Just Go With It:
Development Programming for Architects in a BIM / IWMS World

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- This event handout and recording will be posted on the CAFM home page:

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Learning Objectives

1. Examine the fundamental principles of the Problem Seeking® method for schematic and development programming.

2. Explore the approach and technologies required for integrated project delivery that maximizes the use of BIM.

3. Evaluate how IPD was used on two research laboratories to define and procure of laboratory equipment.

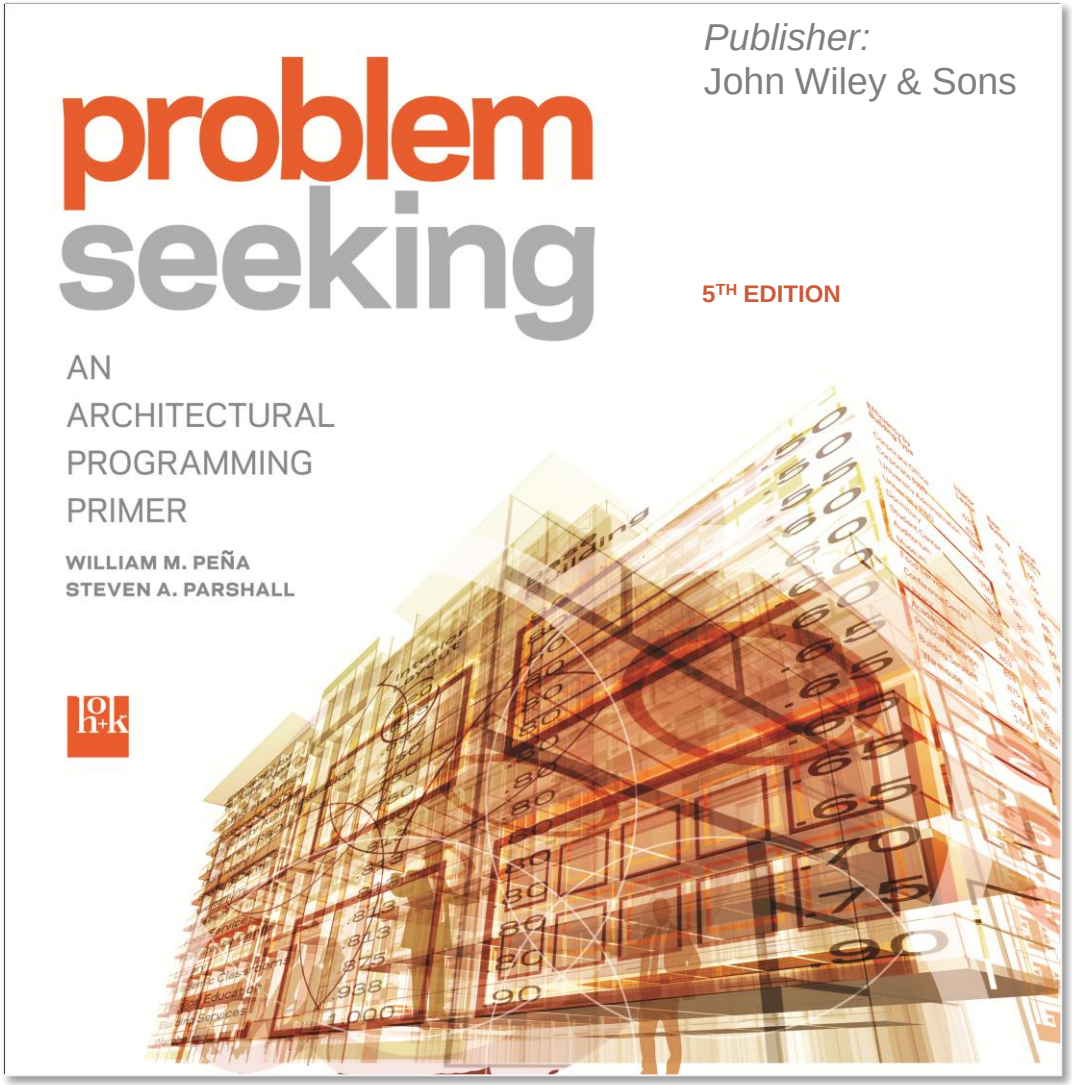
4. Analyze a building information life cycle model that integrates program of requirements, BIM and IWMS.

1.25 AIA/CES credit are available for this webinar

JUST GO WITH IT! DEVELOPMENT PROGRAMMING IN A BIM / IWMS WORLD

Steven A. Parshall, FAIA, HOK | Robin Ellerthorpe, FAIA, HOK

3rd IFMA PRESENTATION ON PROGRAMMING



IFMA World Workplace 2004
Salt Lake City

Programming Workplace Performance Requirements

IFMA World Workplace 2005
Philadelphia

Using Workplace Standards in Programming: A Case Study Of Three Global Corporate Projects

Owners Perspective
Fall 2011

Fall 2011

THE MAGAZINE OF THE CONSTRUCTION OWNERS ASSOCIATION OF AMERICA

THE MAGAZINE OF THE CONSTRUCTION OWNERS ASSOCIATION OF AMERICA

Beyond Construction

The University of Texas Utilizes BIM as a Methodology for Facility Maintenance and Operations

DEFINITION OF PROGRAMMING

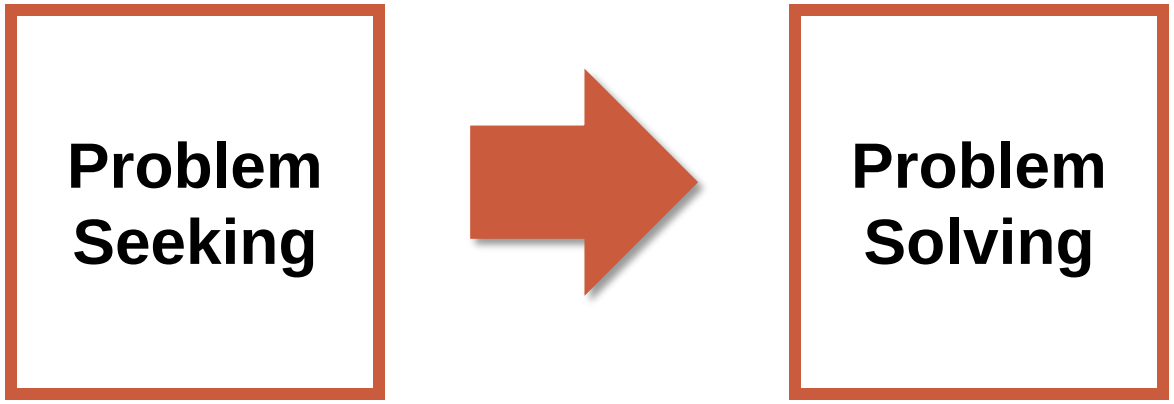
- Facility Programming

  A systematic process of inquiry, leading to a statement of requirements to be met by a facility solution.

Problem Seeking ® is a systematic process of inquiry, and objective analysis to:

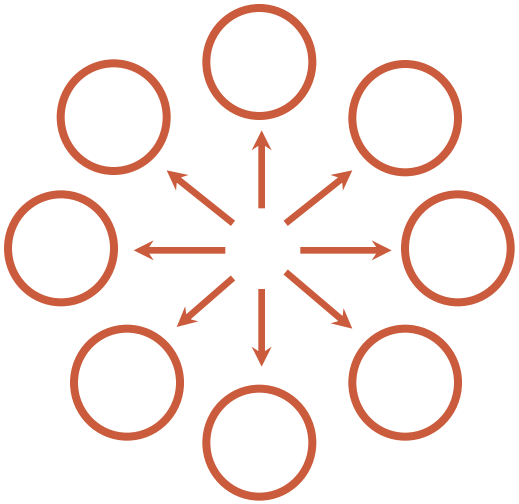
Establish **Goals**	Collect & Analyze **Facts**	Uncover and Test **Concepts**	Determine **Needs**	State the **Problem**
Where do we want to go?	Where are we now?	How can we get there?	What can we afford; when should it be done; who will do it?	What are the critical success factors?

THE SEARCH

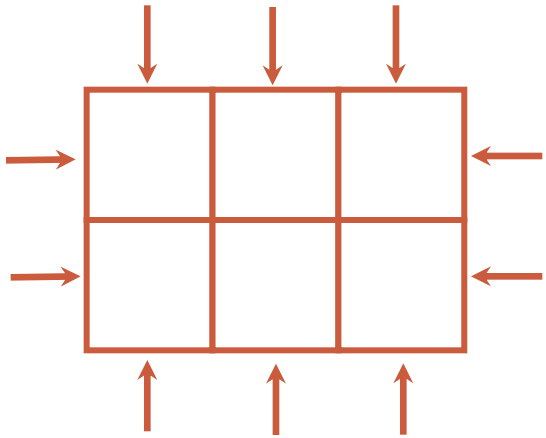


- Identify the Right Problem to Solve
- Avoid “False Starts”
- Understand the Whole Problem

PROBLEM SEEKING



ANALYSIS



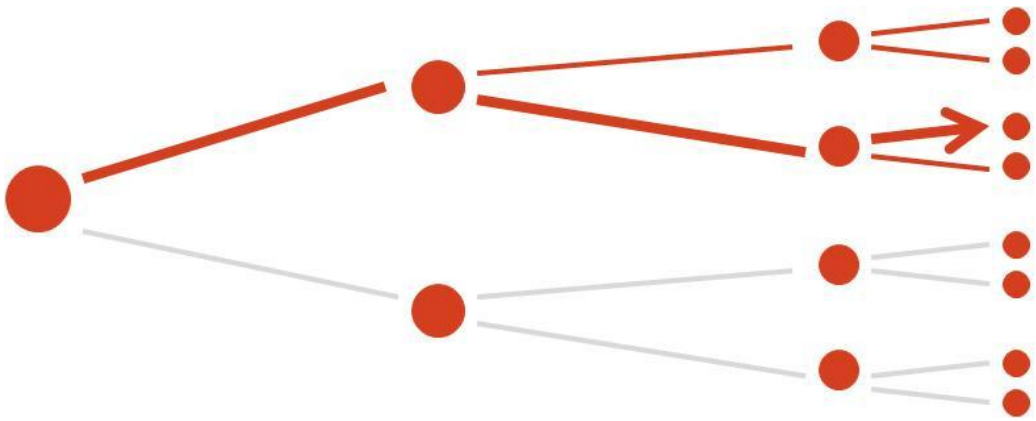
SYNTHESIS

- Collection, classification and analysis of information
- Organizes information into its parts
- Leads to a statement of the problem to solve

PARTICIPATORY PROCESS

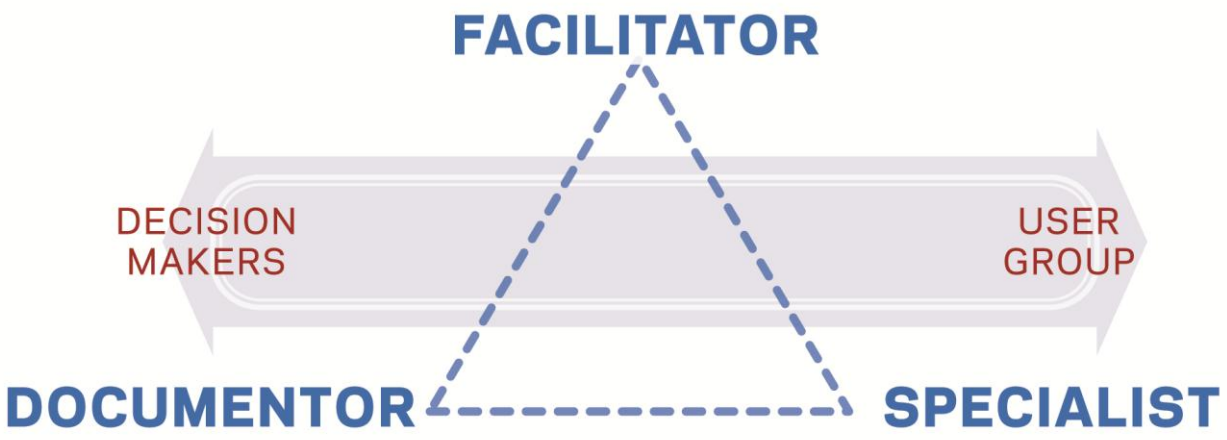
- Interviews and Worksessions with:
  - Management
  - Operations
  - Engineering
  - Maintenance
  - Business Units
- Consensus -
  - Common View of the Project

DECISION-MAKING PROCESS



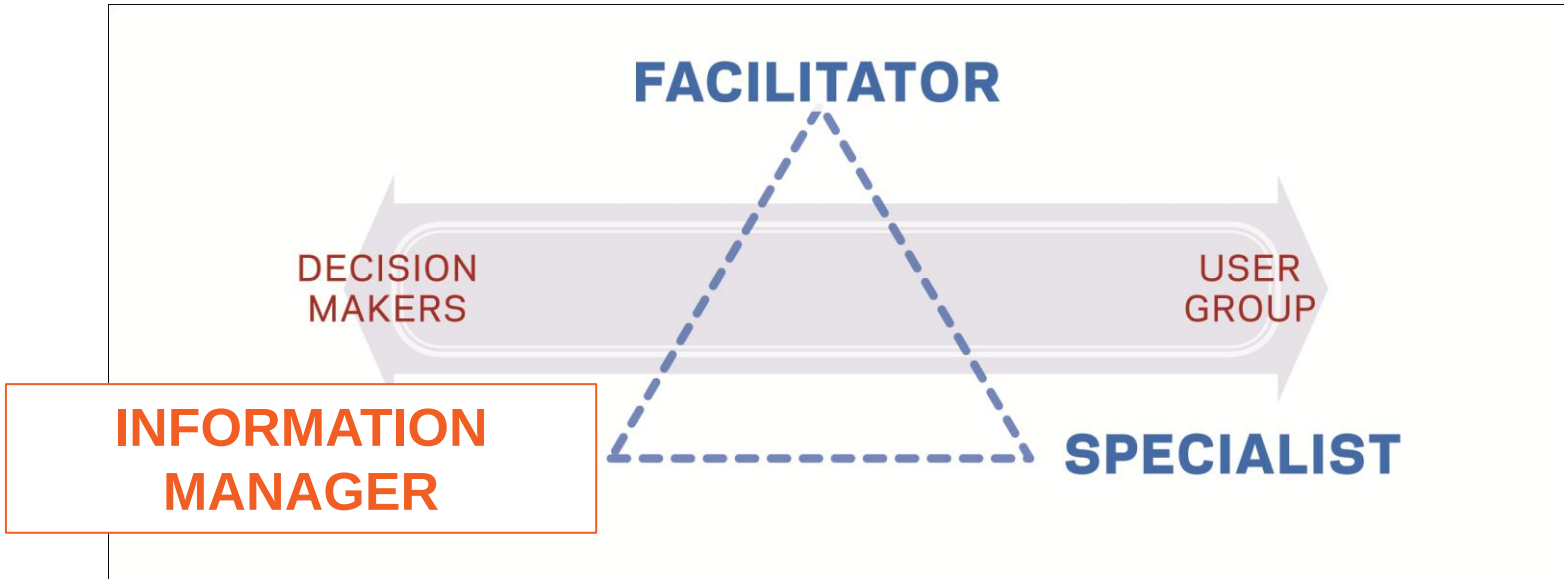
- Obtain decisions about owner user requirements
- Identify and track issues to resolve
- Simplify the design problem (reduce uncertainty)

