

How Does Our Program Measure Up?

Jonathan Dandois: Johns Hopkins Facilities and Real Estate
Will Garmer: JMT Technology Group



The Art and
Science of
Interior Space
Floorplan
Mapping



Will Garmer
Jonathan Dandois

Johns Hopkins Facilities and Real Estate

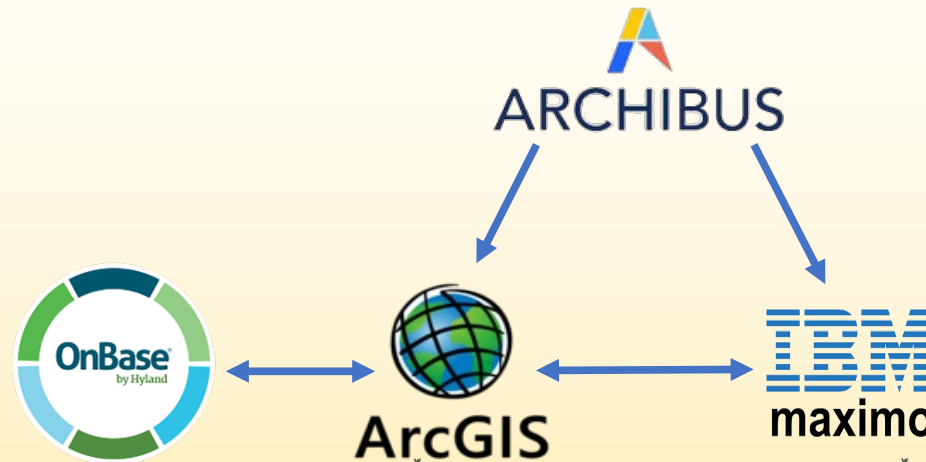
Johns Hopkins Facilities & Real Estate (JHFRE) provides:

- Full **plant operations support** for the Johns Hopkins Homewood campus
- **Planning, design, and construction** for the schools and divisions across the Johns Hopkins enterprise, including Baltimore and Washington, D.C
- **Leasing and property management** for the university as well as the Health System and its affiliates

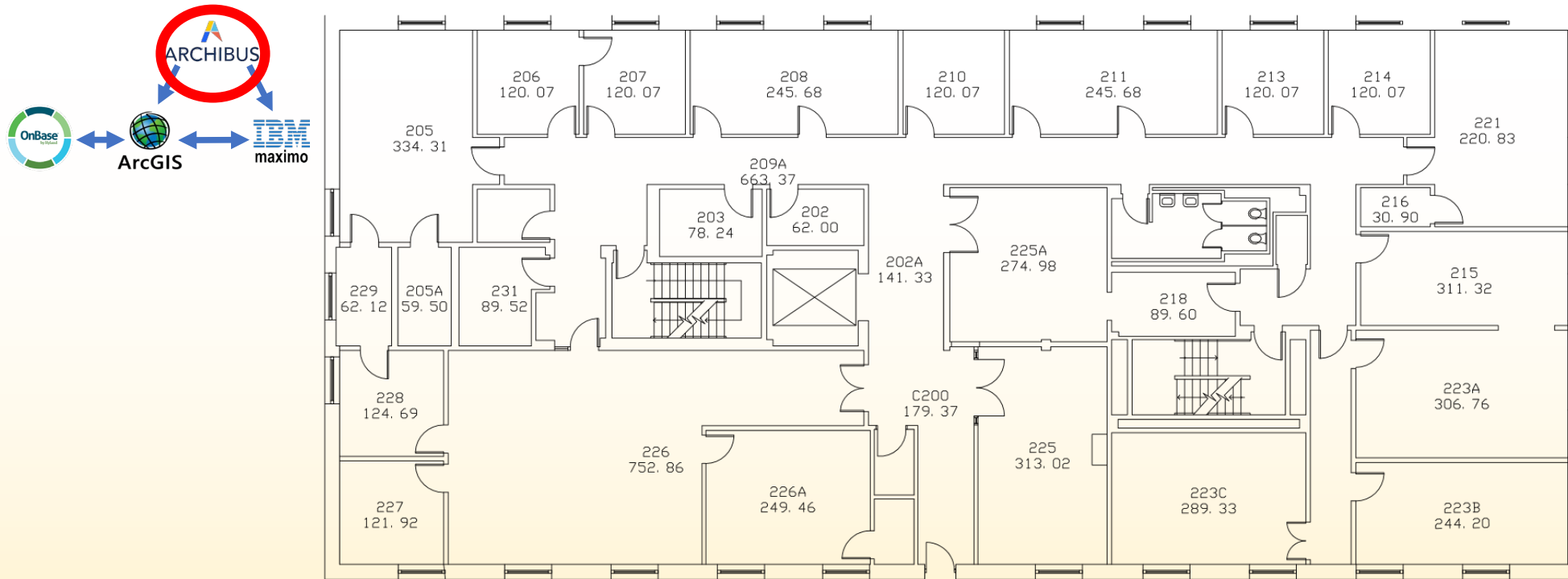
JHFRE Information Technology Team

Supports all JHFRE enterprise systems:

Esri ArcGIS, Archibus, IBM Maximo, OnBase and more...

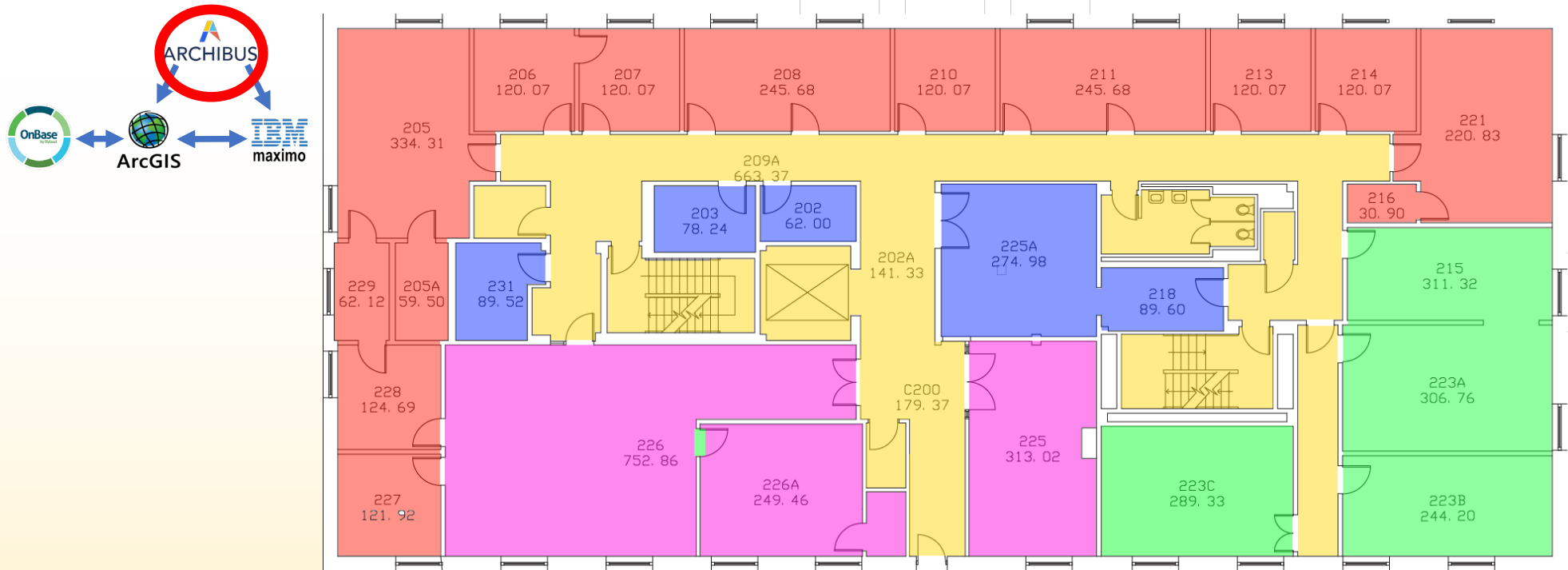


Driven by building & space management data



Supported by accurate, up-to-date floorplans highlighting space use, type, occupancy, and size (SF)

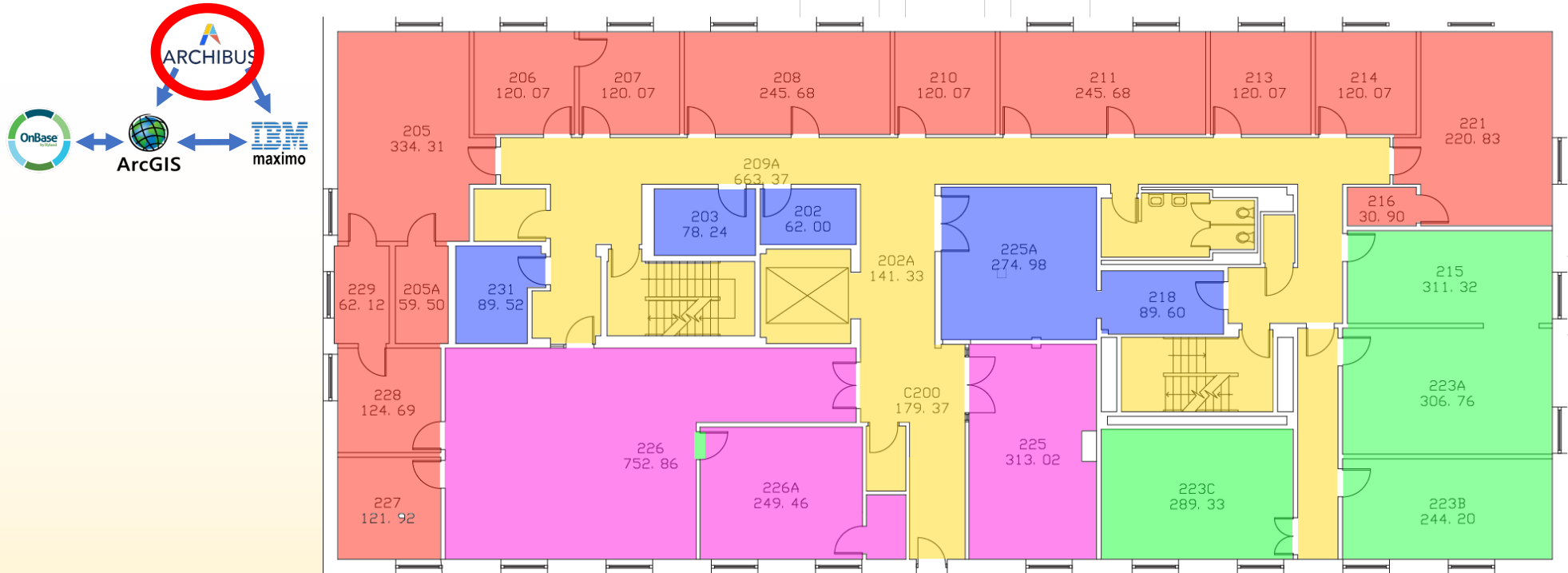
Driven by building & space management data



Requiring updated architectural floorplans and space delineations of room and corridor outlines

So what? This is a GIS conference 🌐🌐🌐...

GIS Data → Space → Floorplans → Interior Space



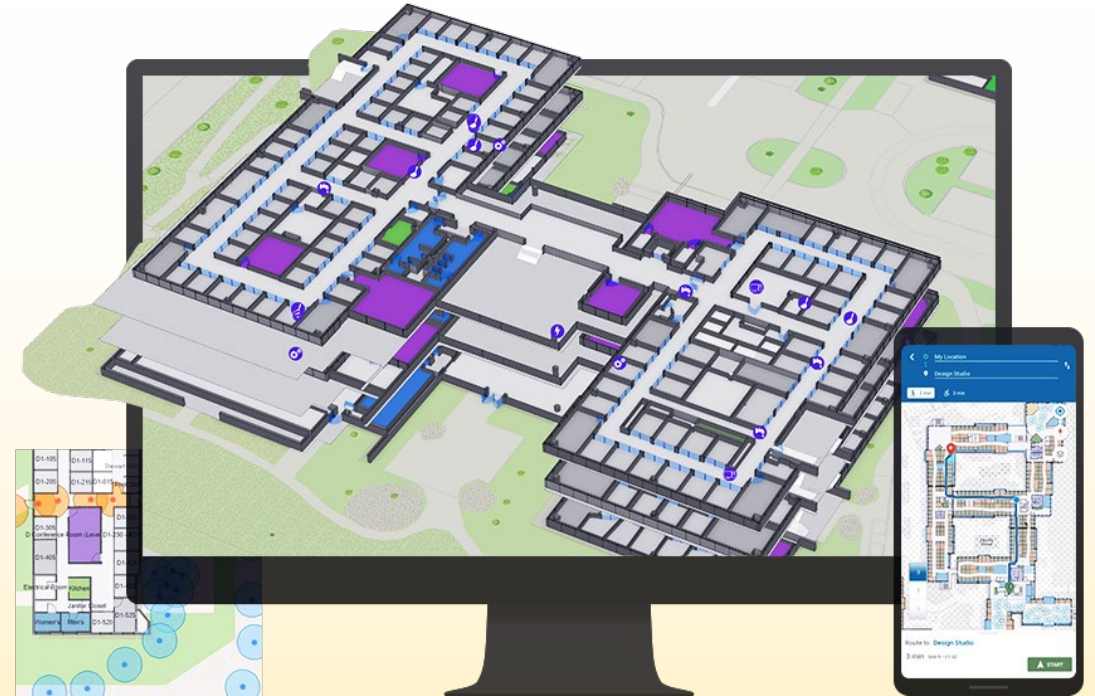
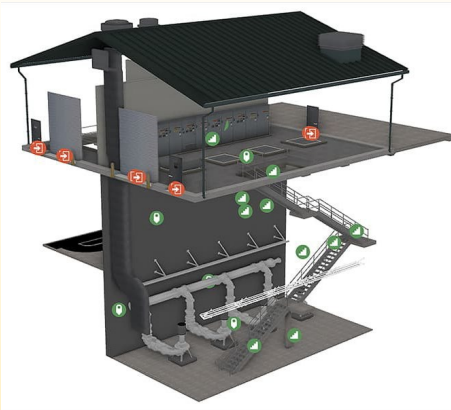
Measurement of space combined with **attribute information** is a core component of GIS...

