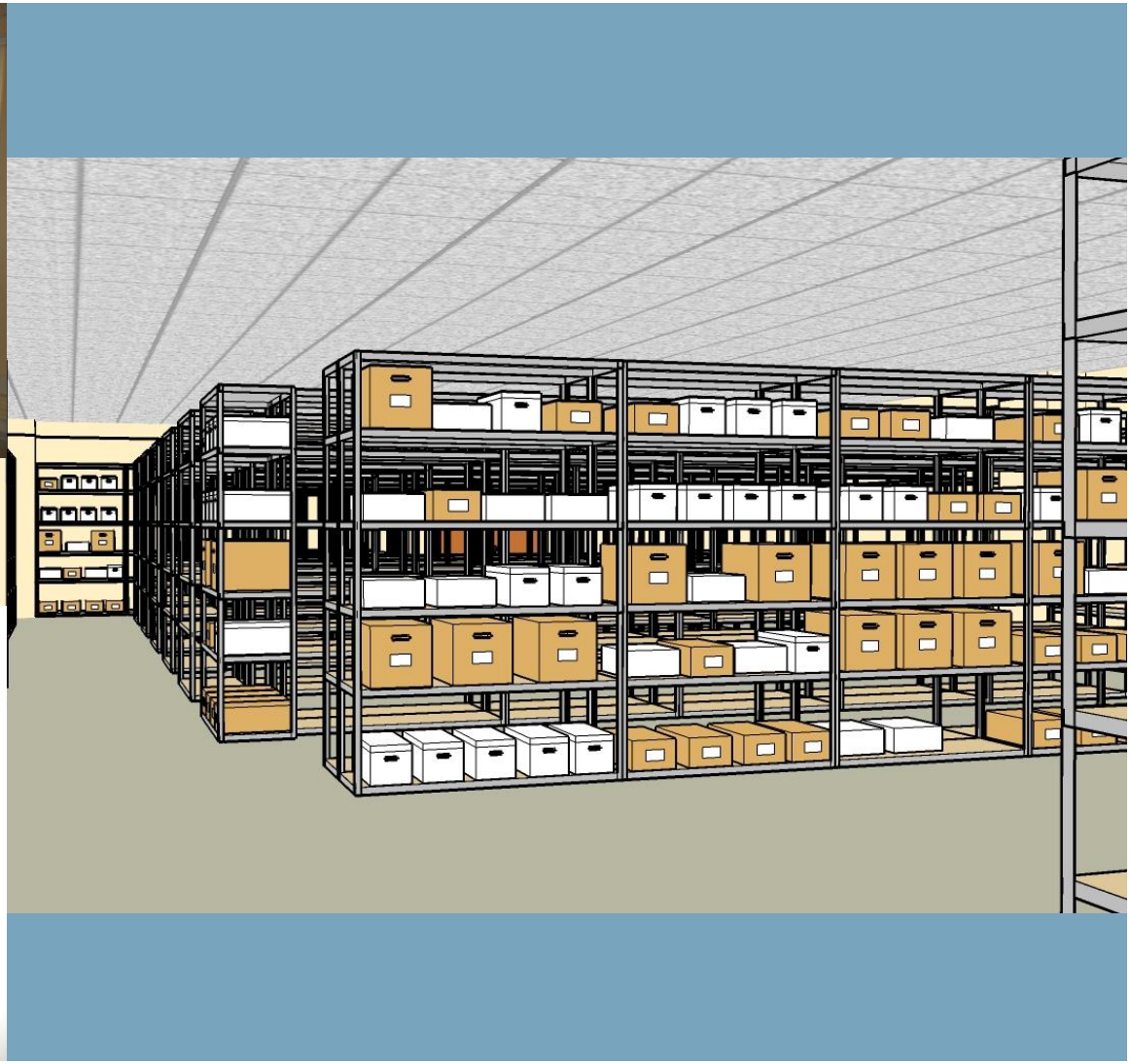
Storage
Existing

New



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Virology
Existing

New

Image of New Facility

Image of New Facility

What we did right

- Early involvement of users
- Continuing communication with users
- Visioning to get staff to think beyond their comfort zone

Thank You

Questions?