COMMUNICATION PROCESS



- Two-way communication process:
  - Enable client decision making
  - Manage project information / deliverables
  - Provide building type knowledge

COMMUNICATION PROCESS



- Two-way communication process:
  - Enable client decision making
  - Manage project information / deliverables
  - Provide building type knowledge

FOUR CONSIDERATIONS

FUNCTION	1	PEOPLE
	2	ACTIVITIES
	3	RELATIONSHIPS
FORM	4	SITE
	5	ENVIRONMENT
	6	QUALITY
ECONOMY	7	INITIAL BUDGET
	8	OPERATING COSTS
	9	LIFE CYCLE COSTS
TIME	10	PAST
	11	PRESENT
	12	FUTURE

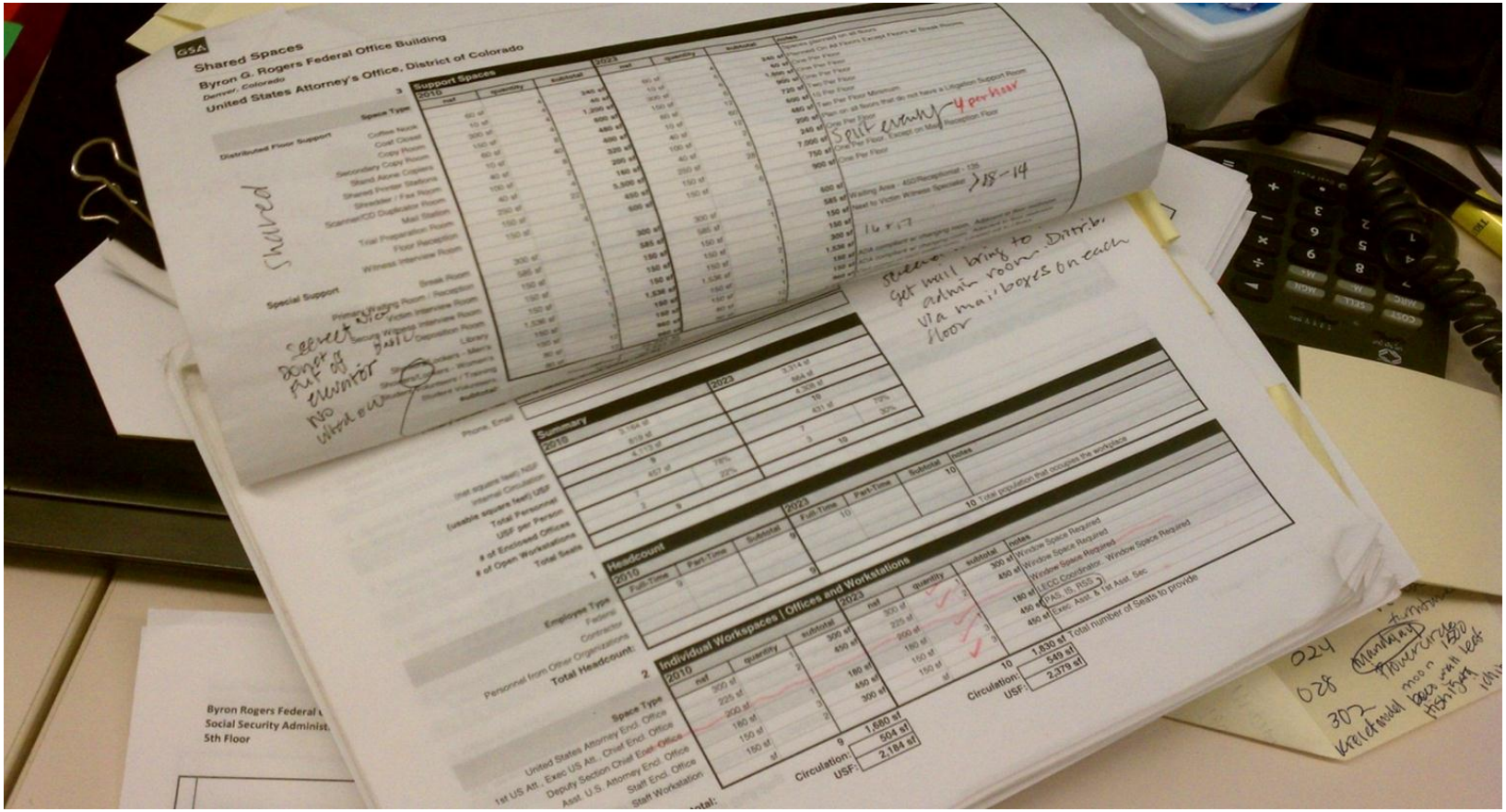
INFORMATION INDEX

	Goals	Facts	Concepts	Needs	Problem
Function People Activities Relationships	Mission Maximum Number Individual Identity Interaction/Privacy Hierarchy of Values Prime activities Security Progression Segregation Encounters Transportation/Parking Efficiency Priority of Relationships	Statistical Data Area Parameters Personnel Forecasts User Characteristics Community Characteristics Organizational structure Value of Potential Loss Time-Motion Studies Traffic Analysis Behavioral Patterns Space Adequacy Type/Intensity Physically Challenged Guidelines	Service Grouping People Grouping Activity Grouping Priority Hierarchy Security Controls Sequential Flow Separated Flow Mixed Flow Functional Relationships Communications	Area Requirements by organization by space type by time by location Parking Requirements Outdoor Space Requirements Functional Alternatives	Unique and important performance requirements which will shape building design.
Form Site Environment Quality	Bias On Site Elements Environmental Response Efficient Land Use Community Relations Community and Ecosystem Improvements Physical Comfort Life Safety Social/Psychological Environments Individuality Wayfinding Projected Image Client Expectations Sustainability	Site Analysis Soils Analysis FAR and GAC Climate Analysis Code Survey Surroundings Psychological Implications Point of Reference/Entry Cost/Square Feet Building or Layout Efficiency Equipment Costs Area per Unit Sustainability Analysis	Enhancements Special Foundations Density Environmental Controls Safety Neighbors Officing Concepts: On-Premise and Off-Premise Orientation Accessibility Character Quality Control Reduce / Reuse / Recycle	Site Developmental Costs Environmental Influences on Costs Building cost/SF Building Overall Efficiency Factor Building System Design Criteria Green Building Rating System	Major form and sustainability considerations which will affect building design.
Economy Initial Budget Operating Costs Life Cycle Costs	Extent of Funds Cost Effectiveness Maximum Return Return on Investment Minimizing of Operating Costs Maintenance and Operating Costs Reduce of Life Cycle Costs	Cost Parameters Maximum Budget Time-Use Factors Market Analysis Energy Source Costs Activities & Climate Factors Economic Data	Cost Control Efficient Allocation Multifunction/Versatility Merchandising Energy Conservation Cost Reduction	Budget Estimate Analysis Balance Budget Cash Flow Analysis Energy Budget Operating Costs Life Cycle Costs	Attitude towards the initial budget and its influence on the fabric and geometry of the building.
Time Past Present Future	Historic Preservation Static/Dynamic activities Change Growth Occupancy Date Availability of funds	Significance Space Parameters Activities Projections Escalation factors	Adaptability Tolerance Convertibility Expansibility Linear/Concurrent Scheduling Phasing	Escalation Time Schedule Time / Cost Schedule	Implications of change/ growth on long-range performance.

QUANTITATIVE & QUALITATIVE PROCESS

1. **Establish Goals**
   Where do you want to go?
2. **Collect Analyze Facts**
   Where are we now?
3. **Uncover and Test Concepts**
   How can we get there?
4. **Determine Needs**
   What can we afford? When should it be done?
5. **State the Problem**
   What are the critical factors?

DATA MANAGEMENT



BUILDING INFORMATION LIFE CYCLE

Life Cycle Framework

for Facility Management Information

- Douglas Sherman
  - Herman Miller FMI, 1980

BUILDING INFORMATION LIFE CYCLE

INFORMATION POOLS

- Precedents • Models
- Specifications
- Schedules • Materials
- Methods • Costs
- Analysis
- *Data Feeds*
- *Questionnaires*
- *Interviews*

BUILDING INFORMATION LIFE CYCLE

INFORMATION POOLS

- Energy
- Leases
- Real Estate Profile
- Employee List/Types
- Preventive Maintenance
- Building Capital Plans
- Projects
- MAC
- Space Strategies

- Precedents
- Models
- Specifications
- Schedules
- Materials
- Methods
- Costs
- Analysis
- *Data Feeds*
- *Questionnaires*
- *Interviews*

BUILDING INFORMATION LIFE CYCLE

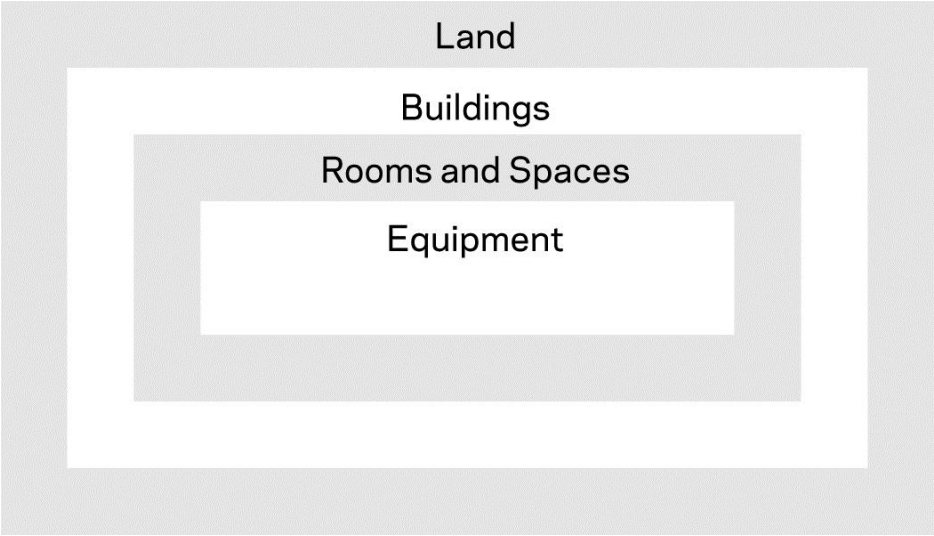
INFORMATION POOLS

•Stack Plans •Block Plan
• Portfolio Strategy
• RE Capital Planning
• Finance • Environmental Sustainability
• Change Management
• Facility Condition
• Energy Management
• Waste Management

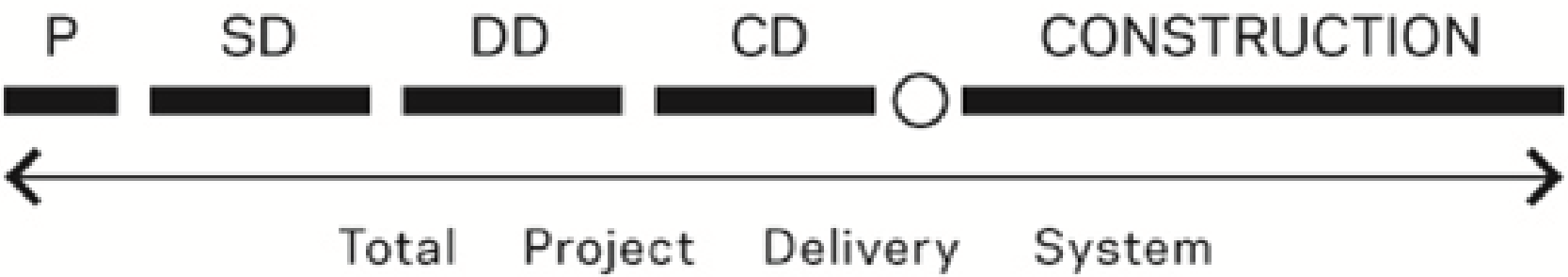
• Precedents • Models
• Specifications
• Schedules • Materials
• Methods • Costs
• Analysis
• *Data Feeds*
• *Questionnaires*
• *Interviews*

•Energy •Leases
•Real Estate Profile
•Employee List/Types
•Preventive Maintenance
•Building Capital Plans
•Projects •MAC
•Space Strategies