GIS is moving indoors...



ArcGIS Indoors

Indoor GIS for smarter building management



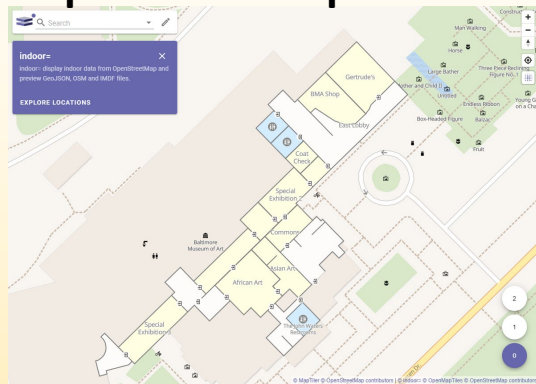
<https://www.esri.com/en-us/ig/industry/water/raleigh-water-case-study>
<https://www.esri.com/en-us/arcgis/products/arcgis-indoors/overview>

GIS is moving indoors...

Whatever the system, this means:

- New data formats
- New web interfaces
- New UI challenges
- New solutions
 - Wayfinding
 - Asset management
 - Space management
 - Scheduling

OpenStreetMap Indoor=



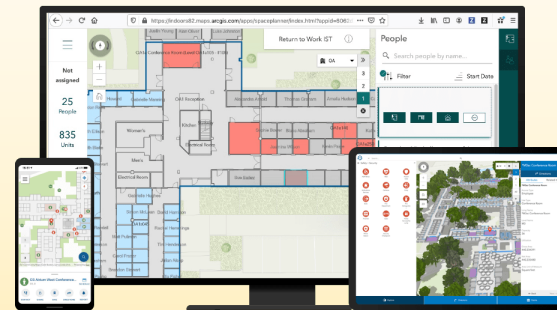
<https://indoorequal.org/#map=-39.66/39.325935/-76.6194132>

Mapbox GL Indoors



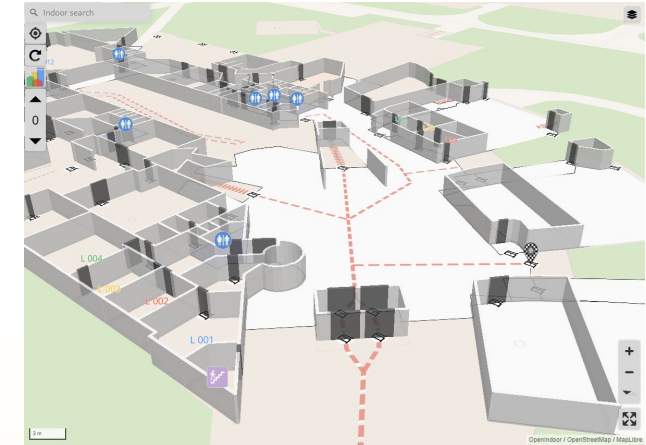
<https://map-gl-indoors.github.io/#18.3/48.876877/2.359316>

ArcGIS Indoors



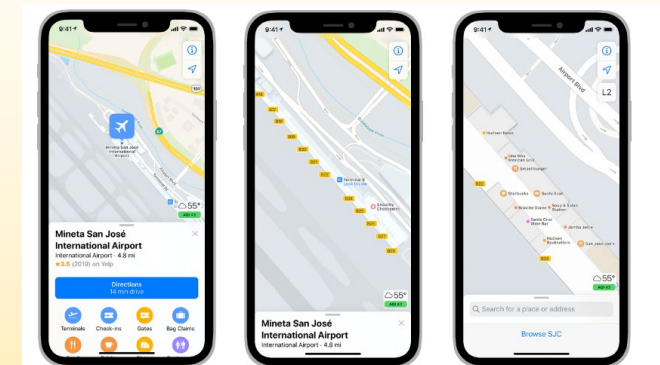
<https://www.esri.com/en-us/arcgis/products/arcgis-indoors-2021-webinar-series>

OpenStreetMap OpenIndoor



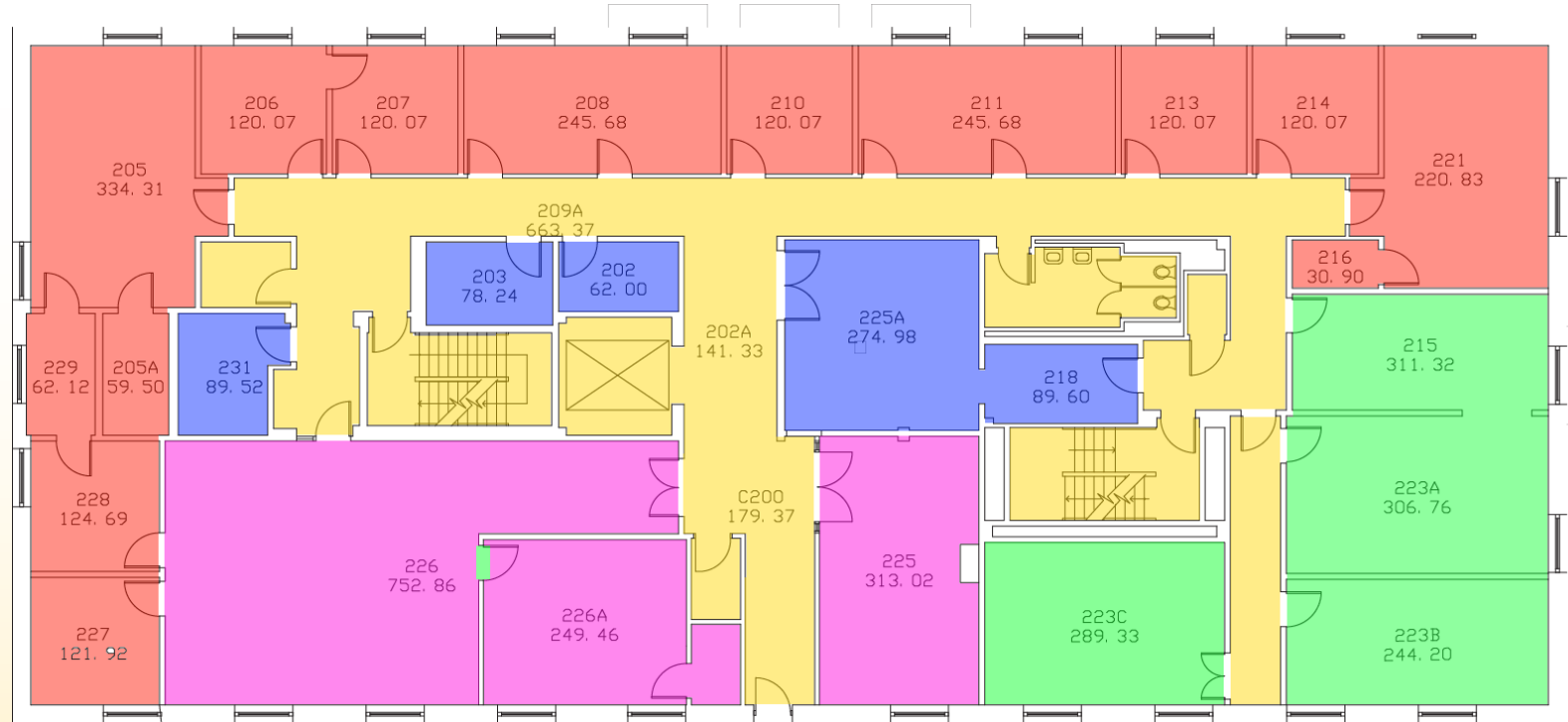
<https://app.openindoor.io/#19.85/48.119538/-1.7018598/58.4/58>

Apple Indoor Maps



https://register.apple.com/resources/indoor/program/indoor_maps

But it all still requires good data



JHFRE Space Management

Space Management by the numbers:

100+ Buildings at JHU Homewood campus and vicinity

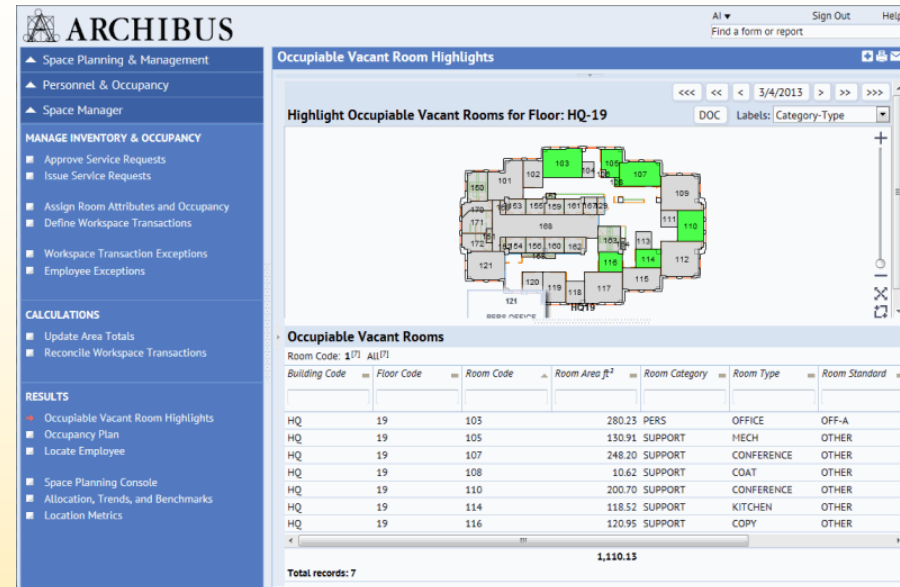


Over 4 million ft² of interior space
across 100's of CAD files

Archibus for interior space management

Introduction to Archibus

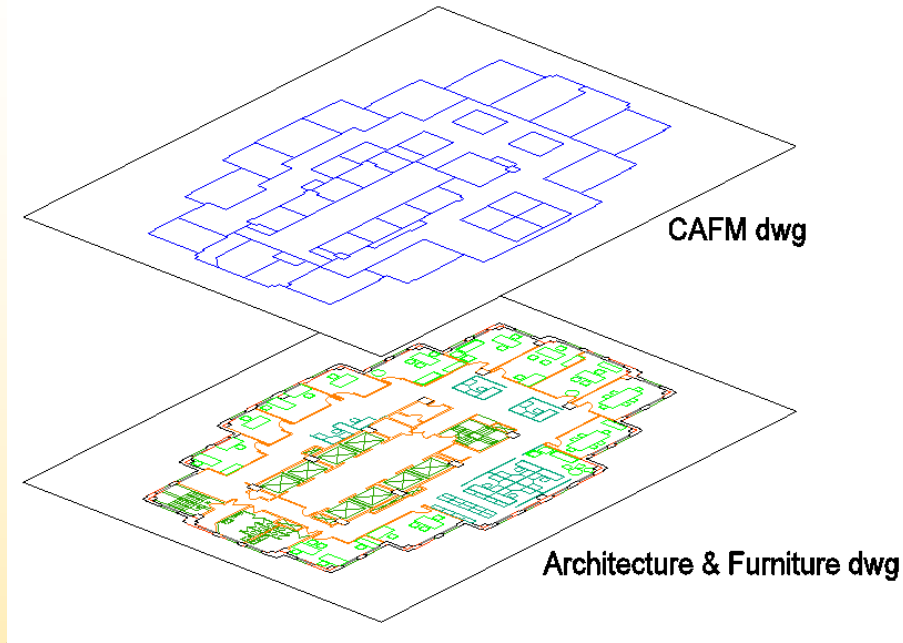
- SQL Server DB, DWGs, AutoCAD plugins, Web-based interface
- Rooms
 - Square footage
 - Use, Type, Category
 - Building
 - Floor
 - Department / Division
- Planning, Budgeting
- Divisional square footage calc.
- Federal indirect cost recovery