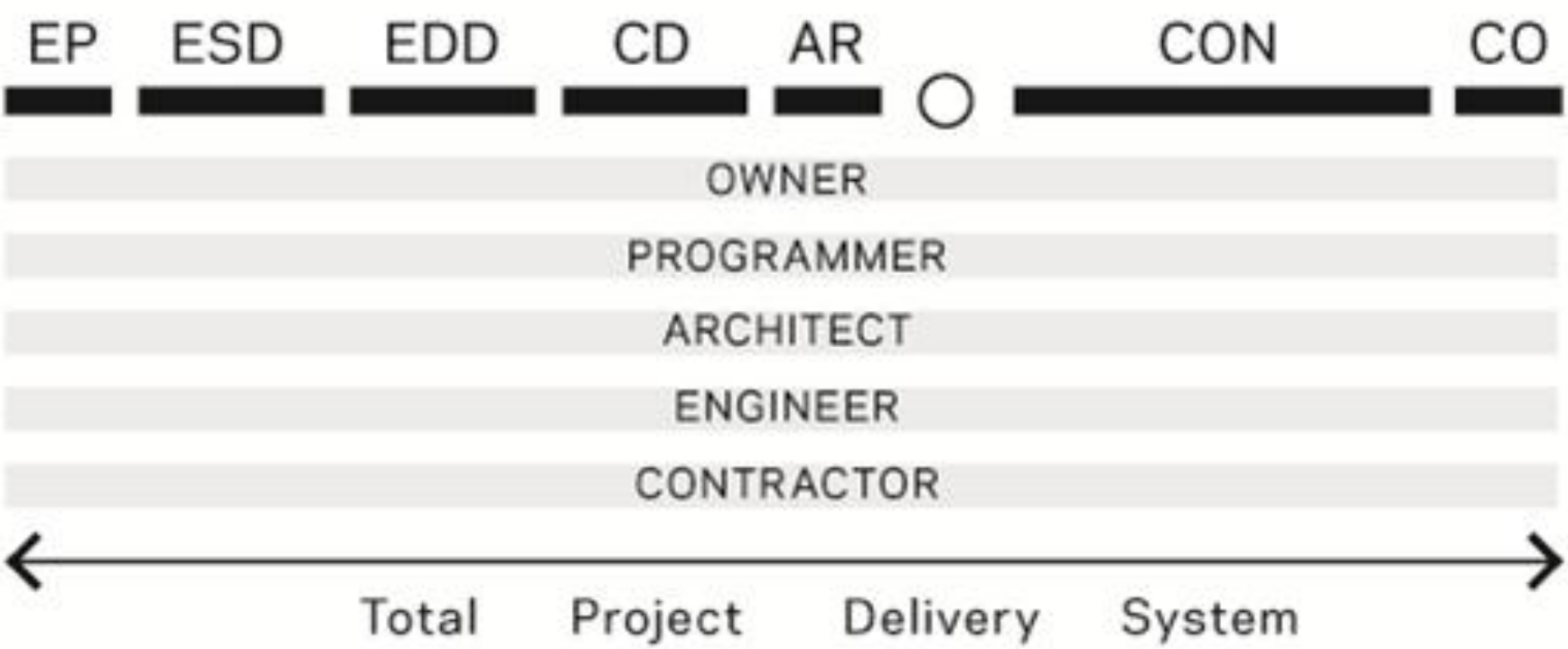
LEVEL OF DETAIL



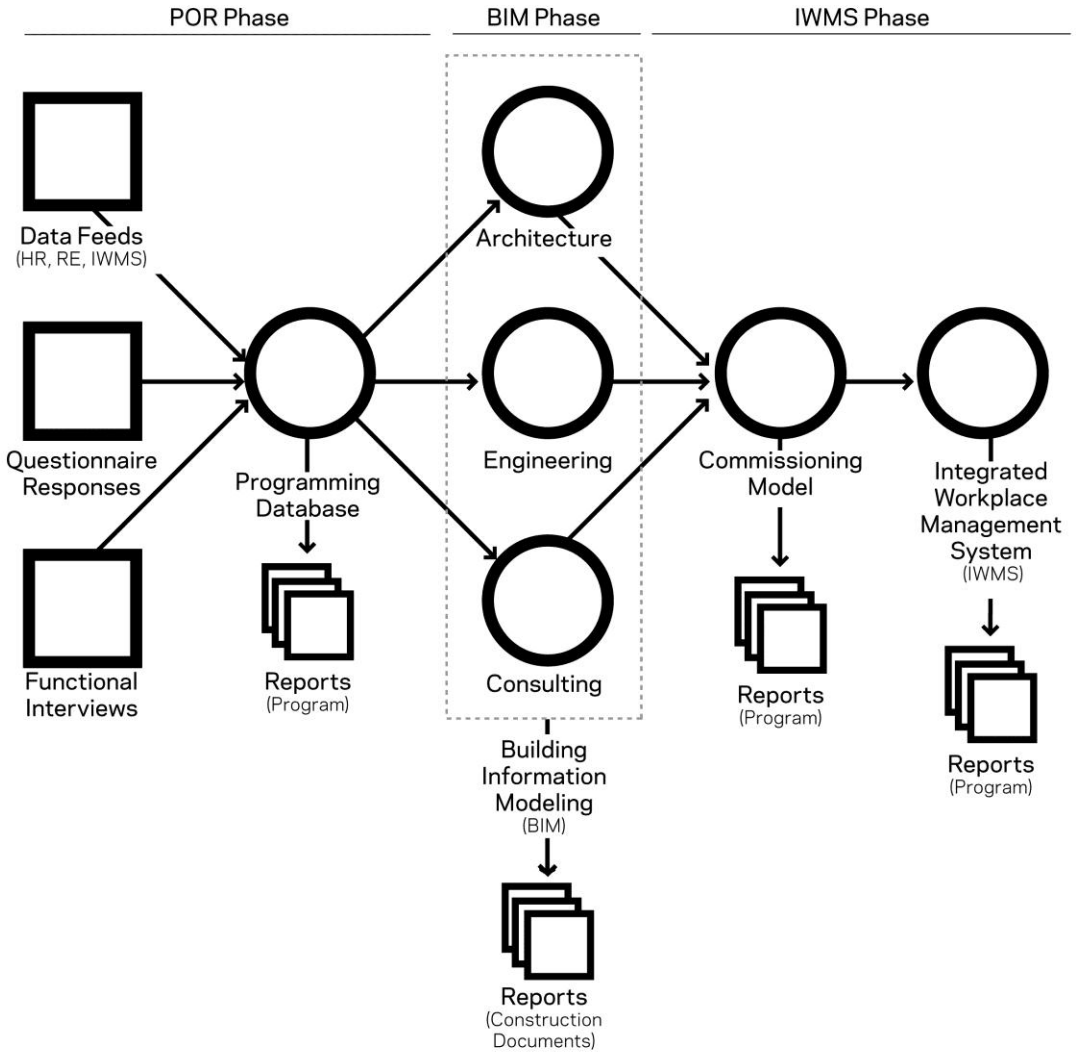
TRADITIONAL PROJECT DELIVERY



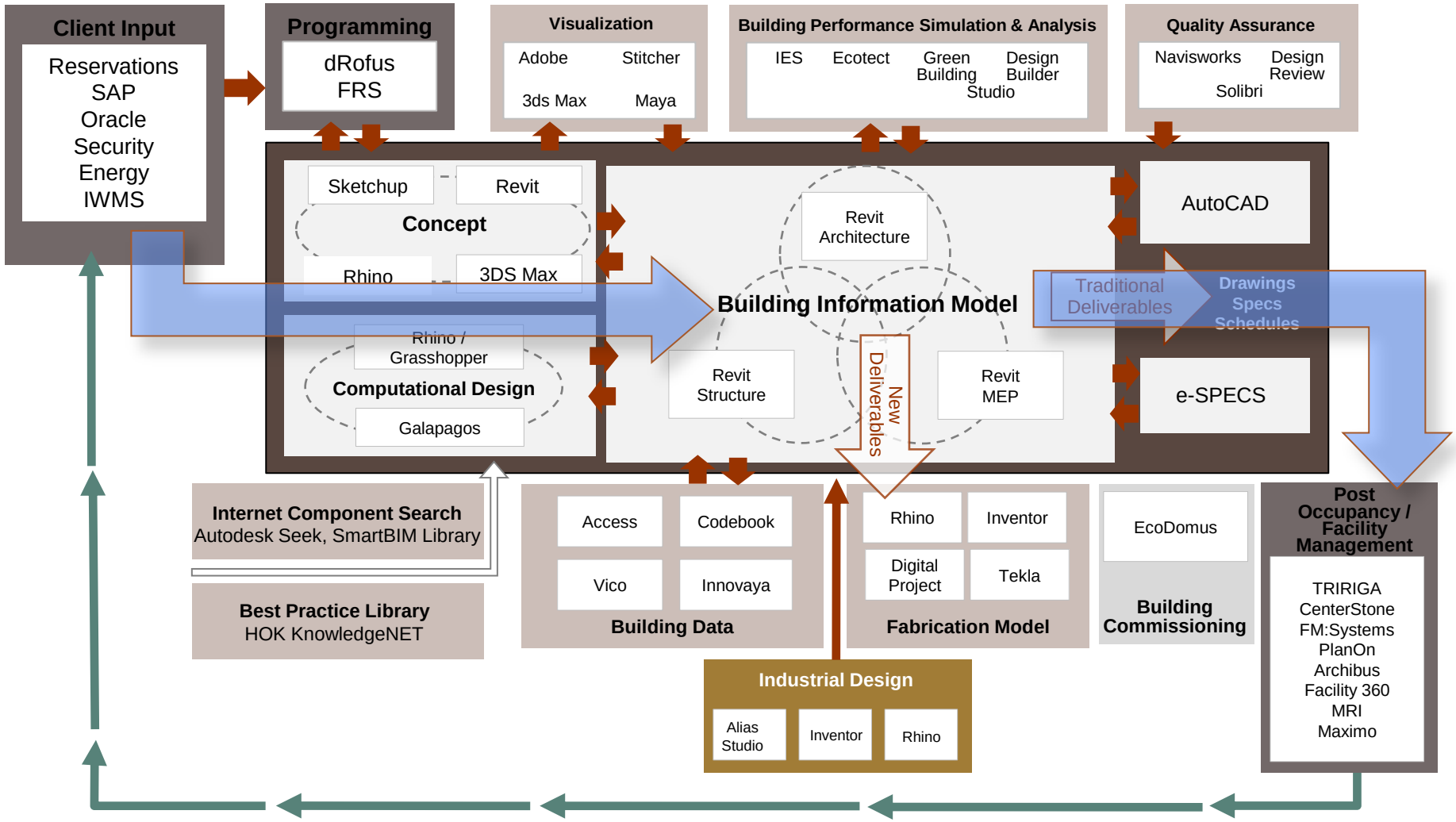
INTEGRATED PROJECT DELIVERY



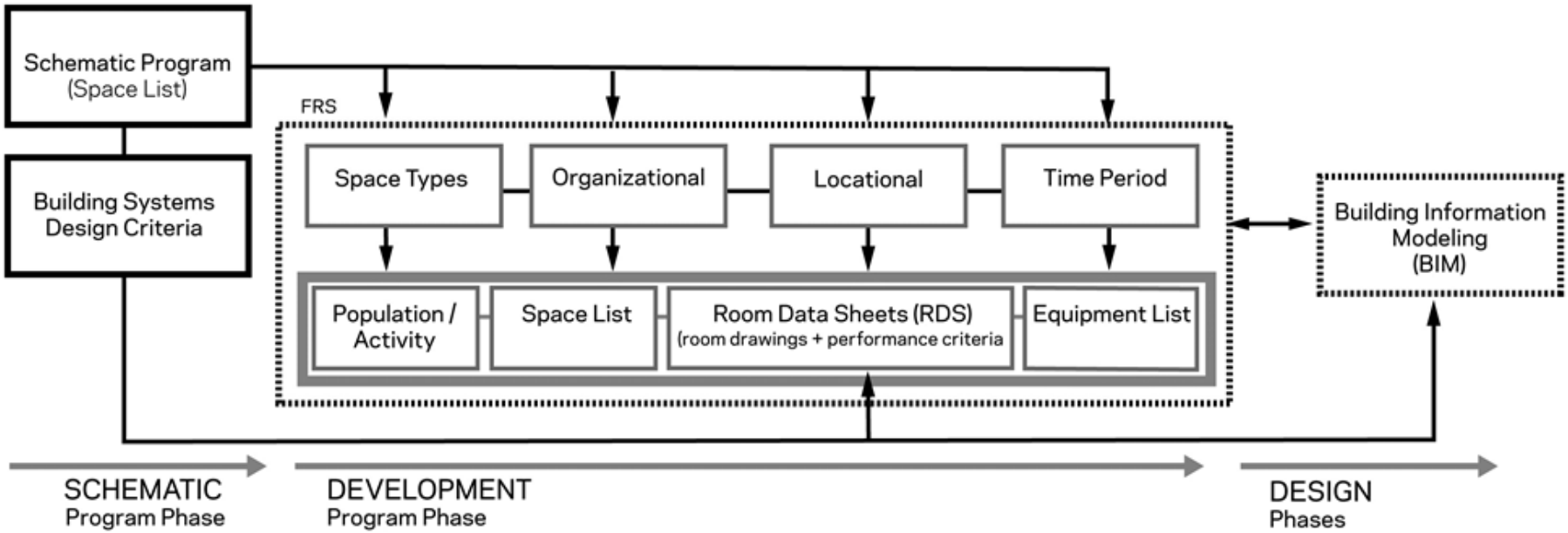
THE LINK: POR – BIM - IWMS



DESIGN INFORMATION ENVIRONMENT



FACILITY REQUIREMENT SYSTEM (FRS)

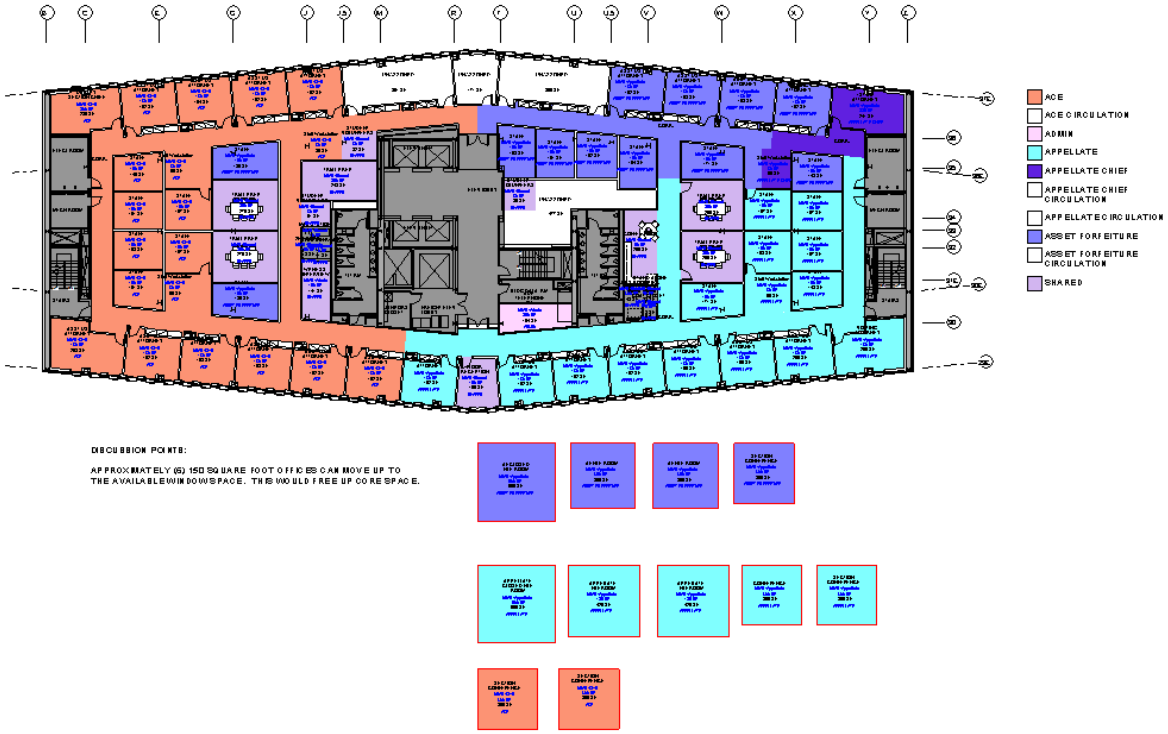


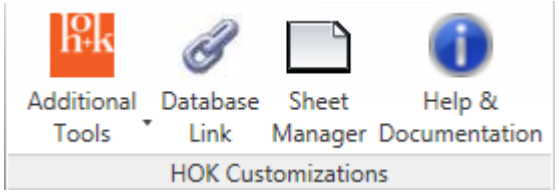
WEB-BASED FRS

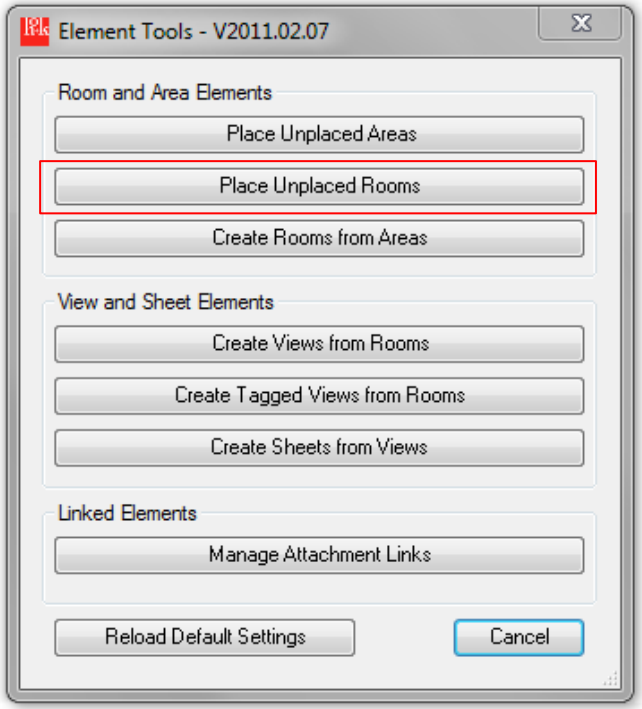
FRS SPACE LIST

Facility	Room Number	Office Seats	Other Capacity	Type	Program Area	Allocated Area	Initial Units at Initial	Initial Area at Initial (nsm)
UN2400 - South Research Laboratory Building 1								
Assignable								
4								
Chemistry								
Analytical - SW3 - LFO 09	L0933	0	0		50	62	1	62
BIO Glass Wash - SW3 - LFO 09	L0939	0	0		30	37	1	37
Bio Process - SW3 - LFO 09	L0936	0	0		40	42	1	42
Bio-Analysis - SW3 - LFO 09	L0940	0	0		20	17	1	17
Bio-Catalysis - SW3 - LFO 09	L0937	0	0		50	50	1	50
Cold Lab - SW3 - LFO 09	L0941	0	0		50	53	1	53
Glass Wash - SW3 - LFO 09	L0938	0	0		50	46	1	46
Homogenous (H1) - SW3 - LFO 09	L0932	0	0		200	215	1	215
Homogenous (H2) - SW3 - LFO 09	L0934	0	0		200	180	1	180
Homogenous (H3) - SW3 - LFO 09	L0942	0	0		30	28	1	28
Homogenous (HG1) - SW3 - LFO 09	L0935	0	0		75	70	1	70
Homogenous (HG2) - SW3 - LFO 09	L0944	0	0		75	72	1	72
Laser - SW3 - LFO 09	L0943	0	0		20	18	1	18
Service Corridor - SW3 - LFO 09	L0945	0	0		100	100	1	100
Total Chemistry (nsm)								**990**

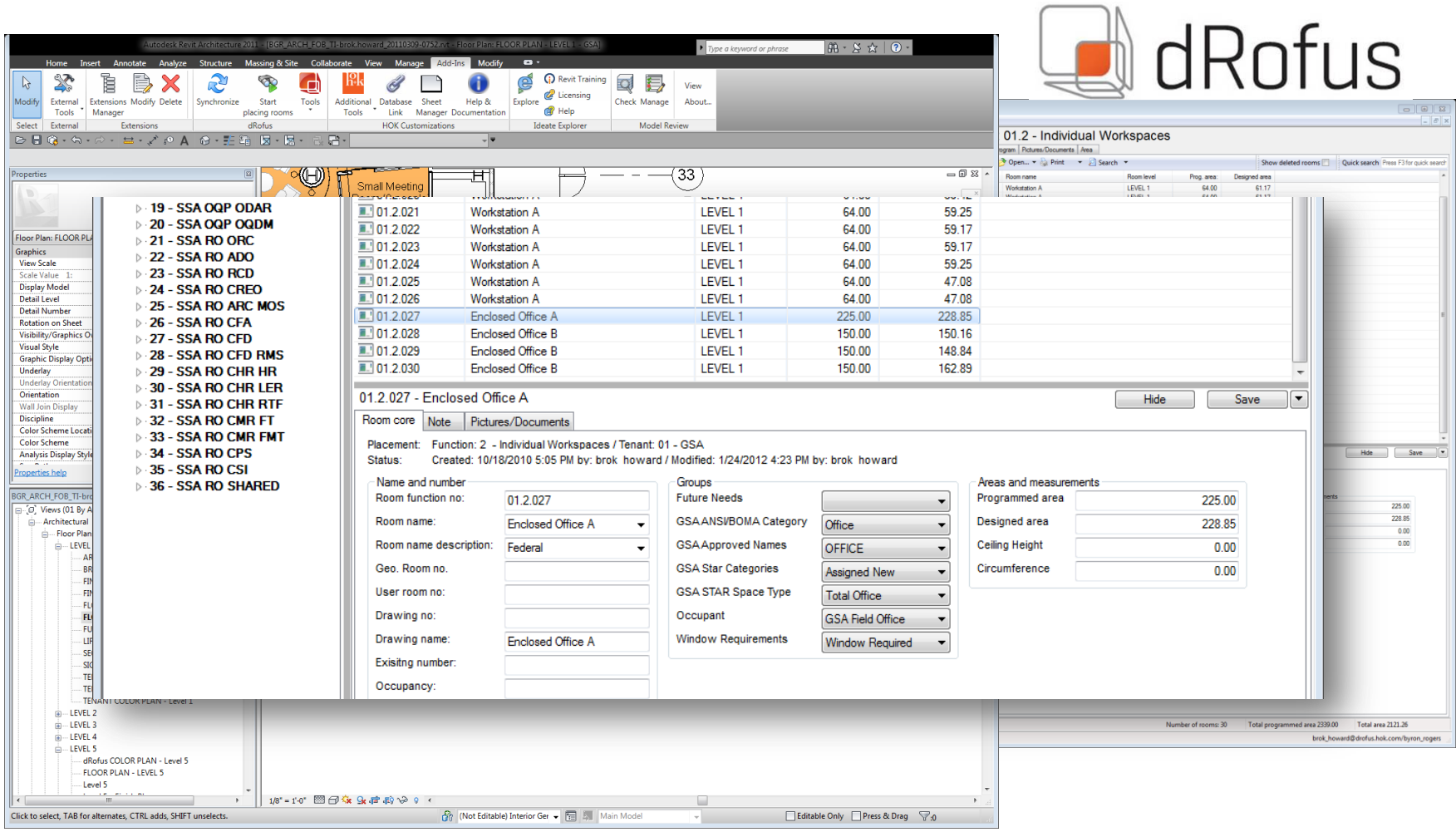
BIM PROCESS


ACE
ACE CIRCULATION
ADMIN
APPELLATE
APPELLATE CHIEF
APPELLATE CHIEF CIRCULATION
APPELLATE CIRCULATION
ASSET FORFEITURE
ASSET FORFEITURE CIRCULATION
SHARED
DISCUSSION POINTS:
APPROXIMATELY (6) 150 SQUARE FOOT OFFICES CAN MOVE UP TO THE AVAILABLE WINDOW SPACE. THIS WOULD FREE UP CORE SPACE.

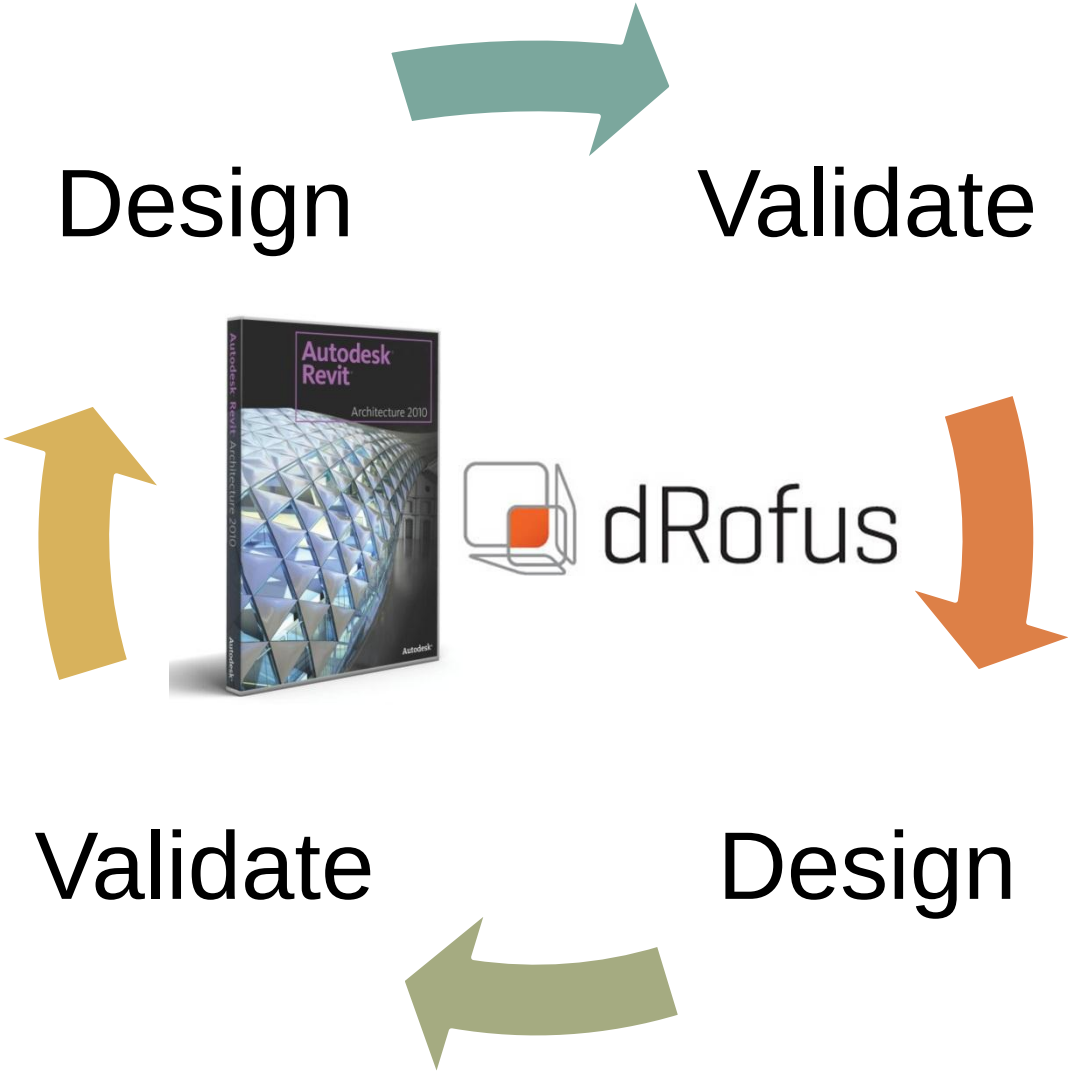

Additional Tools
Database Link
Sheet Manager
Help & Documentation
HOK Customizations


Element Tools - V2011.02.07
Room and Area Elements
Place Unplaced Areas
Place Unplaced Rooms
Create Rooms from Areas
View and Sheet Elements
Create Views from Rooms
Create Tagged Views from Rooms
Create Sheets from Views
Linked Elements
Manage Attachment Links
Reload Default Settings
Cancel