Archibus for interior space management

AutoCAD DWGs linked to an Enterprise Database

External reference (XREF) stacking diagram



Archibus “rooms” database table

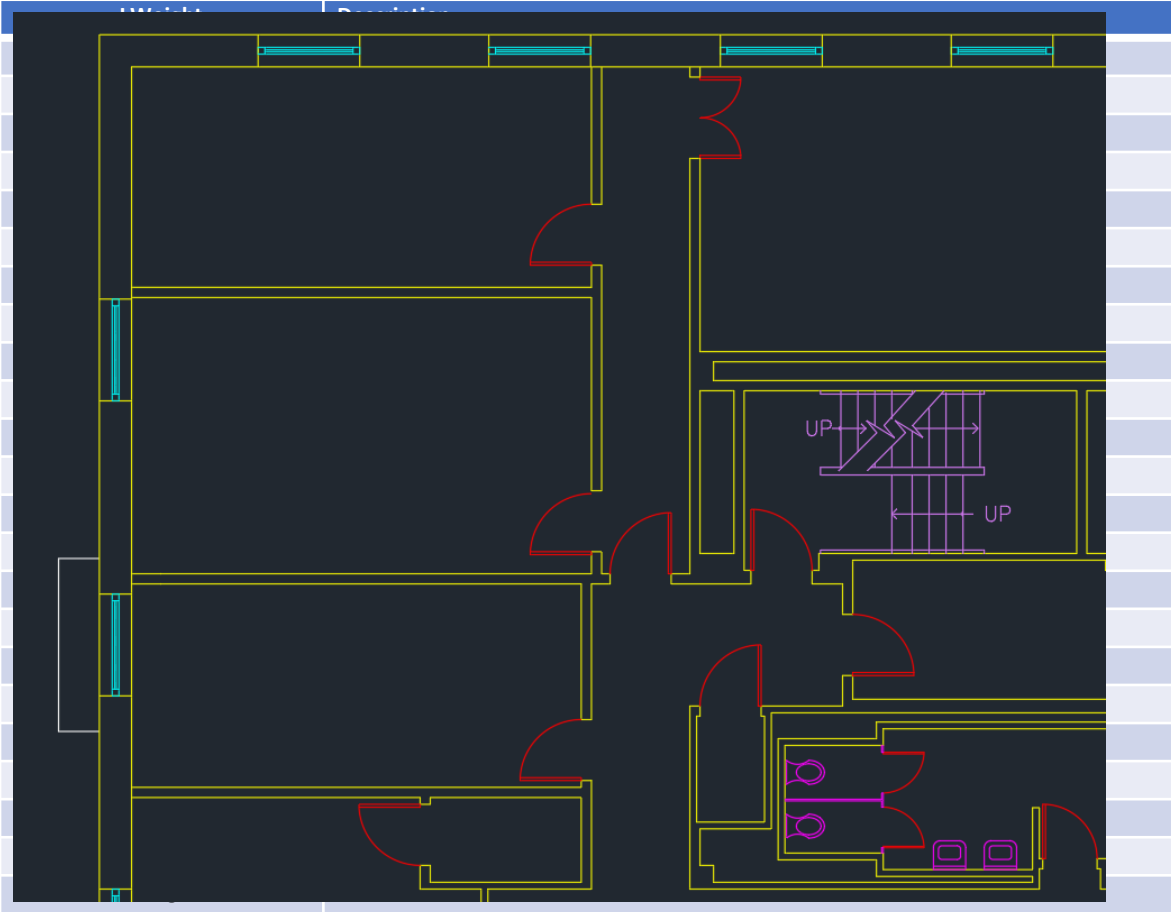
Building Code	Floor Code	Room Code	Room Category	Room Type	Room Standard	Division Code	Department Code	Room Area ft²	Drawing Name
Click here to add a new row									
0001	01	105	300	310		L0101	L0101	130.59	00101_X
0001	01	106	300	310		L0101	L0101	194.32	00101_X
0001	01	108	300	310		L0101	L0101	130.59	00101_X
0001	01	109	300	350		U0901	U0901	262.18	00101_X
0001	01	110	300	310		U0901	U0901	122.09	00101_X
0001	01	111	300	350		U0901	U0901	190.74	00101_X
0001	01	112	300	310		U0901	U0901	102.87	00101_X
0001	01	113	300	310		U0901	U0901	107.33	00101_X
0001	01	113A	300	315		U0901	U0901	538.17	00101_X
0001	01	113B	300	315		U0901	U0901	10.09	00101_X
0001	01	113C	300	315		U0901	U0901	87.81	00101_X
0001	01	113D	300	320		U0901	U0901	277.67	00101_X
0001	01	113E	300	315		U0901	U0901	72.21	00101_X
0001	01	114	300	310		U0901	U0901	108.31	00101_X
0001	01	115	300	310		U0901	U0901	108.59	00101_X
0001	01	116	300	310		U0901	U0901	108.11	00101_X
0001	01	117	300	310		U0901	U0901	108.27	00101_X
0001	01	118	300	310		U0901	U0901	216.40	00101_X
0001	01	119	300	310		U0901	U0901	101.46	00101_X
0001	01	120	300	310		U0901	U0901	117.71	00101_X
0001	01	121	300	310		U0901	U0901	95.21	00101_X
0001	01	122	300	310		U0901	U0901	95.10	00101_X
0001	01	123	300	310		U0901	U0901	107.64	00101_X
0001	01	124	300	350		U0901	U0901	275.20	00101_X
0001	01	125	300	315		U0901	U0901	76.80	00101_X
0001	01	130	300	310		L0801	L0801	330.83	00101_X
0001	01	130A	300	310		L0801	L0801	241.27	00101_X
0001	01	130B	300	310		L0801	L0801	119.92	00101_X

Architectural As-built CAD Layer Standards

LayerName	Color	LineType	LWeight	Description
A-ANNO-NOTE	7 (white)	continuous	LineWeight000	Notes
A-ANNO-TEXT	7 (white)	continuous	LineWeight000	Text (Building name, etc.)
A-BLDG-OTLN	9	continuous	LineWeight000	Outline of adjacent building
A-BLDG-OTLN-TEXT	9	continuous	LineWeight000	Text that names the adjacent building
A-COLS	40	continuous	LineWeight000	Columns
A-DOOR	1 (red)	continuous	LineWeight000	Doors
A-FLOR	7 (white)	continuous	LineWeight000	Floor Information (catch-all layer for misc. floor objects)
A-FLOR-CASE	61	continuous	LineWeight000	Casework (Manufactured cabinets)
A-FLOR-EVTR	191	continuous	LineWeight000	Elevator cars and equipment
A-FLOR-HRAL	201	continuous	LineWeight000	Stair and Balcony handrails, guard rails
A-FLOR-LEVL	9	continuous	LineWeight000	Level changes, ramps, pits, depressions
A-FLOR-PFIX	6 (magenta)	continuous	LineWeight000	Plumbing fixtures
A-FLOR-RAIS	201	continuous	LineWeight000	Raised Floors
A-FLOR-STRS	201	continuous	LineWeight000	Stair Treads, escalators, ladders
A-FLOR-TPTN	221	continuous	LineWeight000	Toilet partitions
A-FURN	3 (green)	continuous	LineWeight000	Furniture
A-FURN-CHAR	3 (green)	continuous	LineWeight000	Chairs and other seating
A-FURN-WKSF	3 (green)	continuous	LineWeight000	Furniture system work surface components
A-GLAZ	4 (cyan)	continuous	LineWeight000	Windows, window walls, curtain walls, glazed partitions
A-ROOF	9	continuous	LineWeight000	Roof
A-SITE	9	continuous	LineWeight000	Parking spaces, curbs, sidewalk
A-WALL	2 (yellow)	continuous	LineWeight000	Walls
A-WALL-MOVE	2 (yellow)	continuous	LineWeight000	Moveable Partitions

Architectural As-built CAD Layer Standards

LayerName	Color	LineType
A-ANNO-NOTE	7 (white)	continuous
A-ANNO-TEXT	7 (white)	continuous
A-BLDG-OTLN	9	continuous
A-BLDG-OTLN-TEXT	9	continuous
A-COLS	40	continuous
A-DOOR	1 (red)	continuous
A-FLOR	7 (white)	continuous
A-FLOR-CASE	61	continuous
A-FLOR-EVTR	191	continuous
A-FLOR-HRAL	201	continuous
A-FLOR-LEVL	9	continuous
A-FLOR-PFIX	6 (magenta)	continuous
A-FLOR-RAIS	201	continuous
A-FLOR-STRS	201	continuous
A-FLOR-TPTN	221	continuous
A-FURN	3 (green)	continuous
A-FURN-CHAR	3 (green)	continuous
A-FURN-WKSF	3 (green)	continuous
A-GLAZ	4 (cyan)	continuous
A-ROOF	9	continuous
A-SITE	9	continuous
A-WALL	2 (yellow)	continuous
A-WALL-MOVE	2 (yellow)	continuous



Archibus Built-in Space Delineation Layers

Drafting / Drawing / Editing Layers

LayerName	Color	LineType	LWeight	Description
GROS	6 (magenta)	continuous	LineWeight000	Closed polylines of building exterior and wall and interior of exterior wall
RM	4 (cyan)	continuous	LineWeight000	Closed polylines of room and other space outlines

Archibus “Cataloged” System Layers

LayerName	Color	LineType	LWeight	Description
GROS\$	1 (red)	continuous	LineWeight000	Archibus registered int and ext gross outline
GROS\$TXT	1 (red)	continuous	LineWeight000	Archibus generated text from int and ext gross
RM\$	5 (blue)	continuous	LineWeight000	Archibus registered room polyline
RM\$TXT	9 (white)	Continuous	LineWeight000	Archibus generated room number and SF text

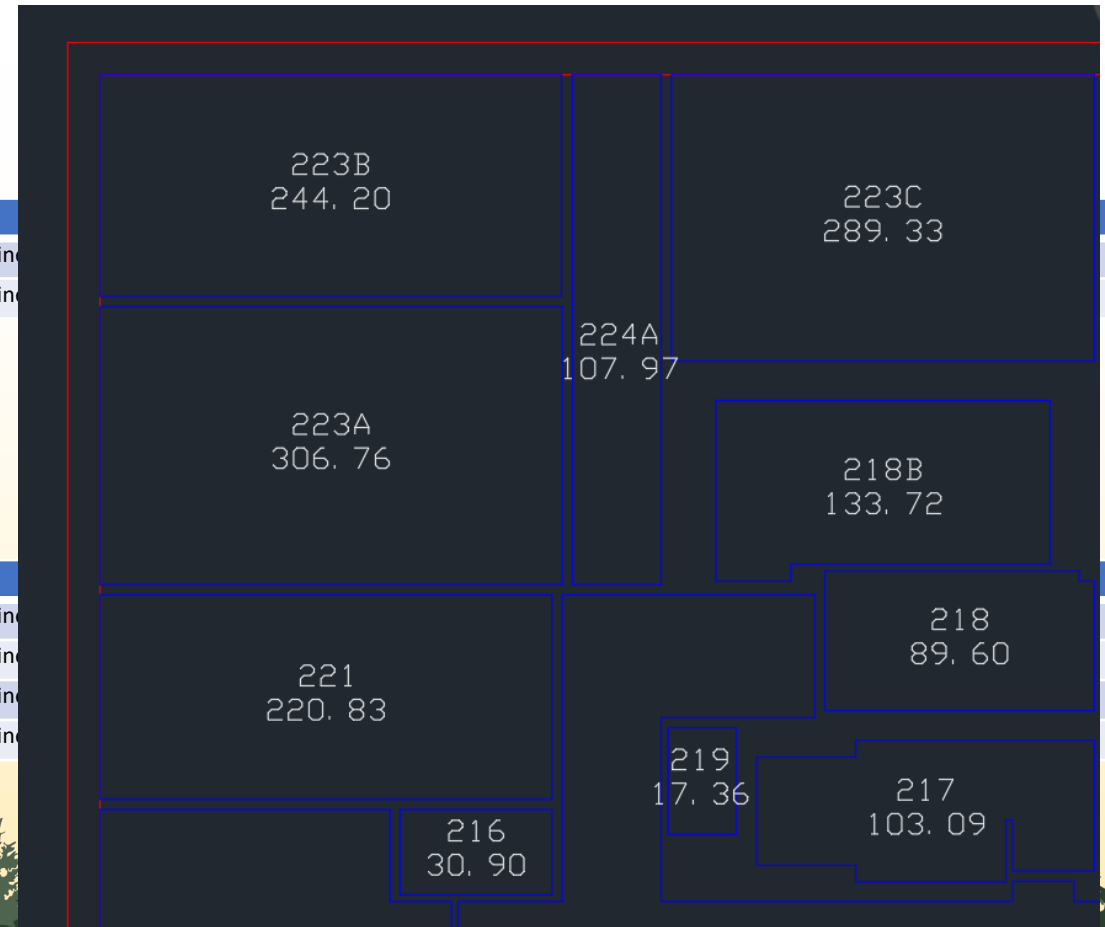
Archibus Built-in Space Delineation Layers

Drafting / Drawing / Editing Layers

LayerName	Color	LineType	
GROS	6 (magenta)	continuous	Line
RM	4 (cyan)	continuous	Line