DATA MANAGEMENT

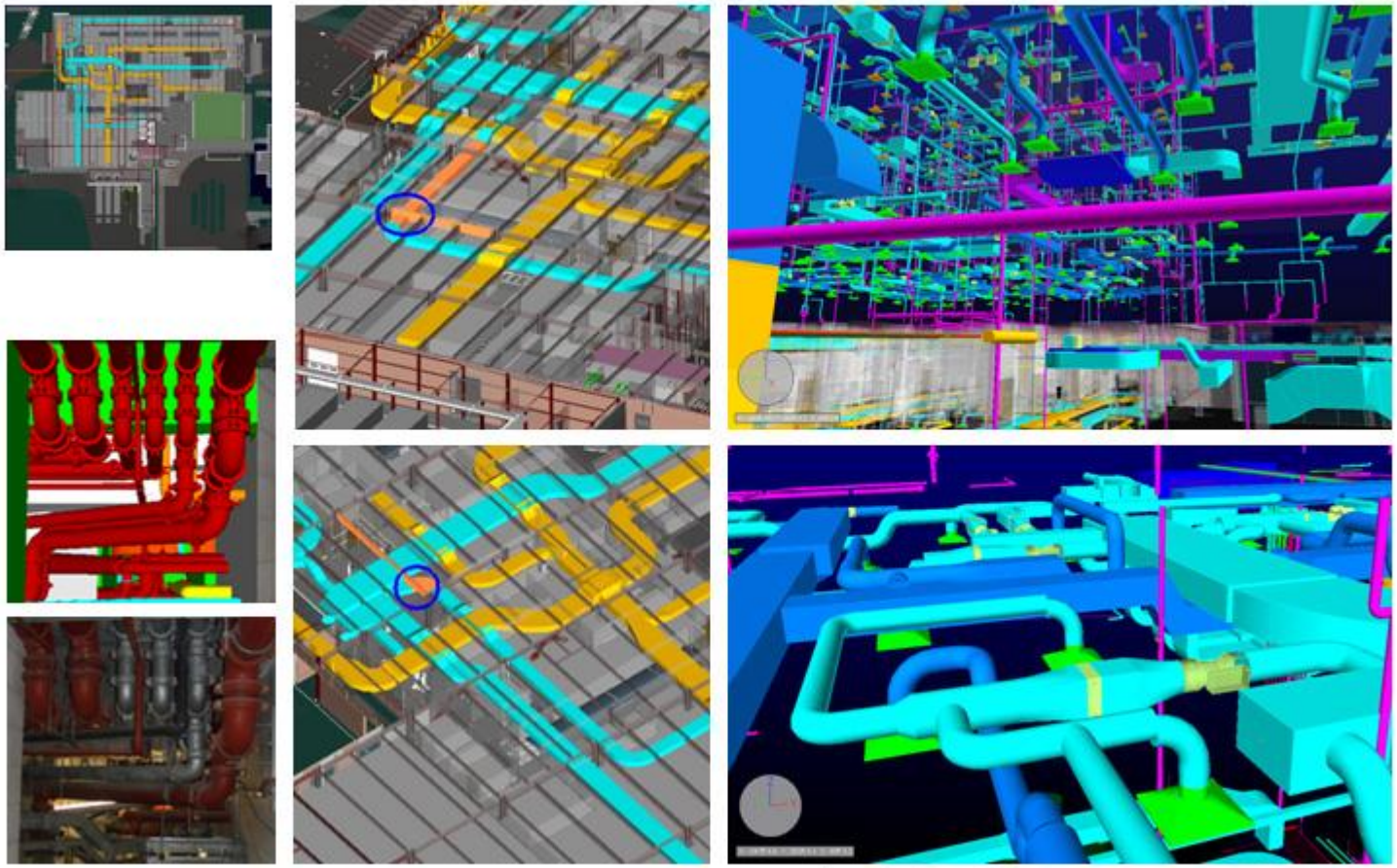


SPACE AUDIT


Design
Validate
Autodesk Revit
Architecture 2010
dRofus
Validate
Design

HOK buildingSMART

BIM: Model Review

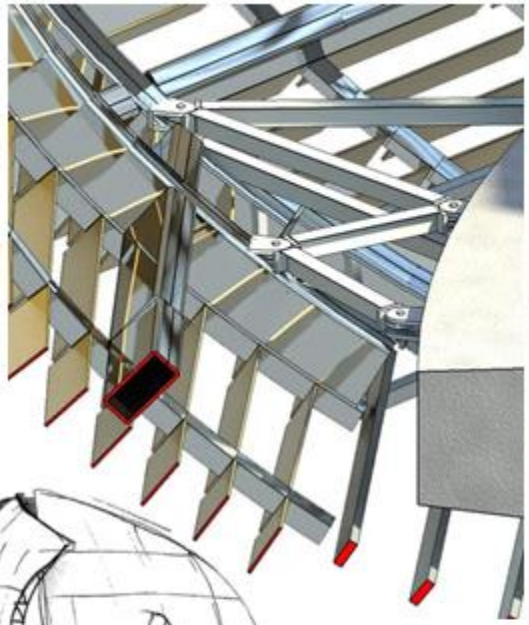


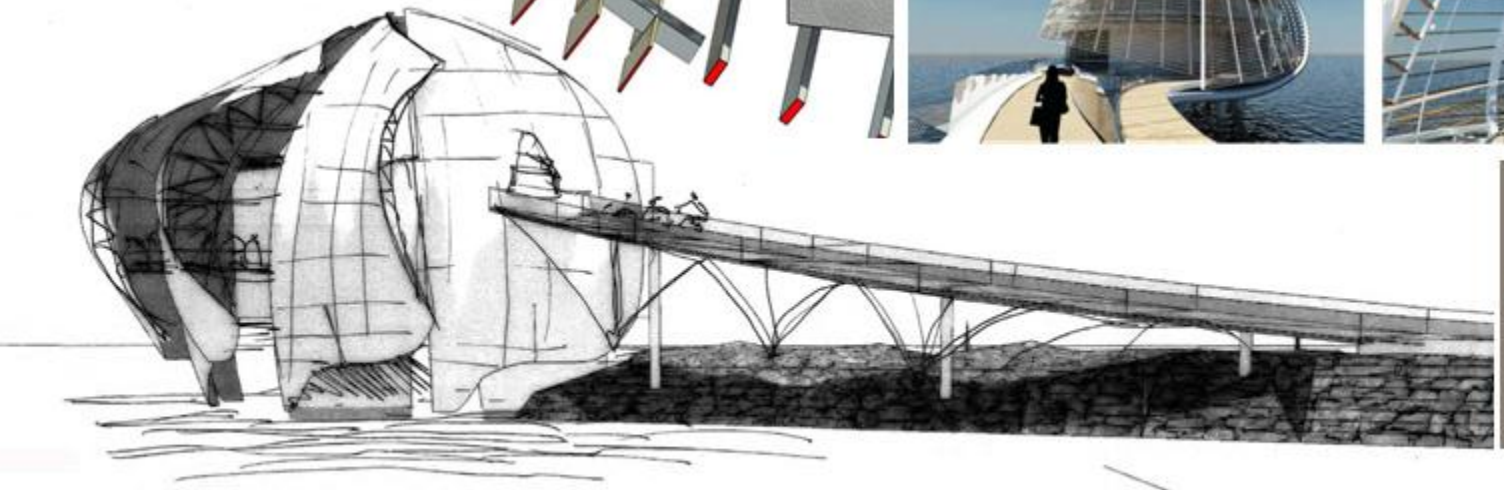
Large Healthcare Project

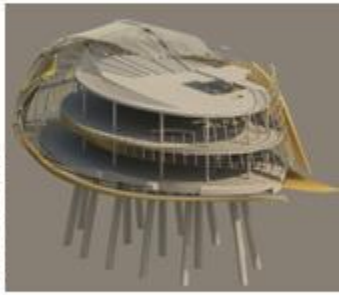
HOK buildingSMART

BIM UTILIZATION

- Building Visualization
- Parametric Modeling
- Document Coordination







Jumeirah Talise - Breakwater Restaurant

HOK buildingSMART

BIM: Interior Design

PROJECT DATA

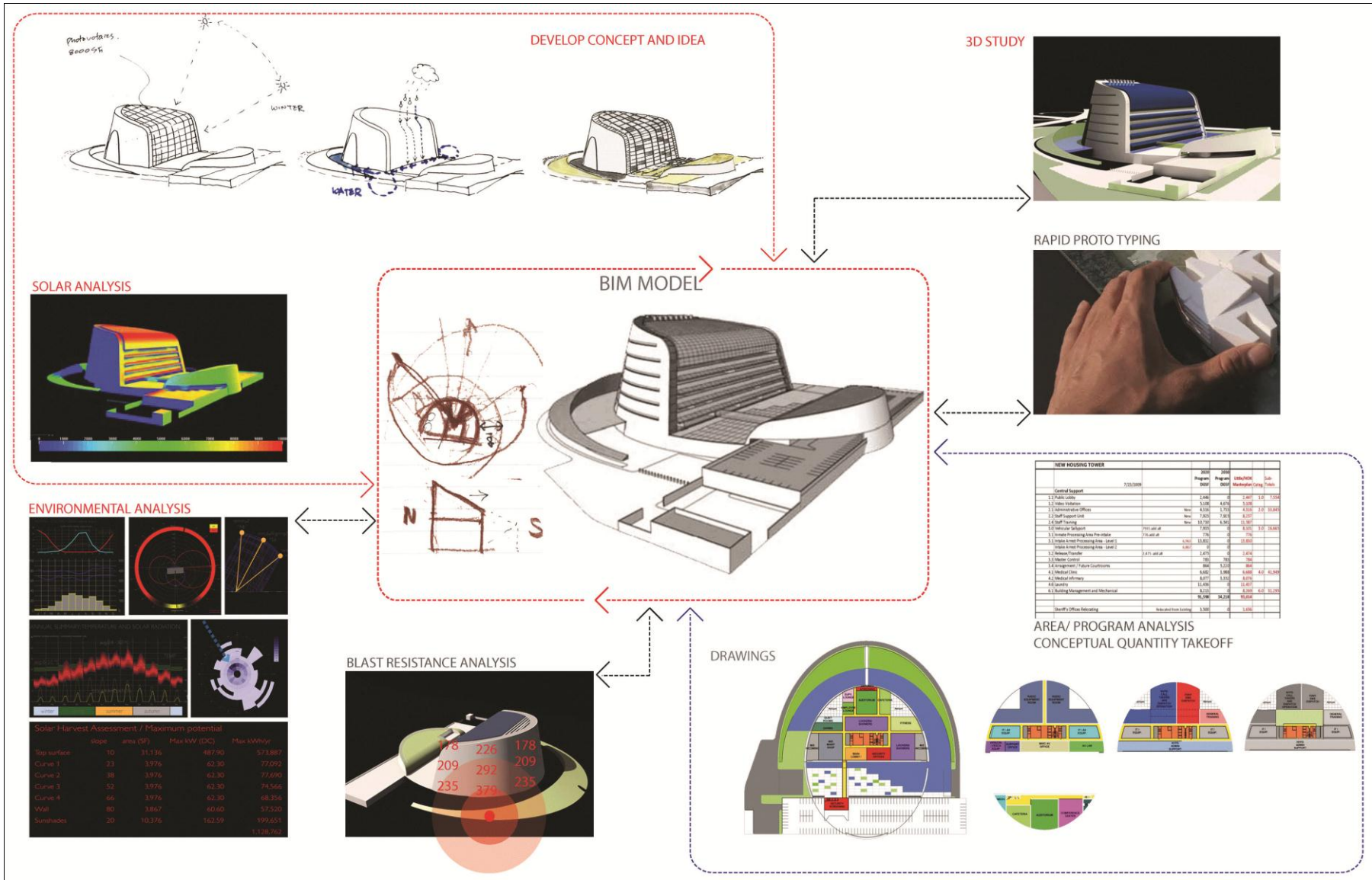
Location: Mexico

Use: Residential

Total Building Area: 90,000 m²

Garza Sada Residences