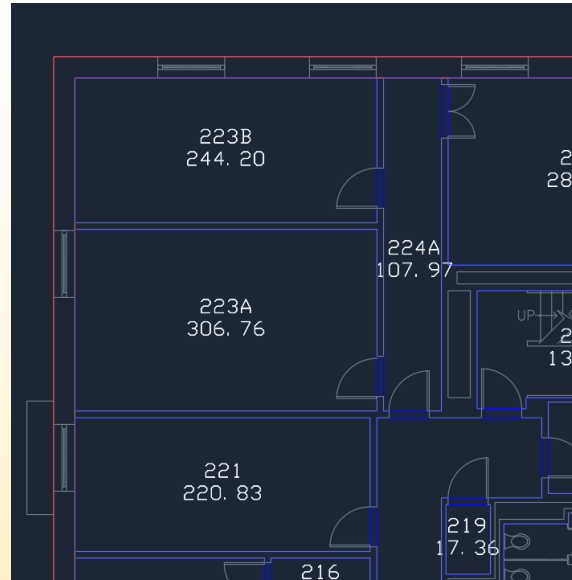
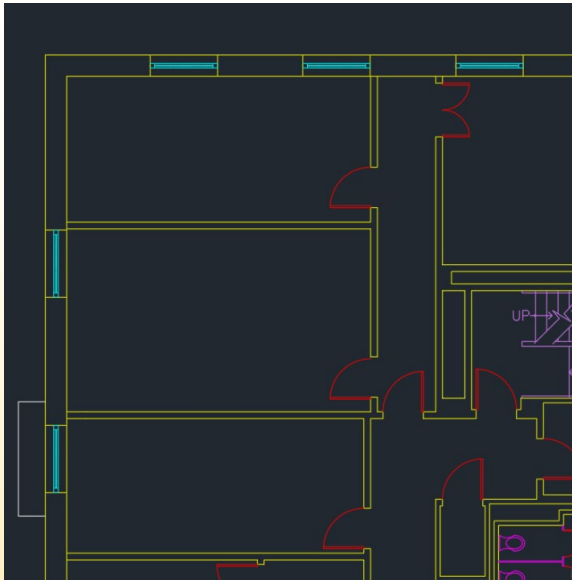
Archibus “Cataloged” System Layers

LayerName	Color	LineType	
GROS\$	1 (red)	continuous	Line
GROS\$TXT	1 (red)	continuous	Line
RM\$	5 (blue)	continuous	Line
RM\$TXT	9 (white)	Continuous	Line



Space Management with CAD Drawings

As-builts → Room Polygons → Attributes



Edit Data (Asset Type: Rooms)

Building Code: *	027	Save
Floor Code: *	02	Cancel
Room Code: *	C202	
Room Standard:		
Division Code:	R0000	
Department Code:	R0000	
Room Category:	SERV	
Room Type:	085	
Prorate: *	NONE	
Room Area ft²:	121.02	
Perimeter ft:	68.30	

Archibus Web Client

- View individual floorplans with room highlights by department, usage, etc.
- Run reports / pivot tables on space usage by School, division, department, room type, room use, etc.
- Submit changes for room use and occupancy
 - “Split” room usage:
 - 50 / 50 between two PIs

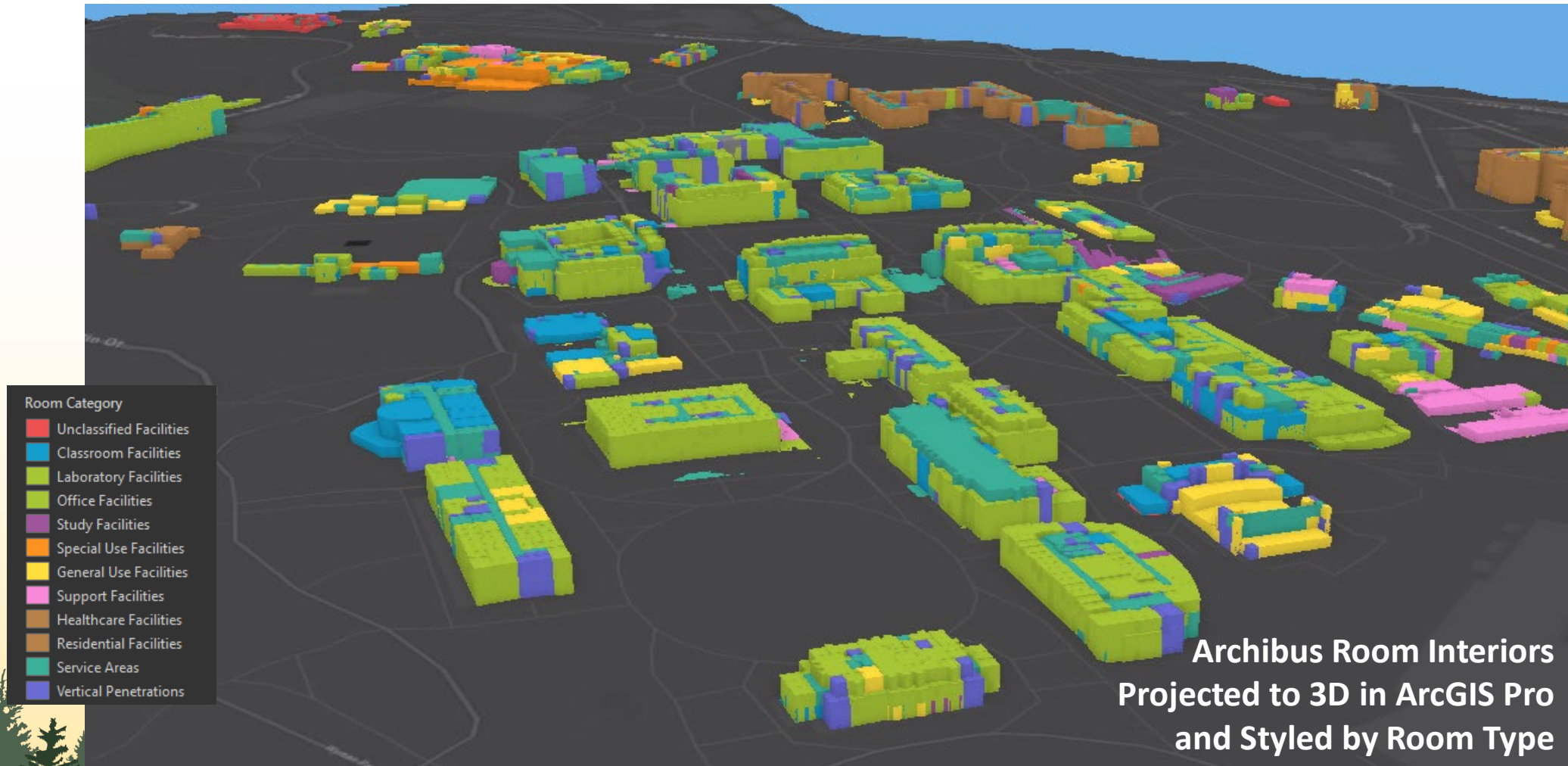
The screenshot displays the Archibus Web Client interface. On the left is a navigation menu with sections: Space Planning & Management, Personnel & Occupancy, Space Manager, MANAGE INVENTORY & OCCUPANCY (with sub-items: Approve Service Requests, Issue Service Requests, Assign Room Attributes and Occupancy, Define Workspace Transactions, Workspace Transaction Exceptions, Employee Exceptions), CALCULATIONS (with sub-items: Update Area Totals, Reconcile Workspace Transactions), and RESULTS (with sub-items: Occupiable Vacant Room Highlights, Occupancy Plan, Locate Employee, Space Planning Console, Allocation, Trends, and Benchmarks, Location Metrics). The main content area is titled 'Occupiable Vacant Room Highlights' and shows a floorplan for 'Floor: HQ-19' with several rooms highlighted in green. Below the floorplan is a table titled 'Occupiable Vacant Rooms' with columns: Building Code, Floor Code, Room Code, Room Area ft², Room Category, Room Type, and Room Standard. The table lists 7 rooms. At the bottom, it shows 'Total records: 7' and a total area of '1,110.13'.

Building Code	Floor Code	Room Code	Room Area ft²	Room Category	Room Type	Room Standard
HQ	19	103	280.23	PERS	OFFICE	OFF-A
HQ	19	105	130.91	SUPPORT	MECH	OTHER
HQ	19	107	248.20	SUPPORT	CONFERENCE	OTHER
HQ	19	108	10.62	SUPPORT	COAT	OTHER
HQ	19	110	200.70	SUPPORT	CONFERENCE	OTHER
HQ	19	114	118.52	SUPPORT	KITCHEN	OTHER
HQ	19	116	120.95	SUPPORT	COPY	OTHER

Archibus at Homewood Campus

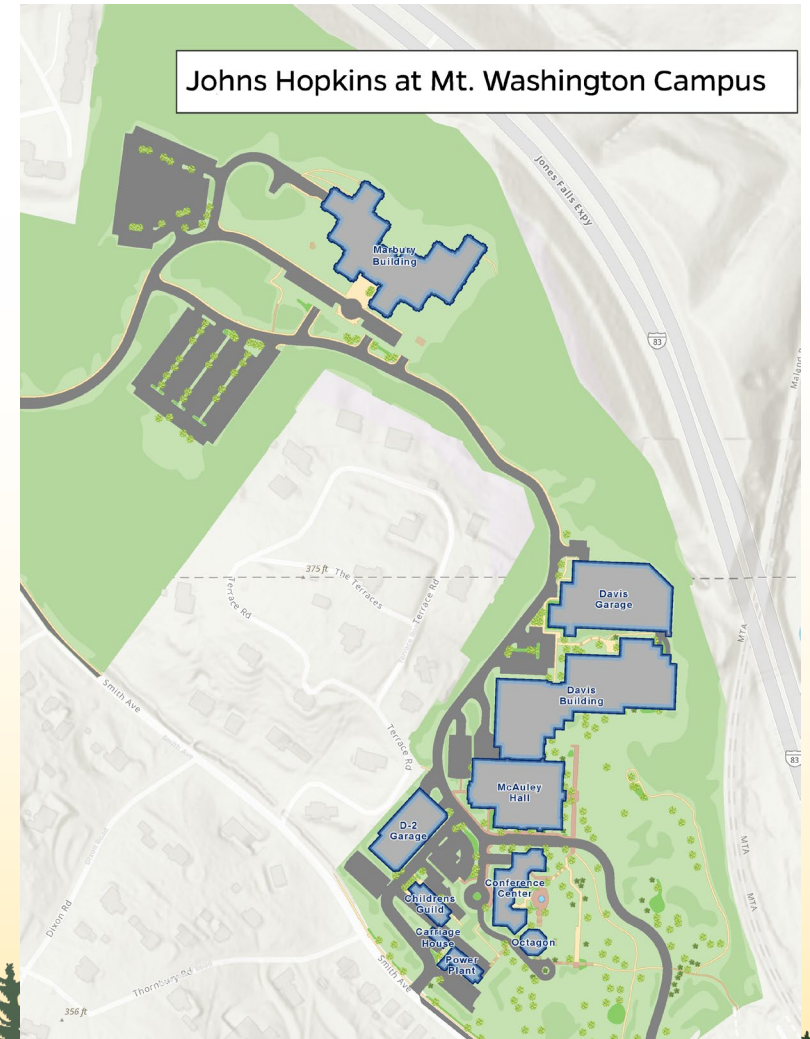


Archibus at Homewood Campus



JHU Mt. Washington Campus

- 8 Buildings
- 2 Parking garages
- ≈1.5 million SF

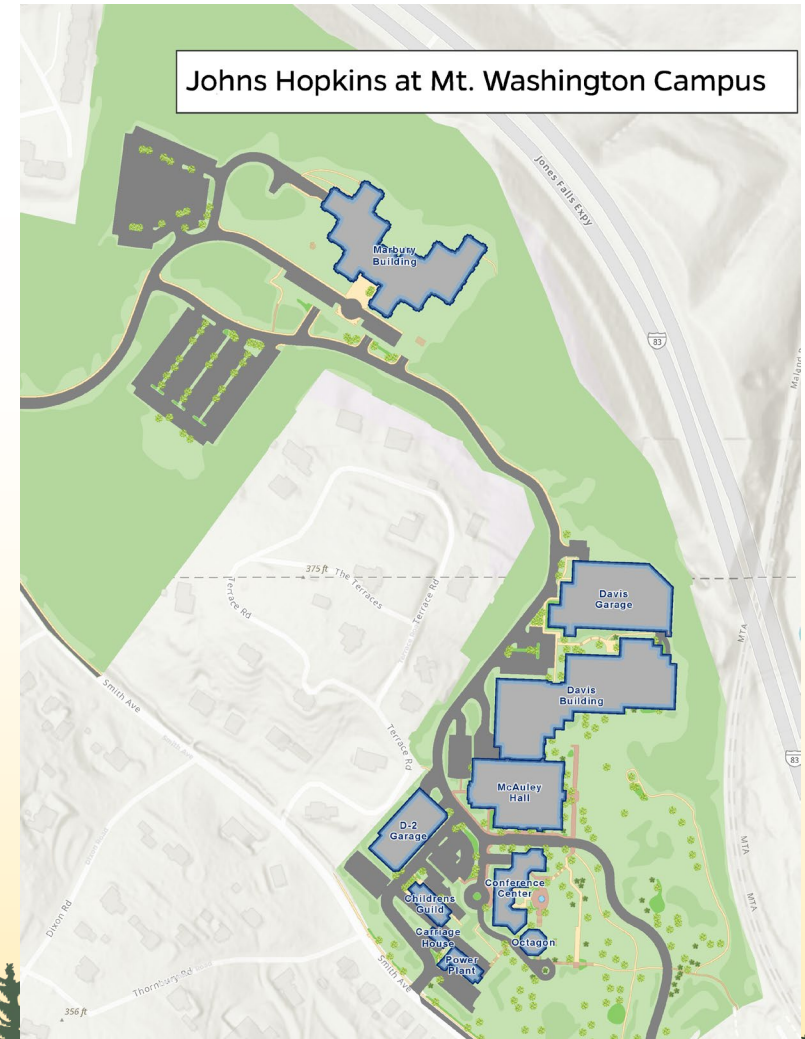


Jonathan Dandois | DJI Mini Pro 3 | 75 m AGL | June 30, 2022

JHU Mt. Washington Campus

- 8 Buildings
- 2 Parking garages
- ≈1.5 million SF

As-builts incomplete / outdated
No CAFM Polylines
No space allocation information



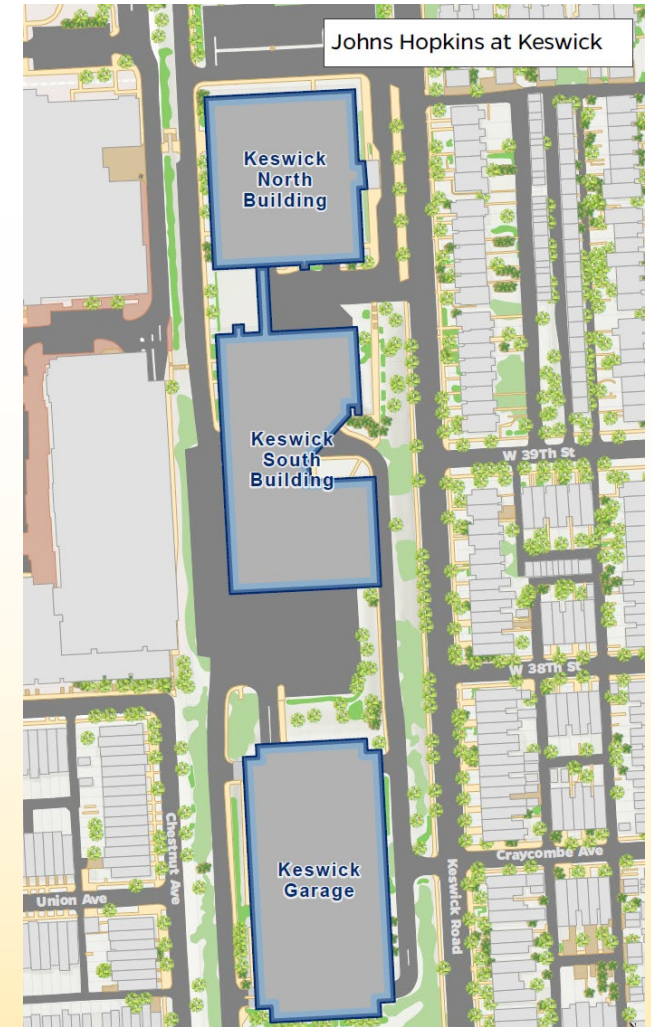
Jonathan Dandois | DJI Mini Pro 3 | 75 m AGL | June 30, 2022

JHU Keswick Campus

- 2 Buildings
- 1 Parking garage
- ≈ 1.2 million SF



Jonathan Dandois | DJI Mini Pro 3 | 80 m AGL | August 3, 2022



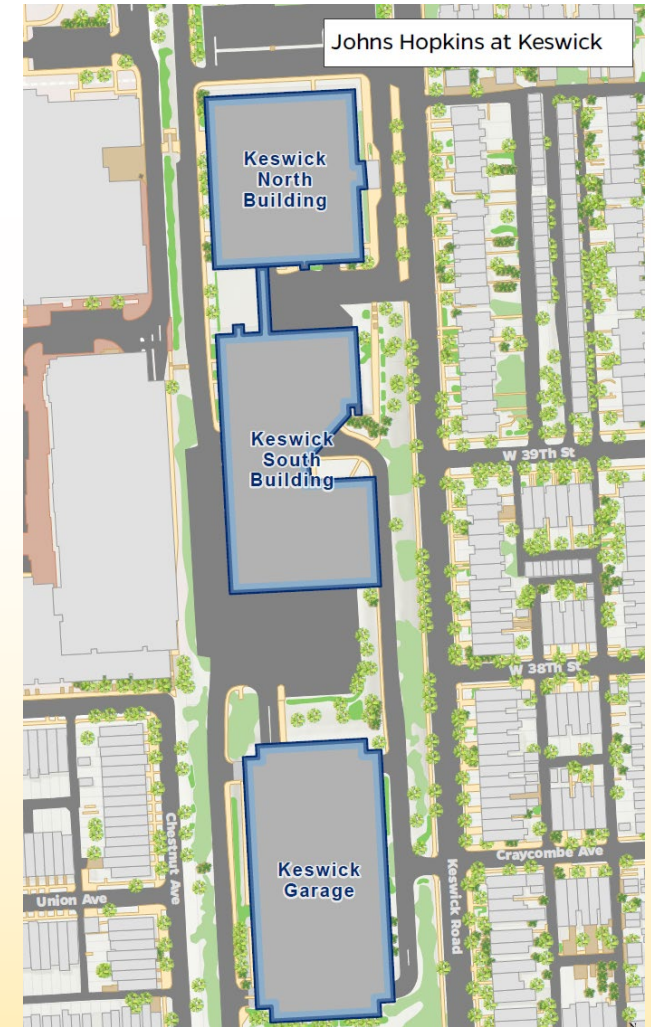
JHU Keswick Campus

- 2 Buildings
- 1 Parking garage
- ≈1.2 million SF

As-builts incomplete / outdated
No CAFM Polylines
No space allocation information



Jonathan Dandois | DJI Mini Pro 3 | 80 m AGL | August 3, 2022



Enter JMT!

JMT brought onboard to re-survey all buildings and update as-built and CAFM AutoCAD DWGS for all **2.7+ million square feet**

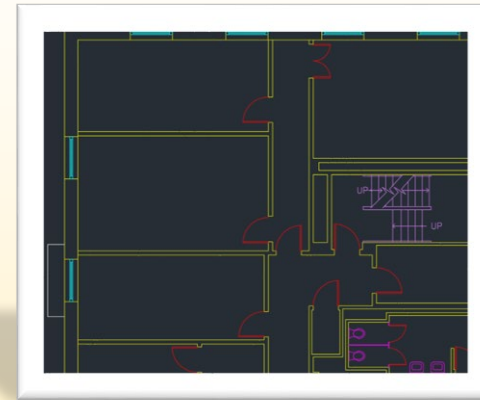


JMT TECHNOLOGY GROUP

I guess this is Jonathan?



Does that mean this is Will?



JMT Floorplan Update Overview

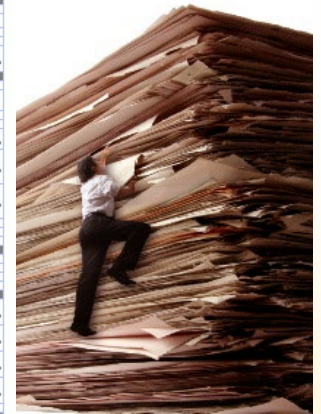
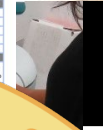
- Three phases:
 - Background Data Gathering
 - Field Data Gathering
 - Data Updates
- 2 Campuses
- 13 buildings (6 with existing Acad FPs)
- 58 floors (29 with existing Acad FPs)
- Eight month duration



JMT Floorplan Update

Phase 1: Background Data Gathering

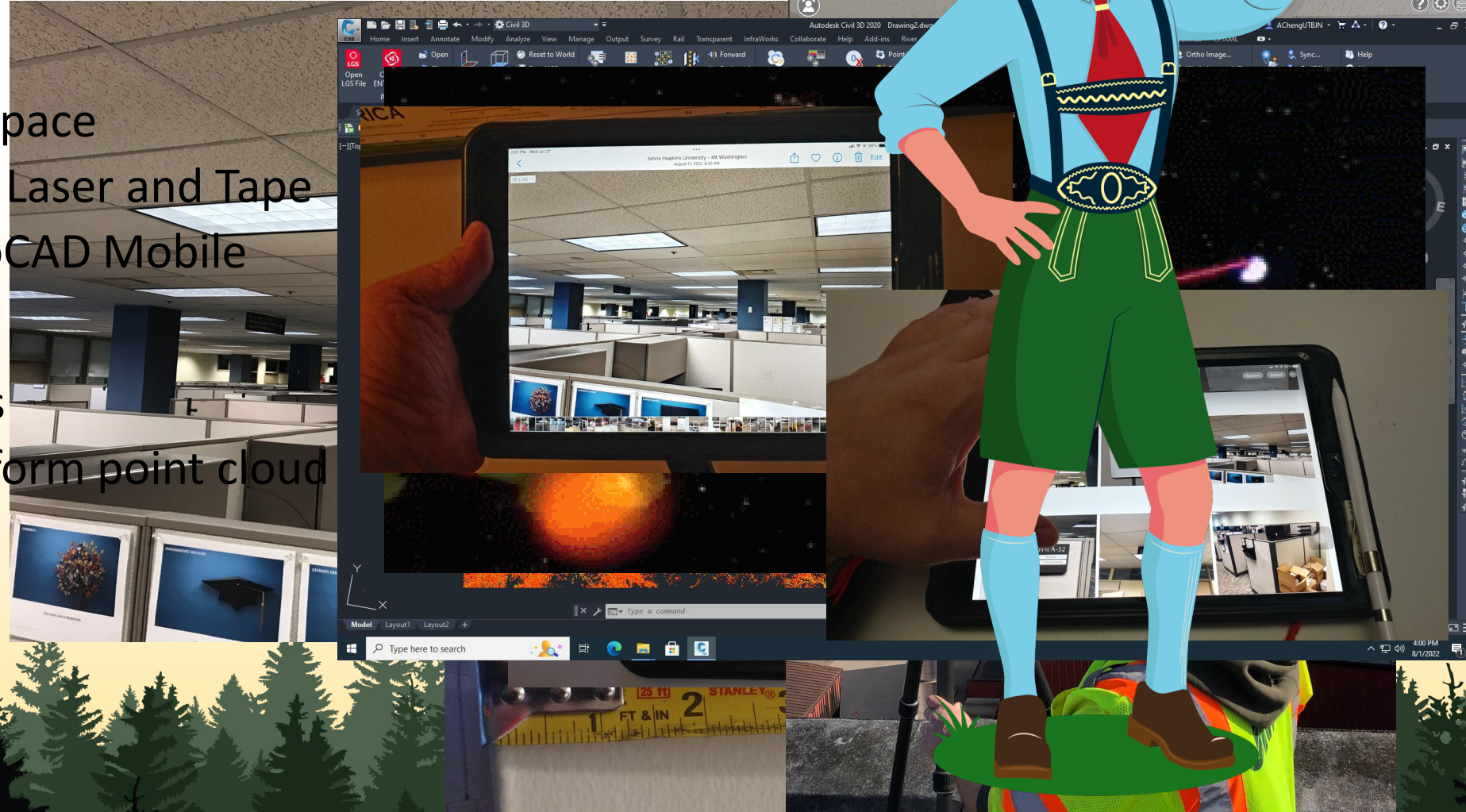
- Sources:
 - Existing AutoCAD files
 - Scans of existing documents
- Inventory and schedule

[illegible][illegible]