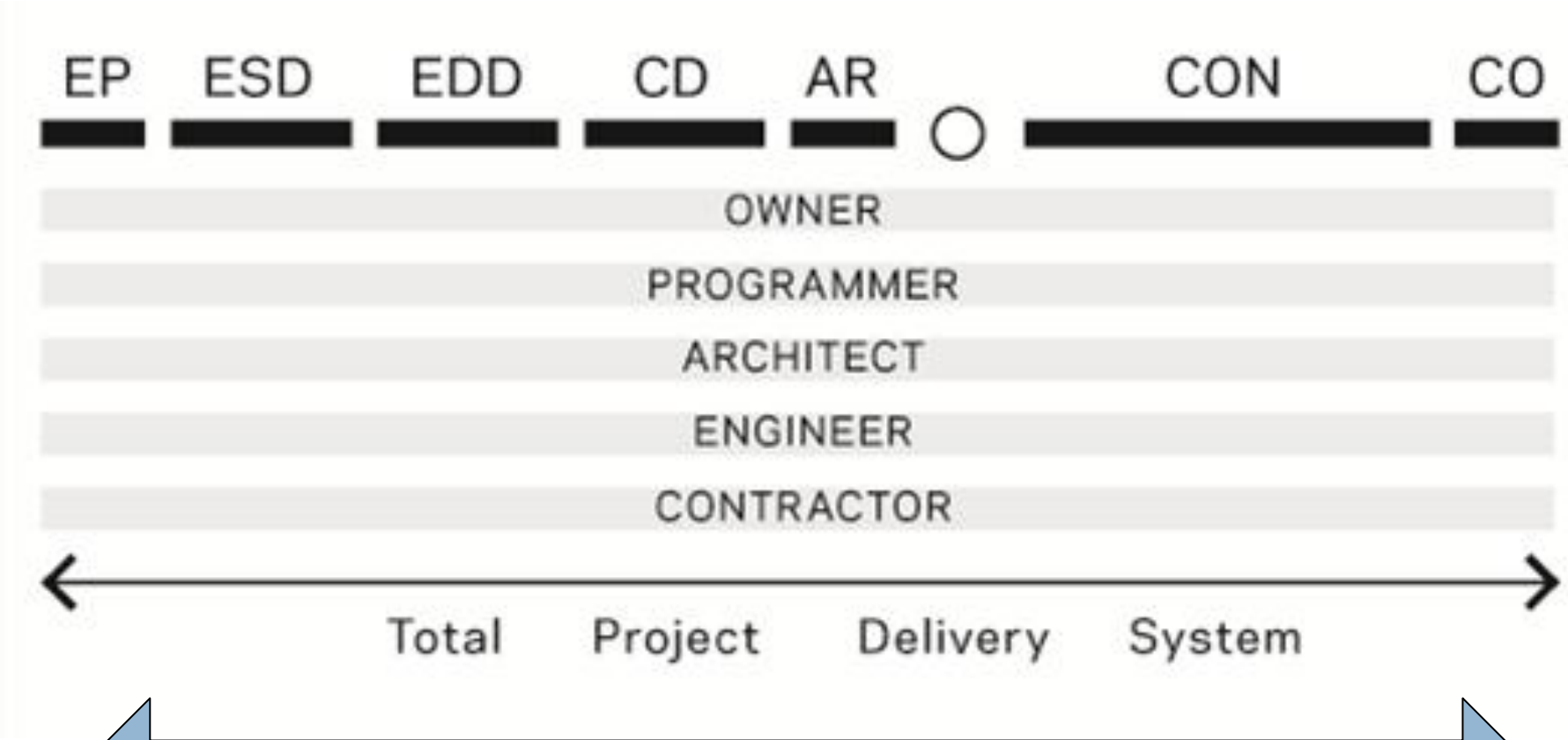
HOK buildingSMART



CASE STUDY: KAUST

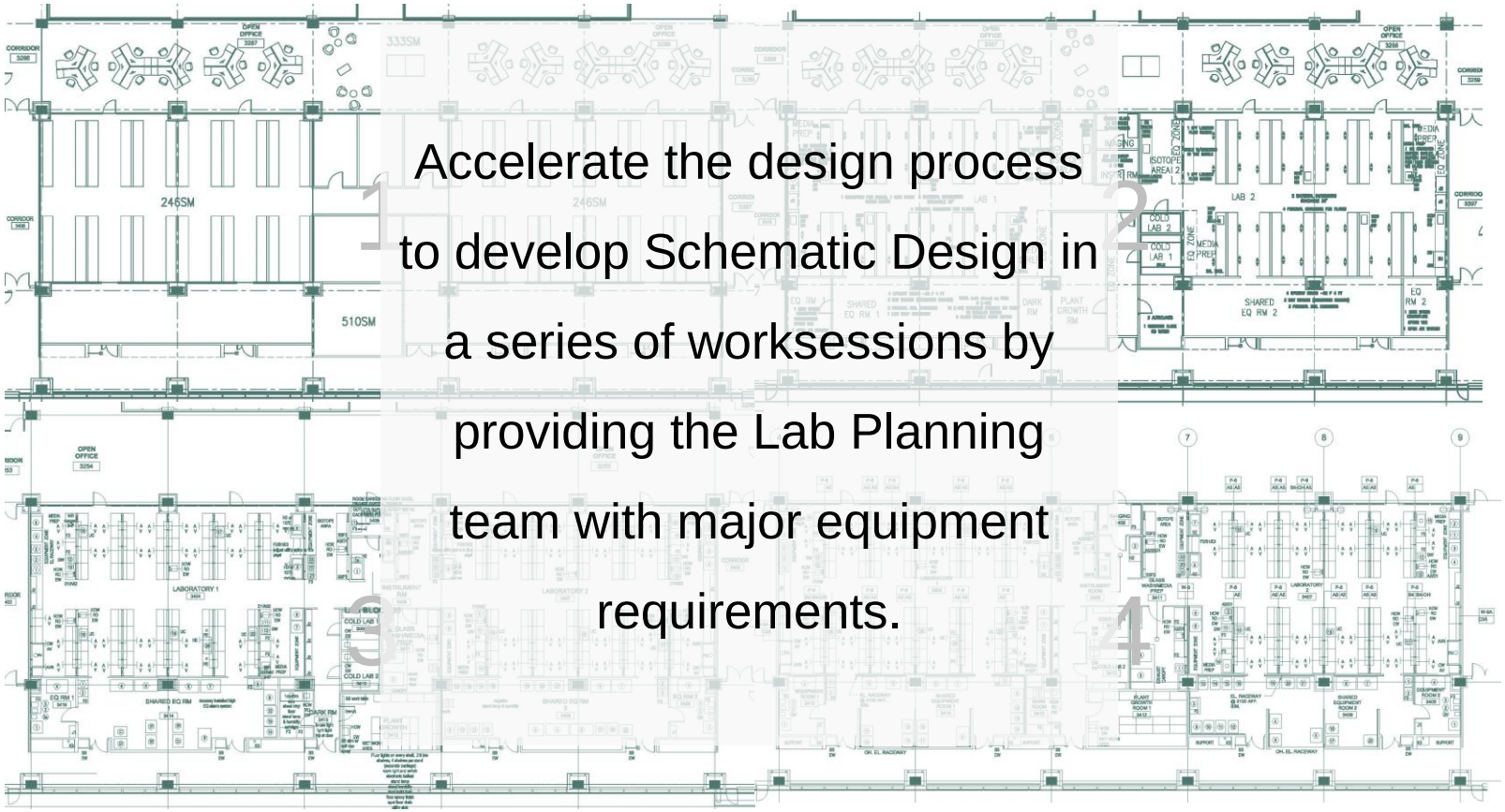
SITE — NOVEMBER 2007

KAUST PROJECT DELIVERY



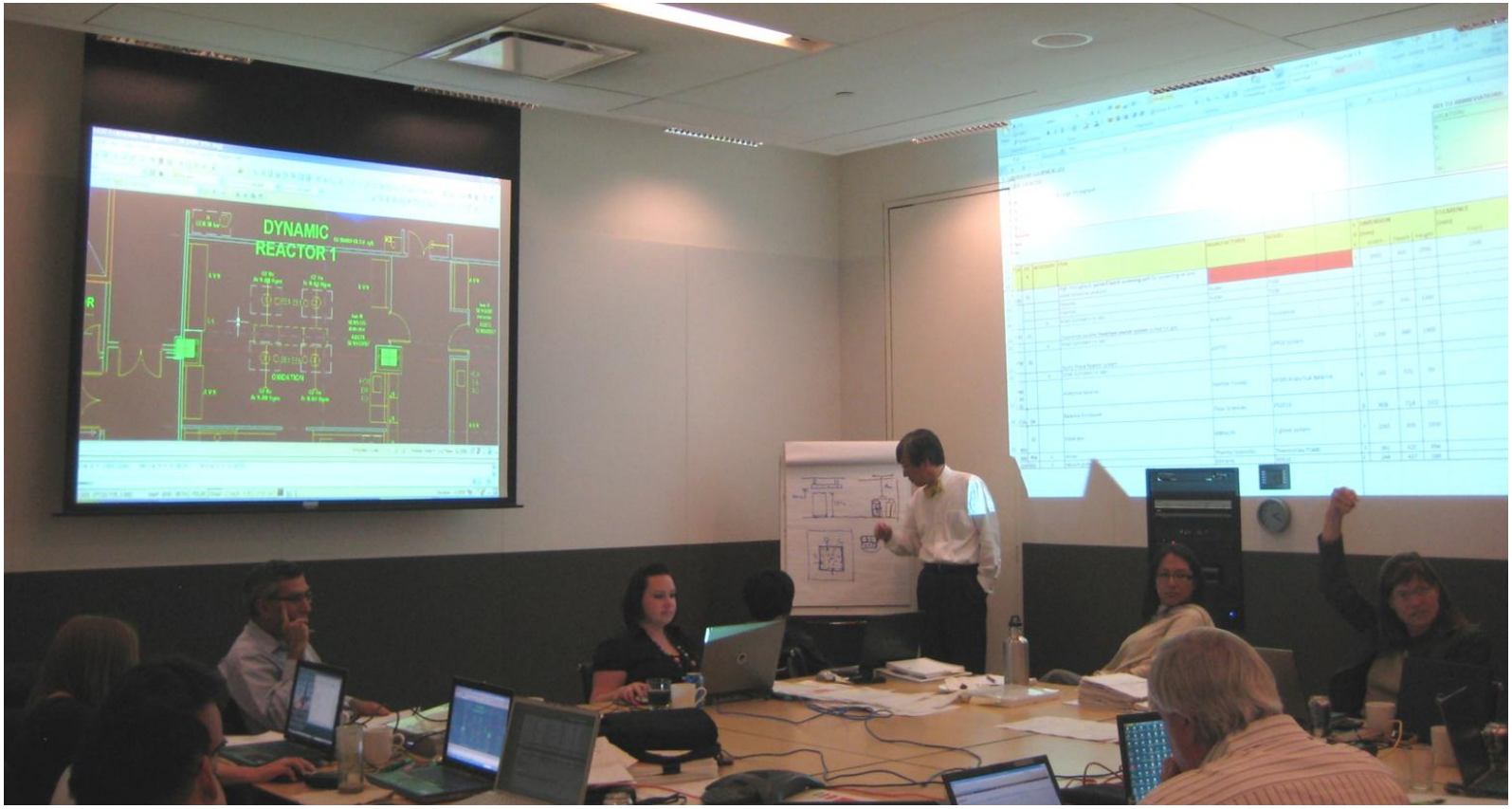
Program, Design, Build 12 MSF in 3 Years

PROJECT OBJECTIVE



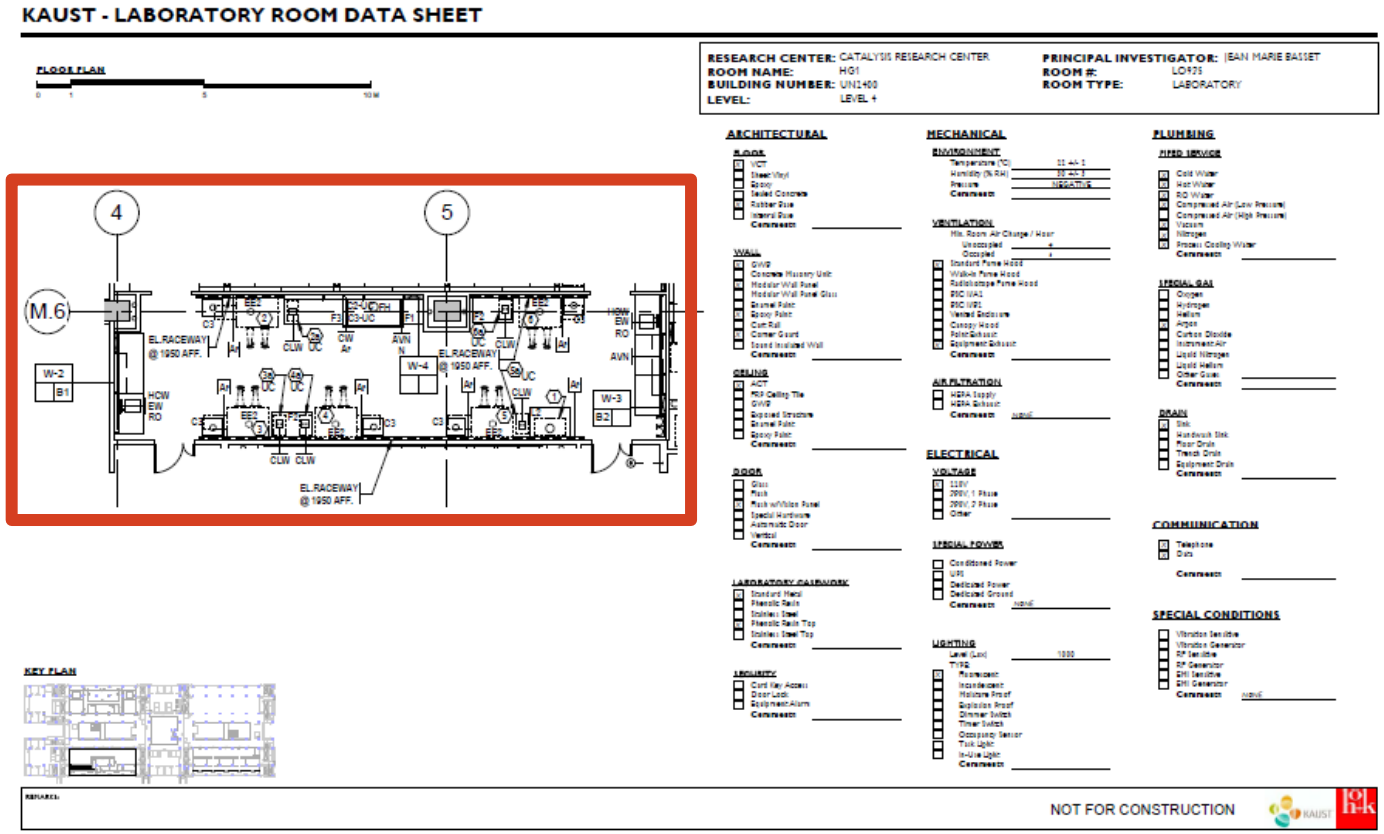
Accelerate the design process to develop Schematic Design in a series of worksessions by providing the Lab Planning team with major equipment requirements.

INFORMING DESIGN



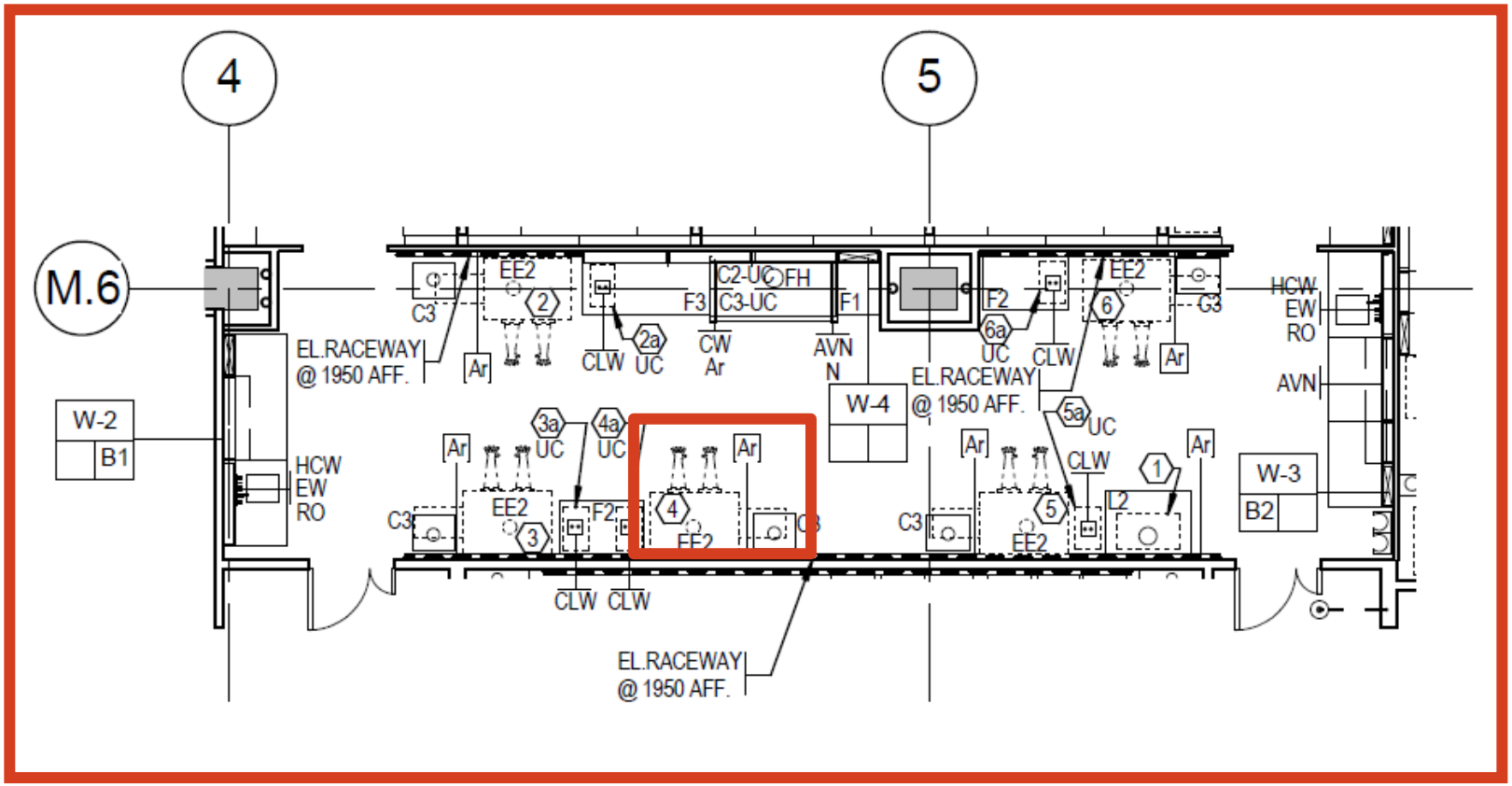
Catalysis Research Center, Worksession. Equipment lists and laboratory layouts are reviewed and modified throughout the worksession.