JMT Floorplan Update

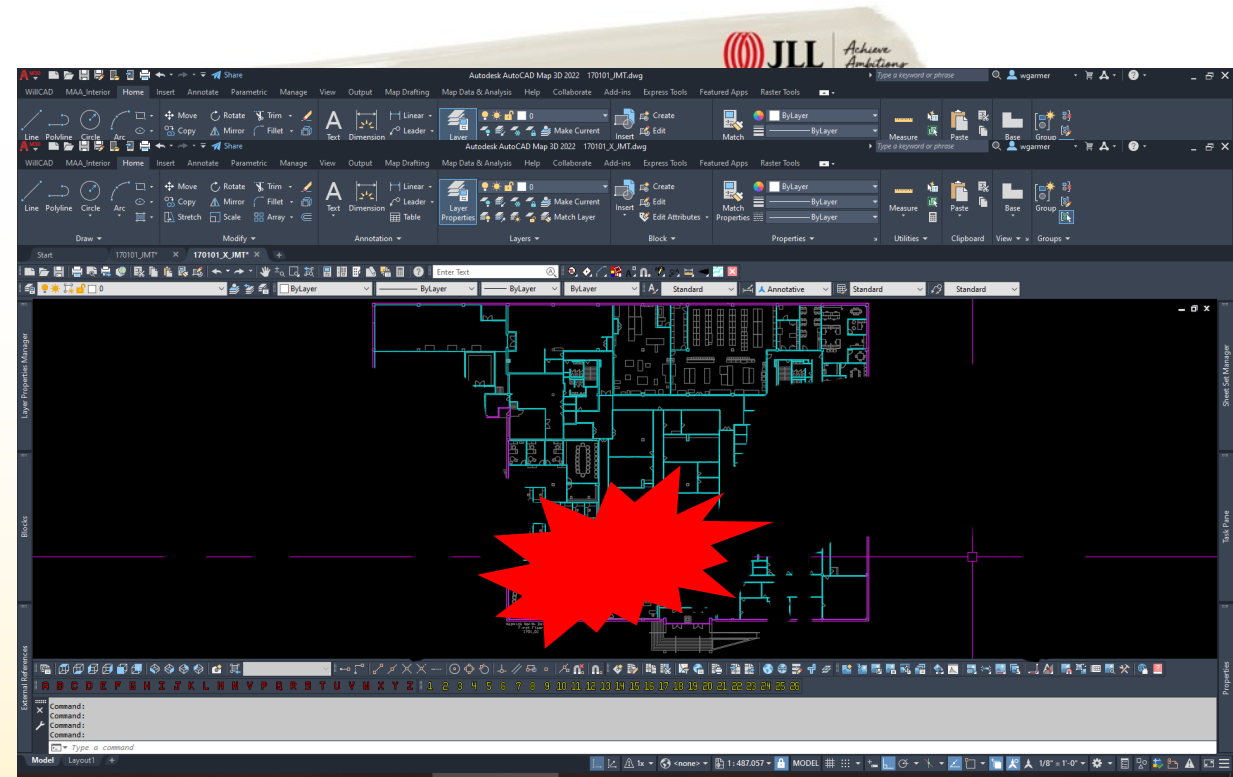
Phase 2: Field Data Gathering

- Space Audit
 - Inspect each space
 - Measure with Laser and Tape
 - Sketch in AutoCAD Mobile
- Lidar Scan
 - Multiple scans
 - Combined to form point cloud
- Photos



JMT Floorplan Update Phase 3: Data Updates

- Combine field data with existing data
 - AutoCAD deliverables
 - Conform to JHU CAD standards
 - Update existing floorplans
 - Create new floorplans as needed
- Create new CAFM (Computer Aided Facility Management) polygons
- QC and handoff to JHU

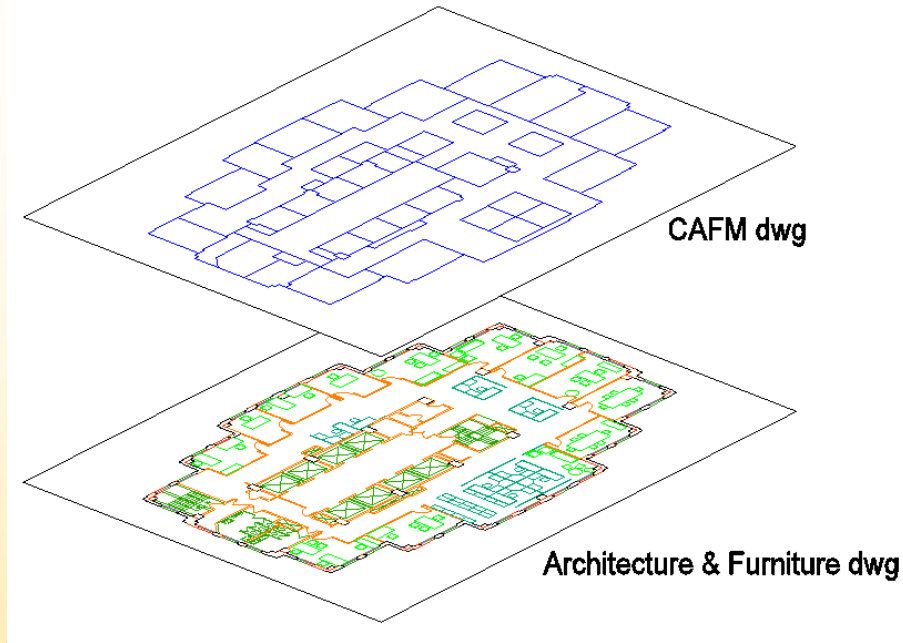


JLL | 200 East Randolph Drive | Chicago, Illinois 60601
www.jll.com

Archibus Data Entry

DWGs are “cataloged” to the Archibus database

External reference (XREF) stacking diagram



Archibus “rooms” database table

Building Code	Floor Code	Room Code	Room Category	Room Type	Room Standard	Division Code	Department Code	Room Area ft²	Drawing Name
Click here to add a new row									
0001	01	105	300	310		L0101	L0101	130.59	00101_X
0001	01	106	300	310		L0101	L0101	194.32	00101_X
0001	01	108	300	310		L0101	L0101	130.59	00101_X
0001	01	109	300	350		U0901	U0901	262.18	00101_X
0001	01	110	300	310		U0901	U0901	122.09	00101_X
0001	01	111	300	350		U0901	U0901	190.74	00101_X
0001	01	112	300	310		U0901	U0901	102.87	00101_X
0001	01	113	300	310		U0901	U0901	107.33	00101_X
0001	01	113A	300	315		U0901	U0901	538.17	00101_X
0001	01	113B	300	315		U0901	U0901	10.09	00101_X
0001	01	113C	300	315		U0901	U0901	87.81	00101_X
0001	01	113D	300	320		U0901	U0901	277.67	00101_X
0001	01	113E	300	315		U0901	U0901	72.21	00101_X
0001	01	114	300	310		U0901	U0901	108.31	00101_X
0001	01	115	300	310		U0901	U0901	108.59	00101_X
0001	01	116	300	310		U0901	U0901	108.11	00101_X
0001	01	117	300	310		U0901	U0901	108.27	00101_X
0001	01	118	300	310		U0901	U0901	216.40	00101_X
0001	01	119	300	310		U0901	U0901	101.46	00101_X
0001	01	120	300	310		U0901	U0901	117.71	00101_X
0001	01	121	300	310		U0901	U0901	95.21	00101_X
0001	01	122	300	310		U0901	U0901	95.10	00101_X
0001	01	123	300	310		U0901	U0901	107.64	00101_X
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0001	01	125	300	315		U0901	U0901	76.80	00101_X
0001	01	130	300	310		L0801	L0801	330.83	00101_X
0001	01	130A	300	310		L0801	L0801	241.27	00101_X
0001	01	130B	300	310		L0801	L0801	119.92	00101_X

Archibus Data Organization

"[FICM] describes standard practices for initiating, conducting, reporting, and maintaining an institutional facilities inventory."

National Center for Education Statistics:

Postsecondary Education Facilities Inventory and Classification Manual (**FICM**)

Room Categories

Room Category	Category Description
000	Unclassified Facilities
100	Classroom Facilities
200	Laboratory Facilities
300	Office Facilities
400	Study Facilities
500	Special Use Facilities
600	General Use Facilities
700	Support Facilities
800	Healthcare Facilities
900	Residential Facilities
SERV	Service Areas
VERT	Vertical Penetrations

Rooms are coded with a hierarchical "Category" and "Use" per the NCES FICM manual.
























Room Types

Room Category	Room Type	Type Description
000	080	Unassigned Area
000	081	Inactive Area
000	082	Alteration or Conversion Area
000	083	Unfinished Area (Under Construction)
000	089	Leased Space
100	110	Classroom (Lecture)
100	110A	Tiered Room
100	110B	Flat Floor Room
100	111	Seminar Room
100	112	Active Learning
100	113	Computer
100	114	Computer w/GIS Software
100	115	Classroom Service
100	116	Table Based Individual
100	117	Video Conference
200	210	Class Laboratory
200	215	Class Laboratory Service
200	220	Open Laboratory
200	225	Open Laboratory Service
200	250	Research Lab
200	250A	Electron Microscope Facility
200	250B	BSL3 Lab
200	250C	Aquatics Lab
200	250D	Freezer Morgue

Archibus Data Organization

Rooms are assigned to individual JHU / JHHS Schools, Divisions & Departments which define their space usage and occupancy

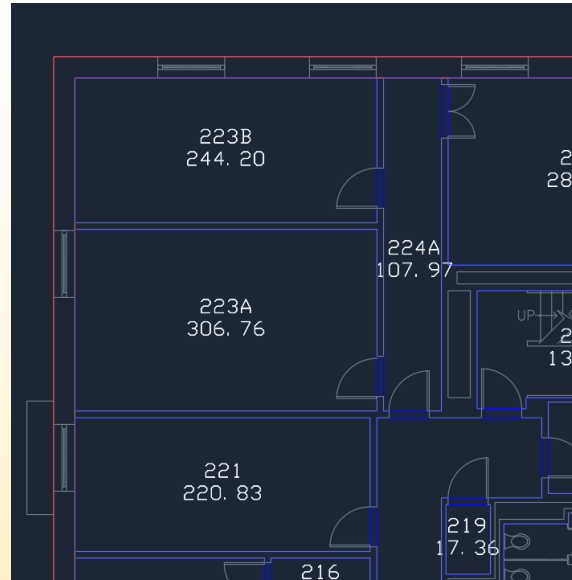
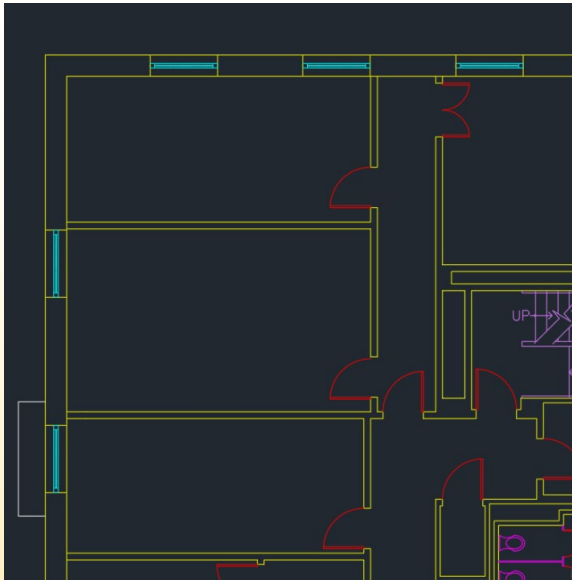
Coding Rooms & Suites to JH Divisions and Departments

Business Units	
	Academic Centers & Support Services
	Bloomberg School of Public Health
	Building Service
	Carey Business School
	Clinical Services
	Health Divisions Administration
	Homewood Student Affairs
	Interim Use
	Johns Hopkins Hospital
	Krieger School of Arts & Sciences
	Leased Space
	Montgomery County Campus
	Peabody Institute
	SAIS - Bologna, Italy
	SAIS - Hopkins-Nanjing Center
	SAIS - Washington DC
	School of Education
	School of Medicine
	School of Nursing
	Sheridan Libraries
	Unallocated & Vacant Space
	University Administration
	Whiting School of Engineering

Division Code	Department Code	Department Name	Highlight Pattern - Acad
G3302	G3302	WSE CENTER FOR COMPUTATIONAL BIOLOGY	
G3401	G3401	WSE ENERGETICS RESEARCH GROUP	
G3501	G3501	WSE JHU INFORMATION SECURITY INST	
G4001	G4001	WSE ENVIRONMENTAL HEALTH & ENGINEERING	
G4101	G4101	WSE MECHANICAL ENGINEERING	
G4201	G4201	WSE MATERIALS SCIENCE & ENGINEERING	
G4301	G4301	WSE CHEMICAL & BIOMOLECULAR ENG	
G4501	G4501	WSE CIVIL ENGINEERING	
G4601	G4601	WSE ELECTRICAL & COMPUTER ENG	
G4701	G4701	WSE BIOMEDICAL ENGINEERING	
G4702	G4702	WSE BME CACDTI	
G4801	G4801	WSE APPLIED MATHEMATICS & STATISTICS	
G4901	G4901	WSE COMPUTER SCIENCE	
G5001	G5001	WSE CTR FOR MULTI FUNCTIONAL APPLIQUE	
G5101	G5101	WSE HOPKINS EXTREME MATERIALS INSTITUTE	
G5201	G5201	WSE CTR FOR LEADERSHIP EDUCATION	
G5301	G5301	WSE INDIVIDUALIZED HEALTH	
G5401	G5401	WSE SYSTEMS INSTITUTE	
G5531	G5531	WSE ENGINEERING FOR PROFESSIONALS	
G5556	G5556	WSE ENG/APPLIED SCIENCE - MTGM. CTY.	
G5601	G5601	WSE MALONE CTR FOR ENGR IN HEALTH CARE	
G5701	G5701	WSE INSTITUTE FOR ASSURED AUTONOMY	
G9999	G9999	WSE VACANT	