ROOM DATA SHEETS



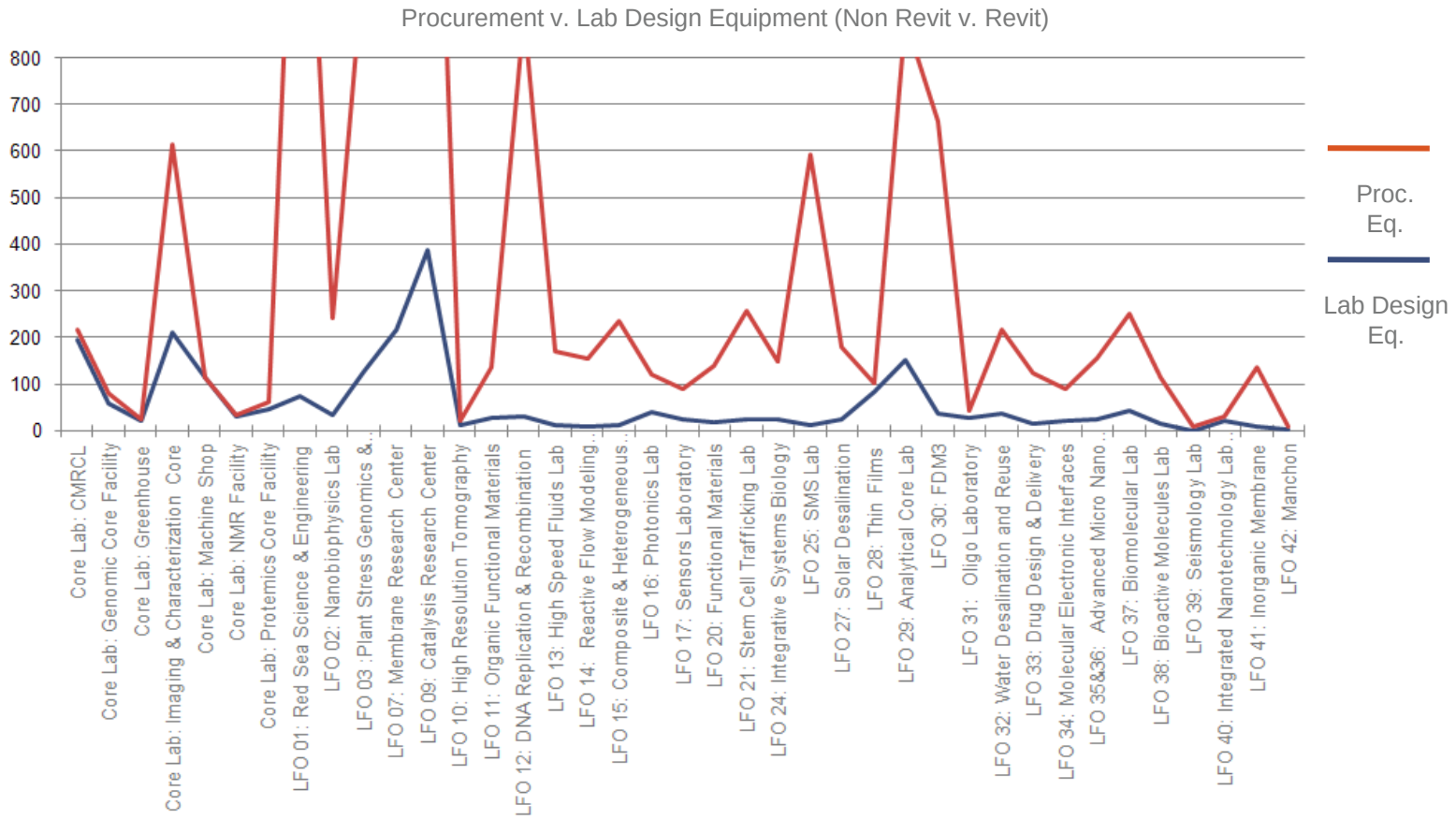
Example Room Data Sheet

ROOM DATA SHEETS

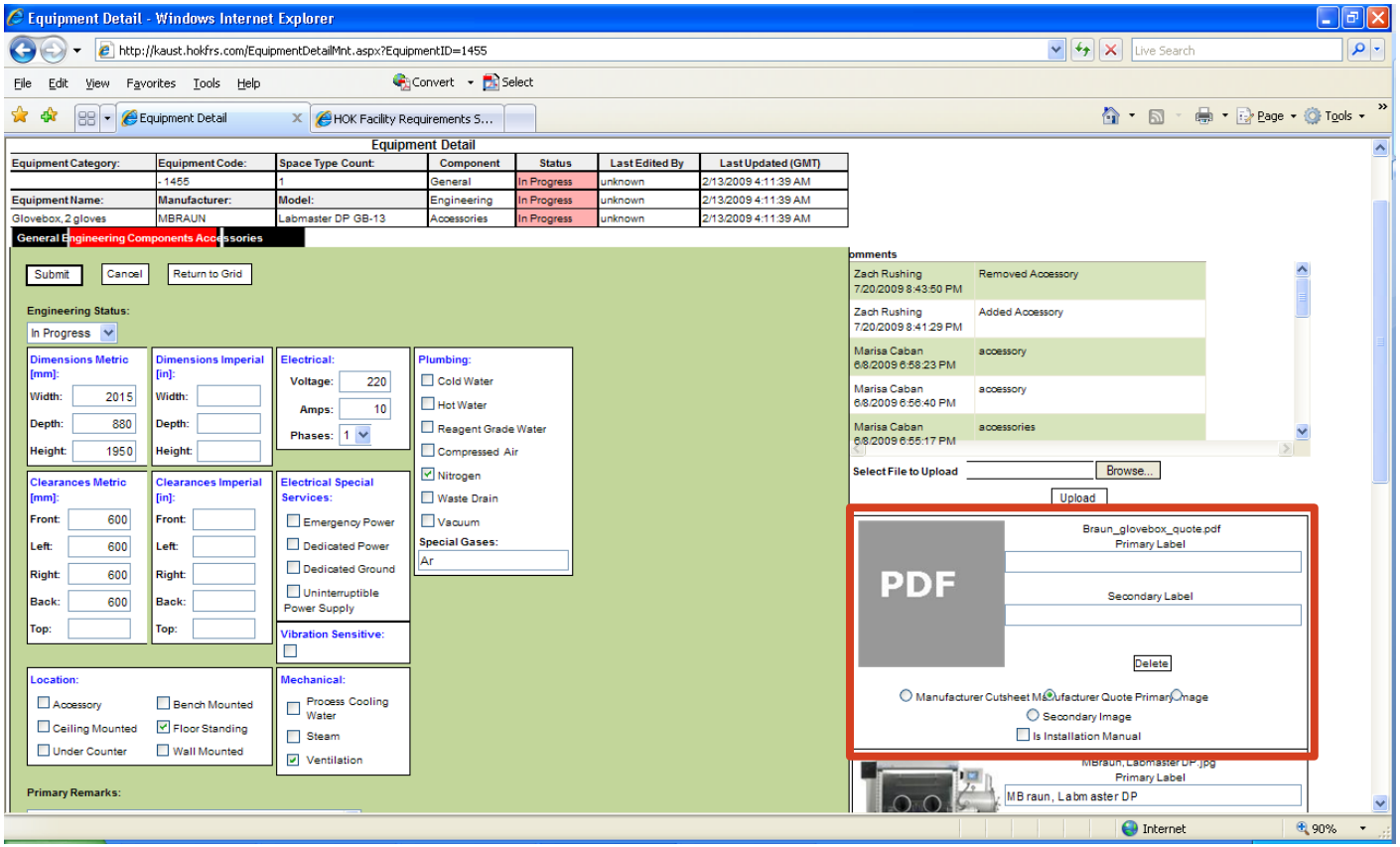


Room layout referencing an equipment item with an equipment number that references the equipment list.

EQUIPMENT PROCUREMENT

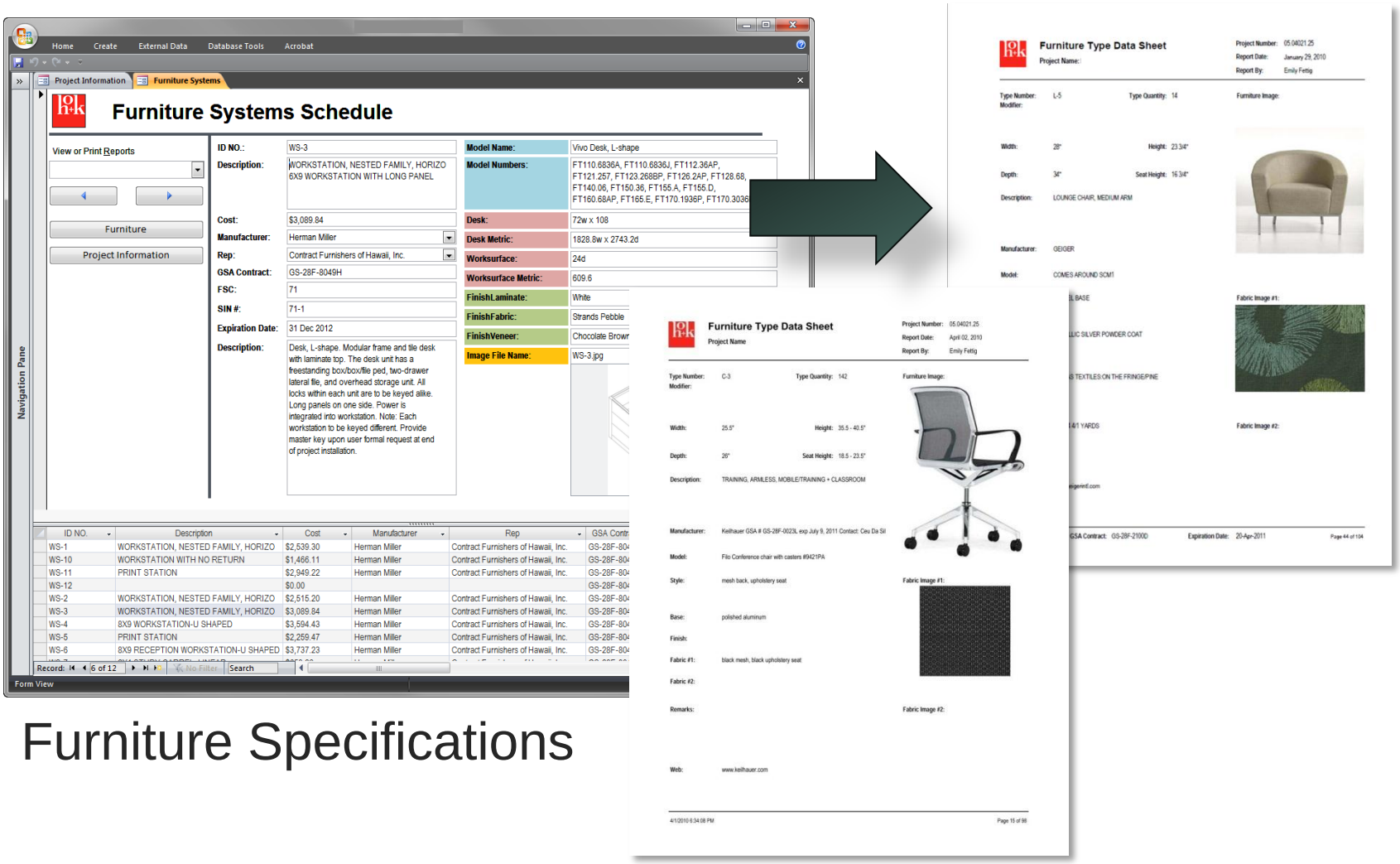


EQUIPMENT DETAIL: ENGINEERING DATA



Equipment engineering requirements

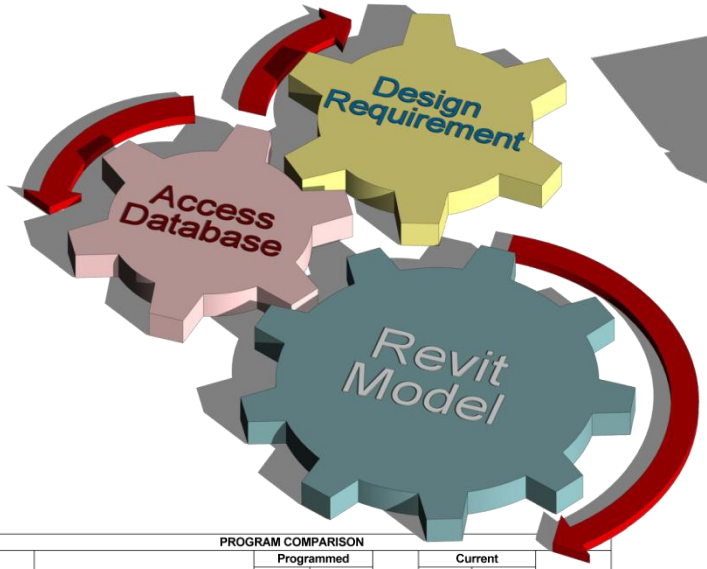
FURNITURE DATA

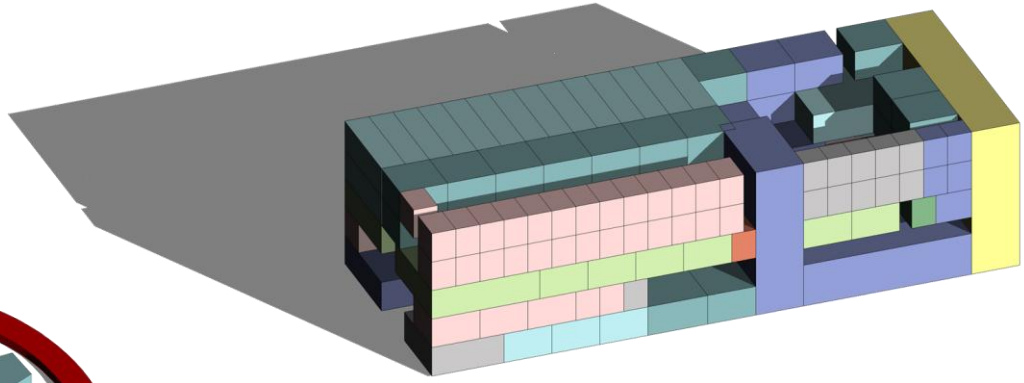


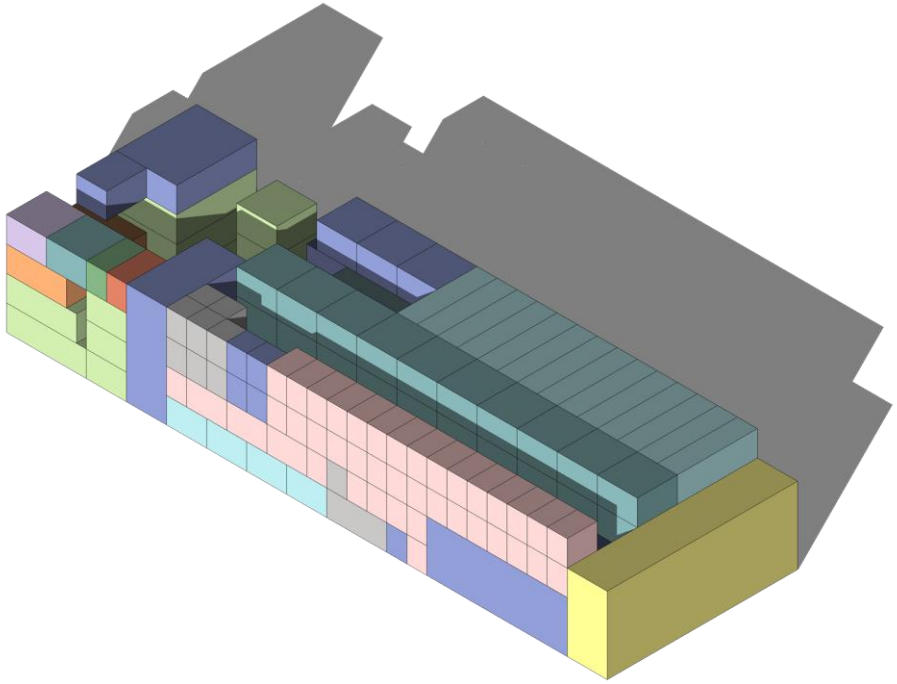
Furniture Specifications

CASE STUDY: Lab Project

DATA EXCHANGE

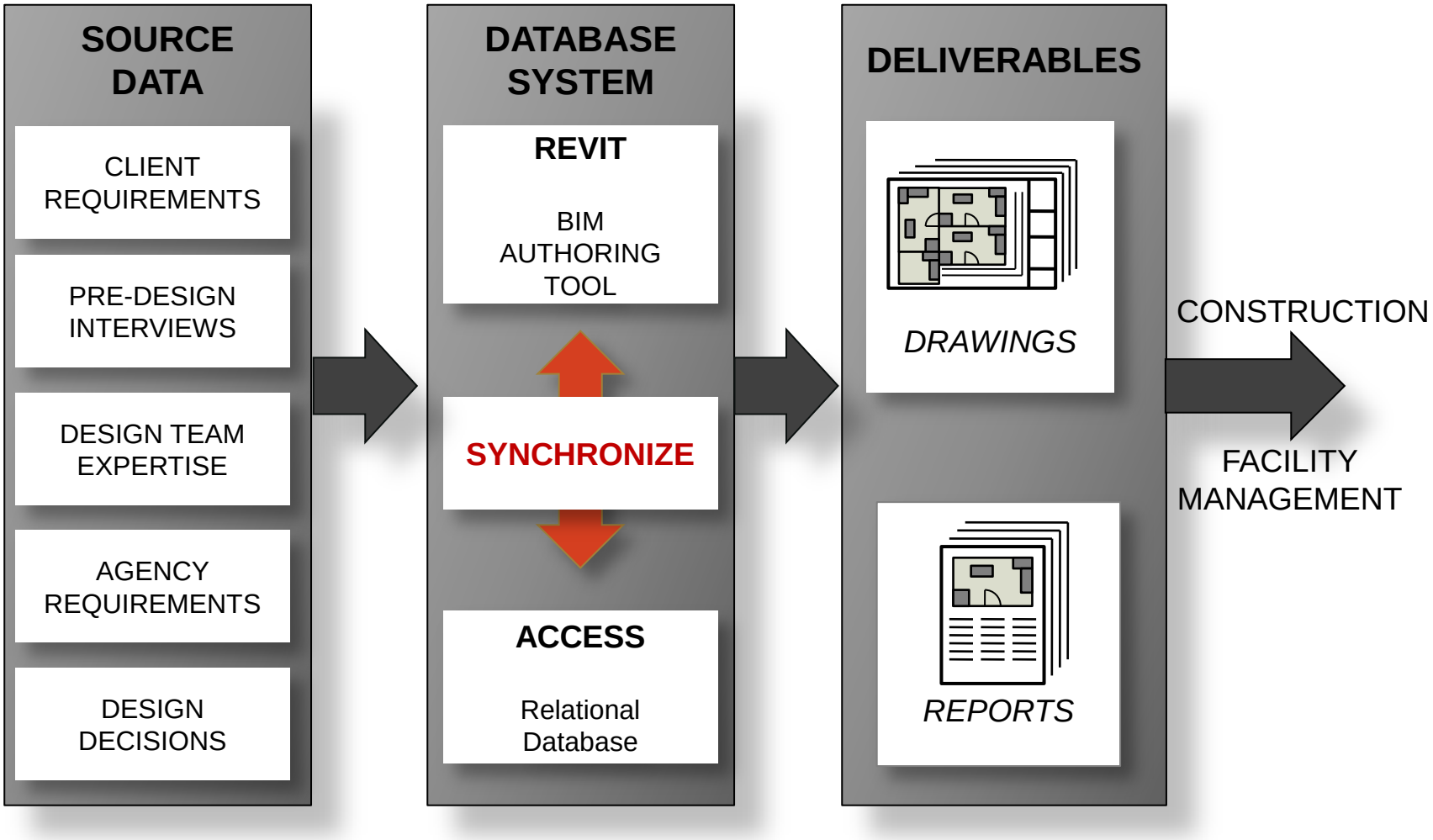






PROGRAM COMPARISON							
		Programmed			Current		
Room ID	Space Name	Quantity	Total NSF	Count	Quantity	Total NSF	Notes
1. TEACHING							
A. CLASSROOMS							
F.01	AUDITORIUM - LARGE - 500 SEATS	1	5,500	1	1	4,784	
F.03	CATERING KITCHEN	2	1,500	1	2	338	
F.03	CLASSRM - 20 SEATS	2	4,500	3	2	1,365	
F.03	CLASSRM - 30 SEATS	2	4,500	3	2	2,069	
F.03	CLASSRM - 60 SEATS	2	1,500	1	2	1,401	
F.03	CLASSRM - 60 SEATS (TIERED)	2	3,000	2	2	2,802	
F.03	CLASSRM STOR.	2	1,500	1	2	220	
F.03	CLASSROOM - TESTING	2	1,500	1	2	1,639	
F.03	LAB STOR.	2	1,500	1	2	455	
F.03	LOBBY (500 SEAT AUDITORIUM)	2	1,500	1	2	1,401	
F.03	MODEL CLEAN LAB	2	1,500	1	2	455	
F.03	SKILLS LAB	2	1,500	1	2	1,401	
F.03	SKILLS LAB STORAGE	2	1,500	1	2	220	
F.03	STUDENT STUDY	2	3,000	2	2	4,232	
A. CLASSROOMS: 20			34,000			22,784	
2. RESEARCH							
B. RESEARCH LABS							
F.03	CORE - LABS	2	1,500	1	3	2,116	
F.03	RES. LAB	2	40,500	27	1	12,090	
F.03	RES. LAB SERV.	2	31,500	21	1	9,557	
B. RESEARCH LABS: 49			73,500			23,763	
C. CDDC							
F.03	"BIG LAB"	2	1,500	1		924	
F.03	CIP SYSTEM	2	1,500	1		164	
F.03	CLEAN ROOM	2	1,500	1		690	
F.03	CLIMATE / STABILITY CHAMBERS	2	1,500	1		338	
F.03	DC LAB	2	1,500	1		690	
F.03	FAC. ENG. OFFICE	2	1,500	1		690	

DATA EXCHANGE



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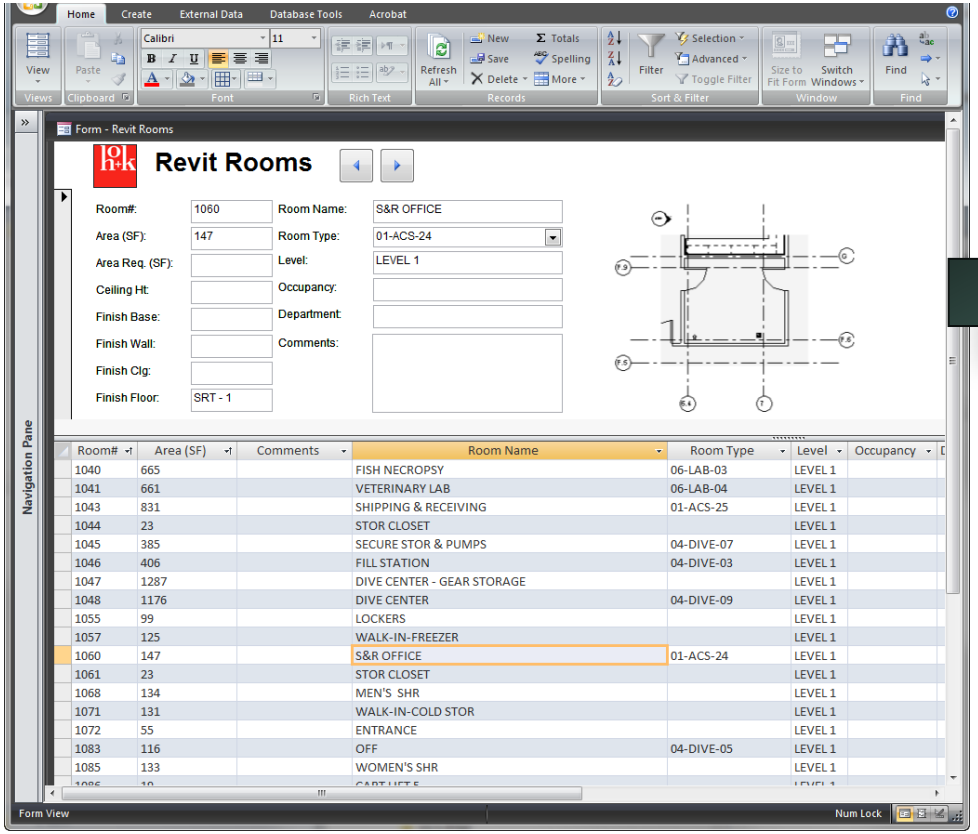
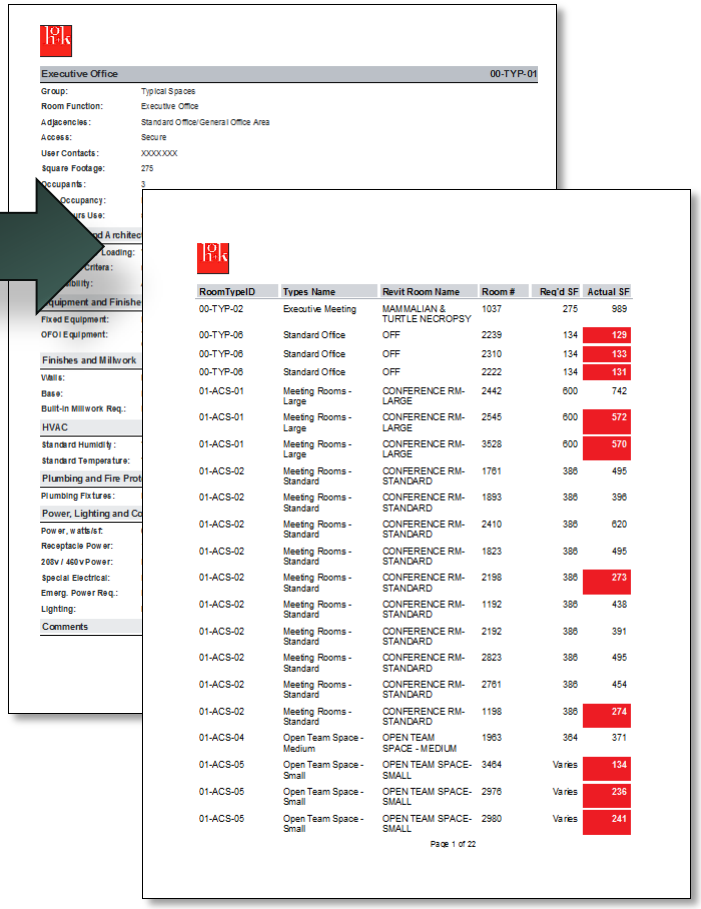
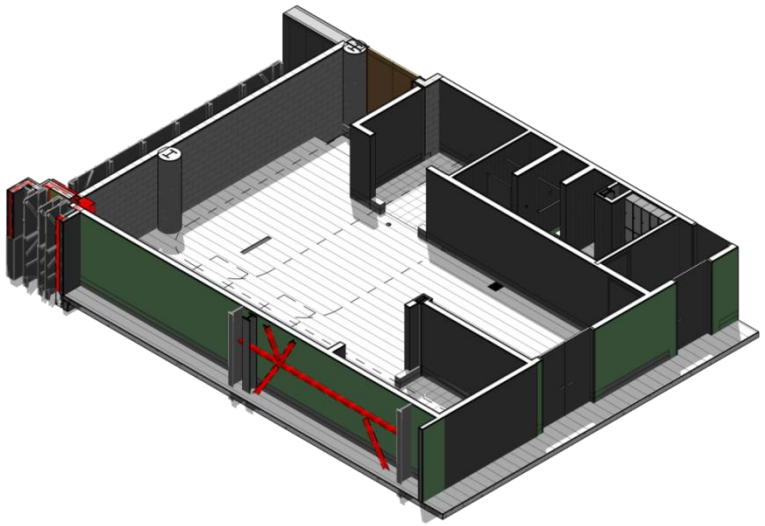
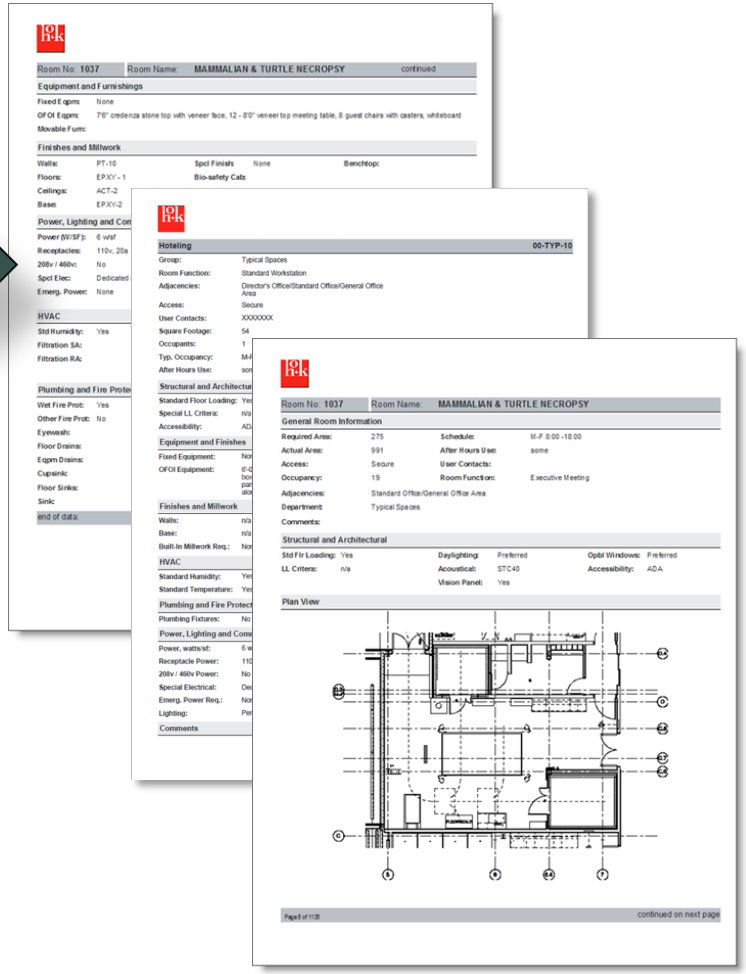




Design Validation Analysis

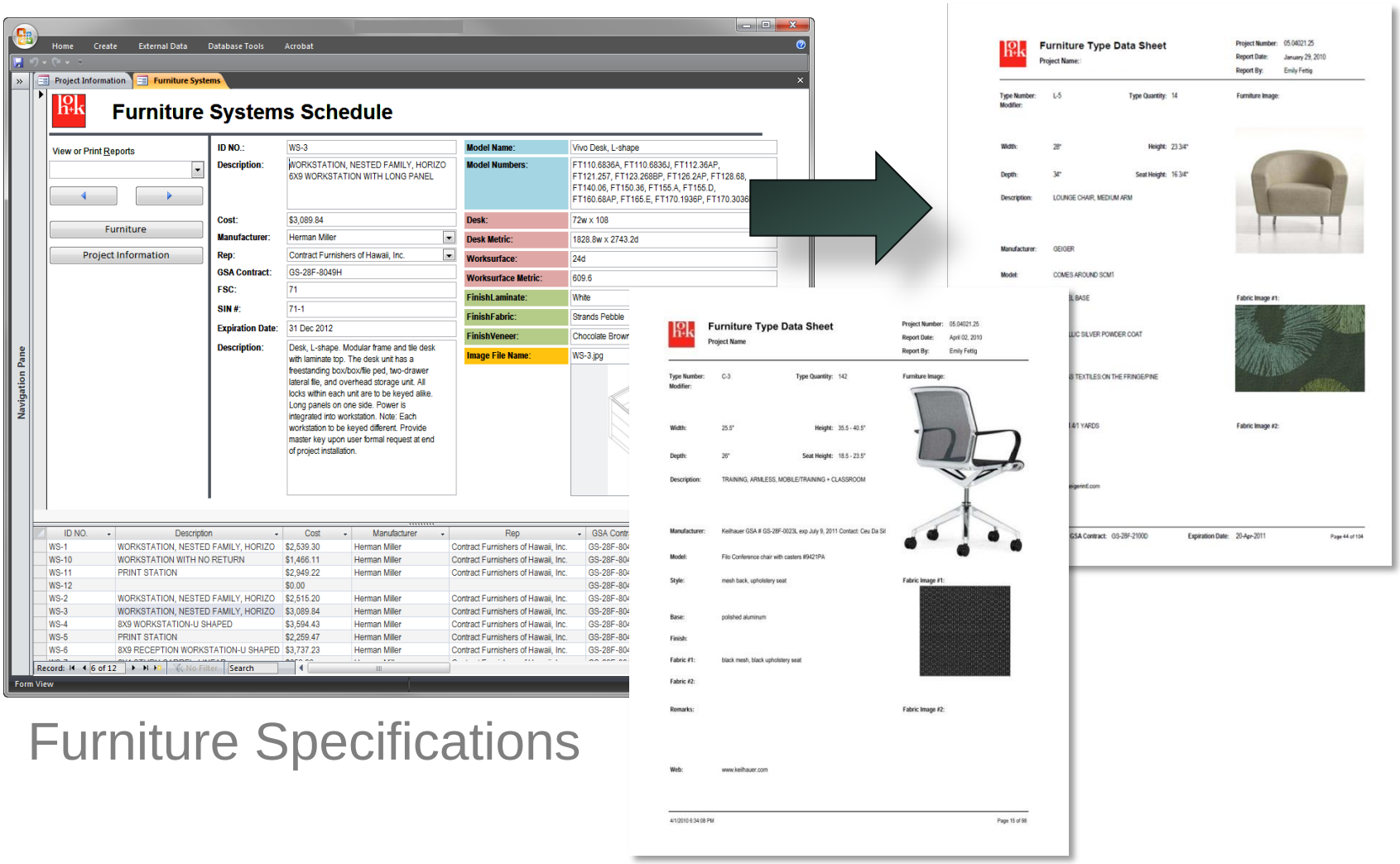
DATA EXCHANGE





Room Data Reports

DATA EXCHANGE



Furniture Specifications

CONCLUSION

To capitalize on BIM information for FM, begin with programming and continue throughout the facility life cycle.

The role of the programmer/facility planner is evolving to include information management throughout the process. This entails:

- Existing client data can feed into program requirements;
- Programming results can now serve a design auditing function;
- New data management capabilities can decrease friction in the programming process;
- Programming data is extracted from client operational information and then feeds client facility management functions when construction is complete; and
- Tools are emerging that increase efficiency throughout the process.

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