Cataloging Rooms in Archibus

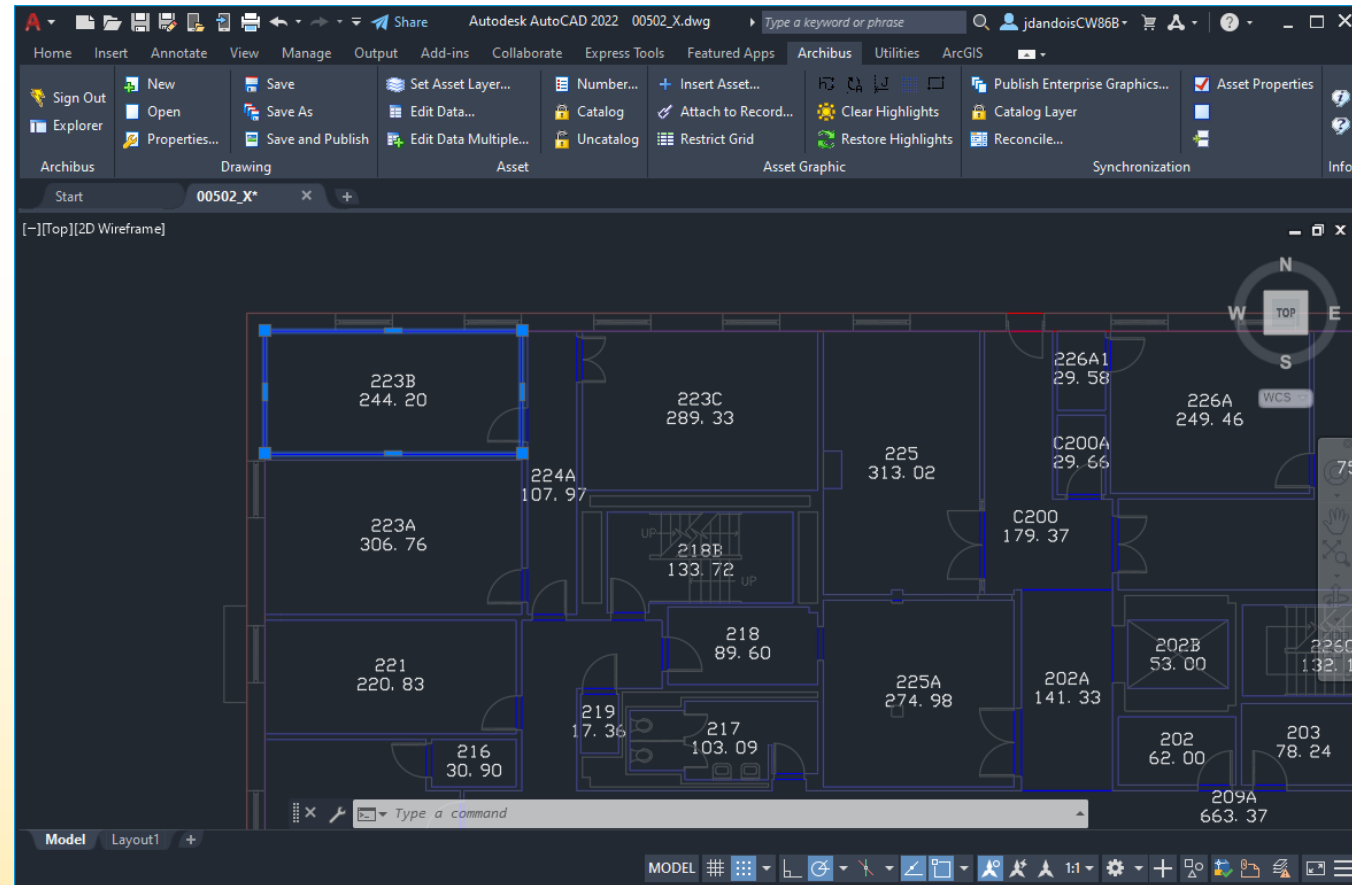
As-builts → Room Polygons → Attributes



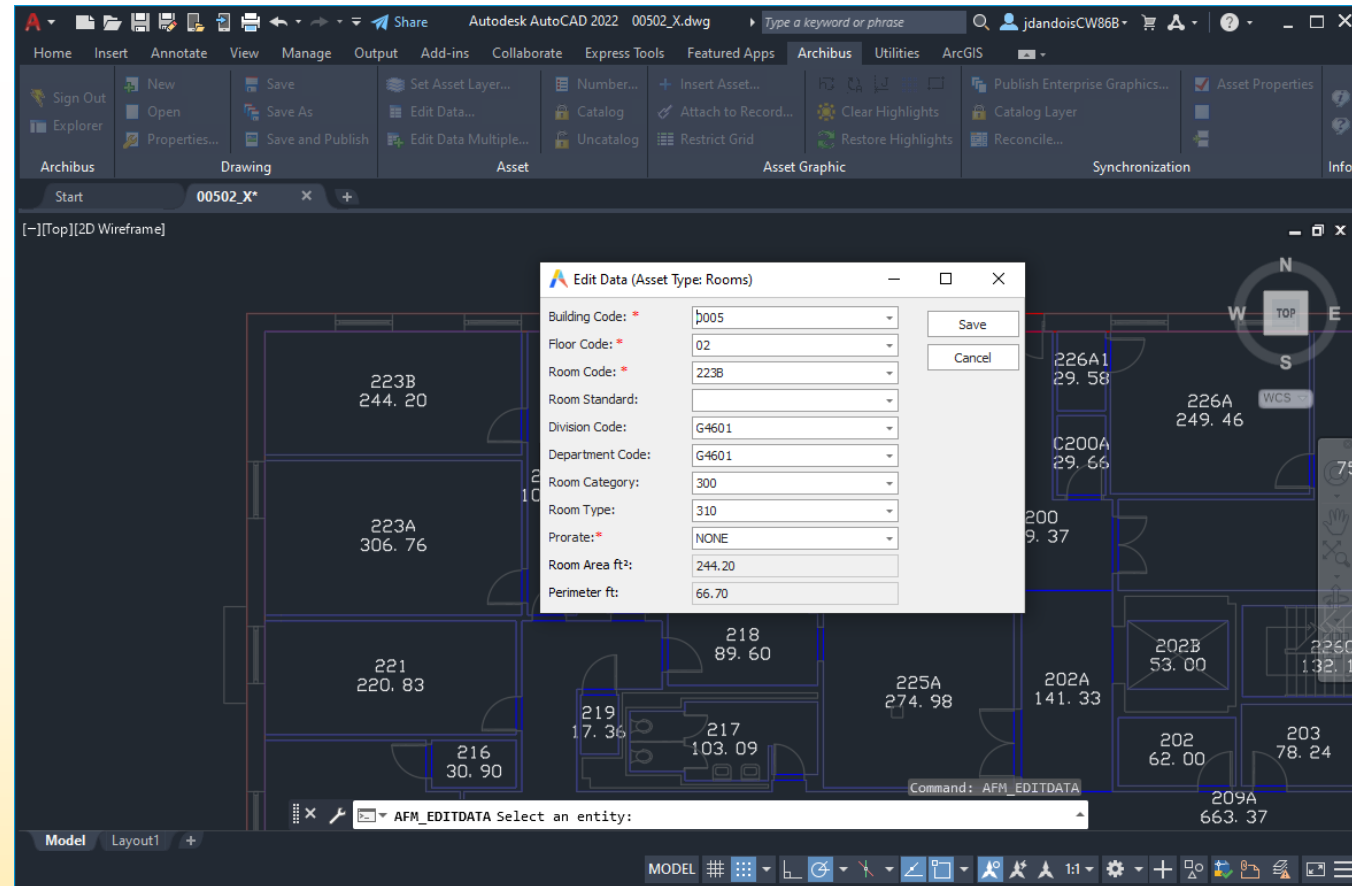
Edit Data (Asset Type: Rooms)

Building Code: *	027	Save
Floor Code: *	02	Cancel
Room Code: *	C202	
Room Standard:		
Division Code:	R0000	
Department Code:	R0000	
Room Category:	SERV	
Room Type:	085	
Prorate: *	NONE	
Room Area ft²:	121.02	
Perimeter ft:	68.30	

Cataloging Rooms in Archibus



Cataloging Rooms in Archibus



Cataloging Rooms in Archibus

ARCHIBUS AI Sign Out Help
Find a form or report

▲ Space Planning & Management
▲ Personnel & Occupancy
▲ Space Manager

MANAGE INVENTORY & OCCUPANCY

- Approve Service Requests
- Issue Service Requests
- Assign Room Attributes and Occupancy
- Define Workspace Transactions
- Workspace Transaction Exceptions
- Employee Exceptions

CALCULATIONS


- Update Area Totals
- Reconcile Workspace Transactions

RESULTS

- Occupiable Vacant Room Highlights
- Occupancy Plan
- Locate Employee
- Space Planning Console
- Allocation, Trends, and Benchmarks
- Location Metrics

Occupiable Vacant Room Highlights

Highlight Occupiable Vacant Rooms for Floor: HQ-19
DOC Labels: Category-Type



Occupiable Vacant Rooms

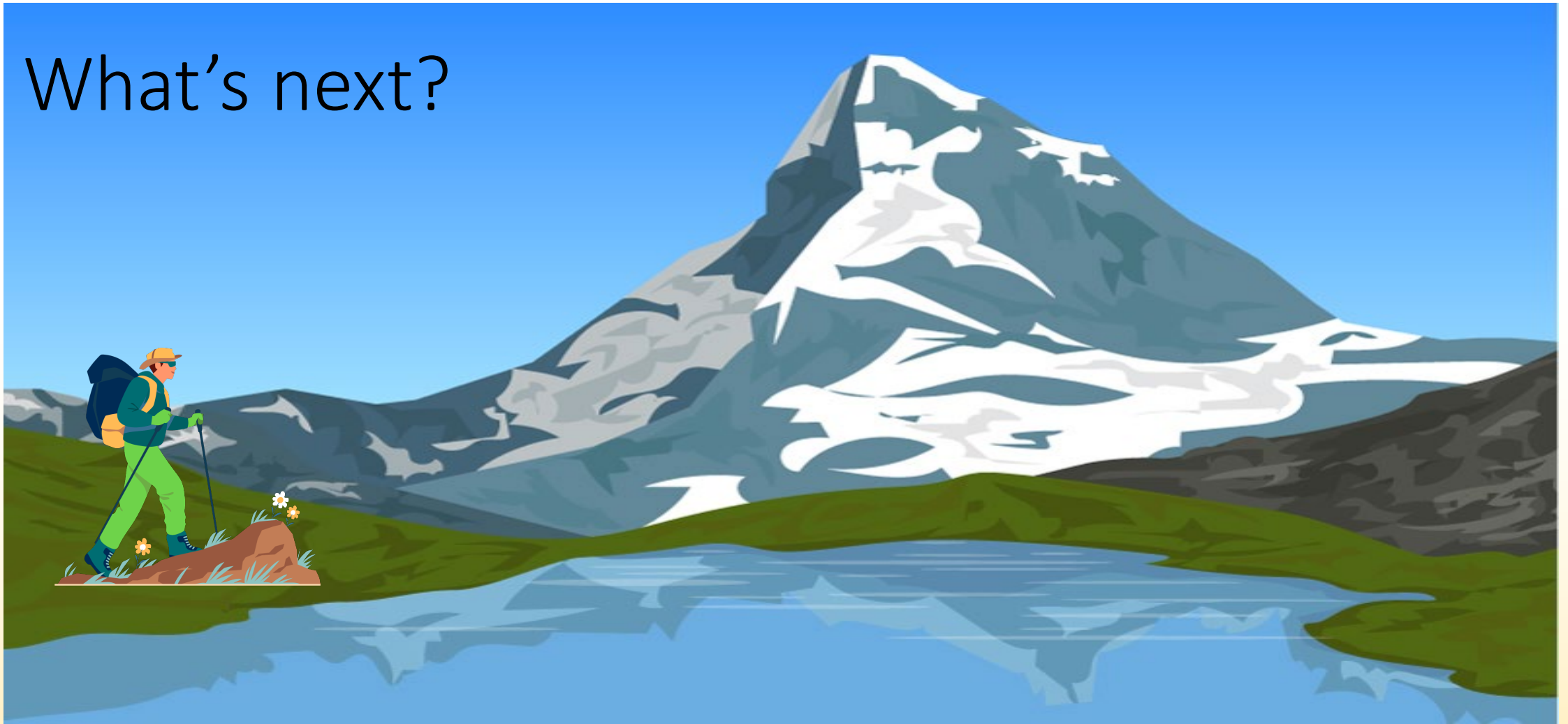
Room Code: 1^[7] All^[7]

Building Code	Floor Code	Room Code	Room Area ft ²	Room Category	Room Type	Room Standard
HQ	19	103	280.23	PERS	OFFICE	OFF-A
HQ	19	105	130.91	SUPPORT	MECH	OTHER
HQ	19	107	248.20	SUPPORT	CONFERENCE	OTHER
HQ	19	108	10.62	SUPPORT	COAT	OTHER
HQ	19	110	200.70	SUPPORT	CONFERENCE	OTHER
HQ	19	114	118.52	SUPPORT	KITCHEN	OTHER
HQ	19	116	120.95	SUPPORT	COPY	OTHER

1,110.13

Total records: 7

What's next?



Archibus Publishing to ArcGIS

ETL in Archibus to use ArcGIS Rest API

- Floorplans are georeferenced in CAD
- Publish floorplan geometry/attributes via REST API
- Complete feature classes of floors, rooms, backgrounds

Archibus Publishing to ArcGIS – REST API

ArcGIS REST Services Directory

[Home](#) > [services](#) > [Archibus](#)

[JSON](#) | [SOAP](#)

Folder: Archibus

Current Version: 10.6

View Footprints In: [ArcGIS Online Map Viewer](#)

Services:

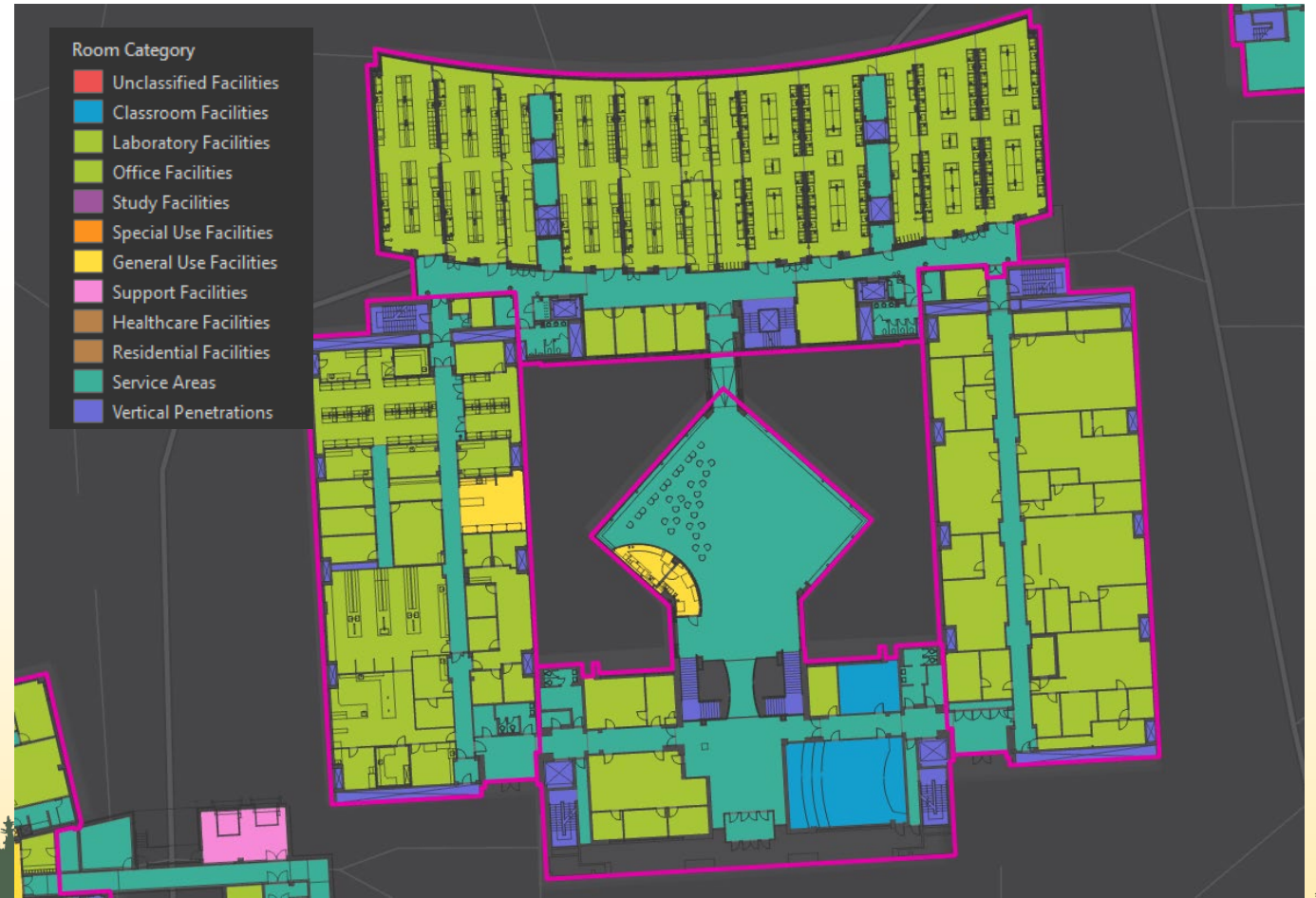
- [Archibus/Archibus Background](#) (FeatureServer)
- [Archibus/Archibus Background](#) (MapServer)
- [Archibus/Archibus Gros](#) (FeatureServer)
- [Archibus/Archibus Gros](#) (MapServer)
- [Archibus/Archibus Space](#) (FeatureServer)
- [Archibus/Archibus Space](#) (MapServer)

Fields:

- OBJECTID (type: esriFieldTypeOID , alias: OBJECTID , editable: false)
- bl_id (type: esriFieldTypeString , alias: **Building Code** , editable: true)
- fl_id (type: esriFieldTypeString , alias: **Floor Code** , editable: true)
- rm_id (type: esriFieldTypeString , alias: **Room Code** , editable: true)
- rm_name (type: esriFieldTypeString , alias: **Room Name** , editable: true)
- mx_rm_id (type: esriFieldTypeString , alias: Maximo Room ID , editable: true)
- dv_id (type: esriFieldTypeString , alias: Division Code , editable: true) [L9108: HMWD HOUSING OFC-CHARLES COMMONS] , ...696 more...
- dp_id (type: esriFieldTypeString , alias: **Department Code** , editable: true) [LEASED SPACE] , [Z1400: LEASED COLUMBIA MARYLAND CAMPUS] , ...183 more...
- org_unit (type: esriFieldTypeString , alias: Org Unit , editable: true)
- rm_type (type: esriFieldTypeString , alias: **Room Type** , editable: true) [or Conversion Area] , ...183 more...
- rm_cat (type: esriFieldTypeString , alias: **Room Category** , editable: true) [Laboratory Facilities] , ...9 more...
- rm_use (type: esriFieldTypeString , alias: **Room Use** , editable: true) [more...])
- rm_area (type: esriFieldTypeDouble , alias: Room Area SF , editable: true)
- dwgname (type: esriFieldTypeString , alias: Drawing Name , editable: true)
- geo_objectid (type: esriFieldTypeSmallInteger , alias: GIS ObjectID)
- lat (type: esriFieldTypeDouble , alias: Latitude , editable: true , null)
- lon (type: esriFieldTypeDouble , alias: Longitude , editable: true , null)
- notes (type: esriFieldTypeString , alias: Notes , editable: true , null)
- created_user (type: esriFieldTypeString , alias: created_user , editable: true)
- created_date (type: esriFieldTypeDate , alias: created_date , editable: true)
- last_edited_user (type: esriFieldTypeString , alias: last_edited_user , editable: true)
- last_edited_date (type: esriFieldTypeDate , alias: last_edited_date , editable: true)

Room Interiors in GIS

First floor of a lab / classroom complex of four buildings, all co-registered to each other and georeferenced to NAD83

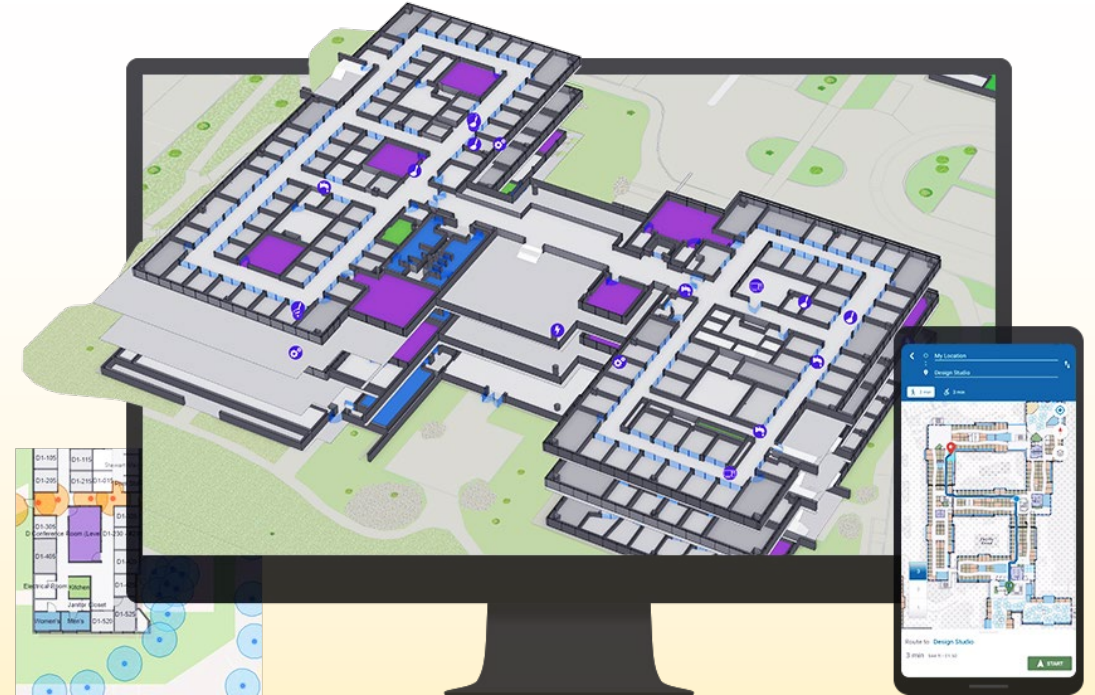
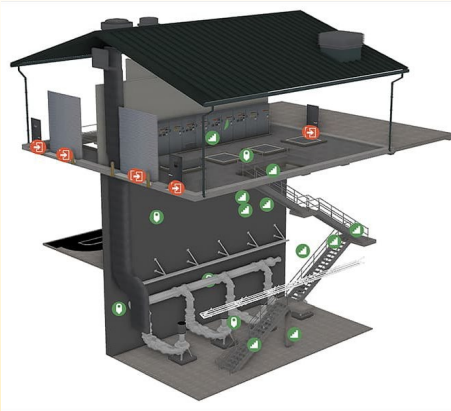


ArcGIS Indoors at JHU?



ArcGIS Indoors

Indoor GIS for smarter building management



<https://www.esri.com/en-us/ig/industry/water/raleigh-water-case-study>
<https://www.esri.com/en-us/arcgis/products/arcgis-indoors/overview>

ArcGIS Indoors at JHU?

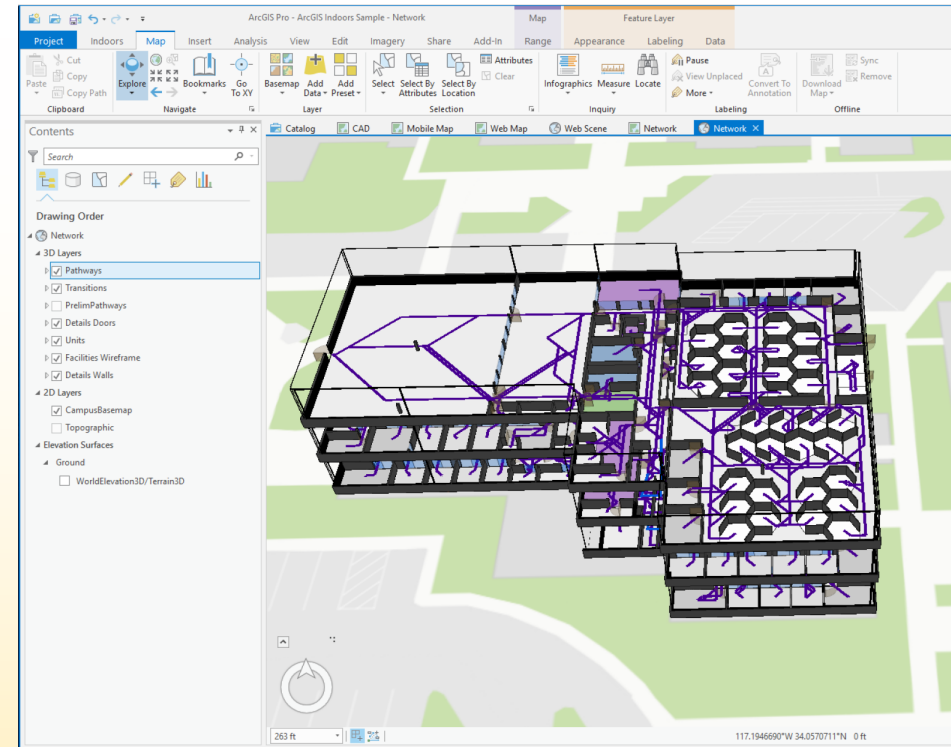
Indoor dataset feature classes

The indoor feature dataset consists of feature classes that represent floor plan information in 2.5D for visualization and analysis purposes.

These feature classes are organized in a hierarchy with assumed spatial relationships defined in the following ascending order:

- Units and Details
- Levels
- Facilities
- Sites

Name	Description
Details	Describes your linear architectural features, such as walls, doors, windows, and so on. Details are used to constrain generated network pathways and to support visualization. Details features should be contained in a Levels feature.
Facilities	Describes the footprints of your managed buildings and other structures. A facility can represent any occupiable structure, such as an office or campus building, retail setting, warehouse, generator or pump house, silo, or any industrial structure. It is recommended that Facilities features be contained in a Sites feature.
Levels	Describes the footprint of each occupiable floor contained in your managed facilities. Levels footprints must be contained in a Facilities feature.
Sites	Describes the boundaries of your managed sites and is used for visualization in mapmaking.
Units	Describes the footprints of nonoverlapping individual functional areas such as workspaces, amenities, retail spaces, elevators and stairways, and so on. Unit footprints must be contained in a Levels feature.





Questions?