

Advancing Campus Efficiencies by Developing and Utilizing Indoors Data

Scott Holland

Michigan State University

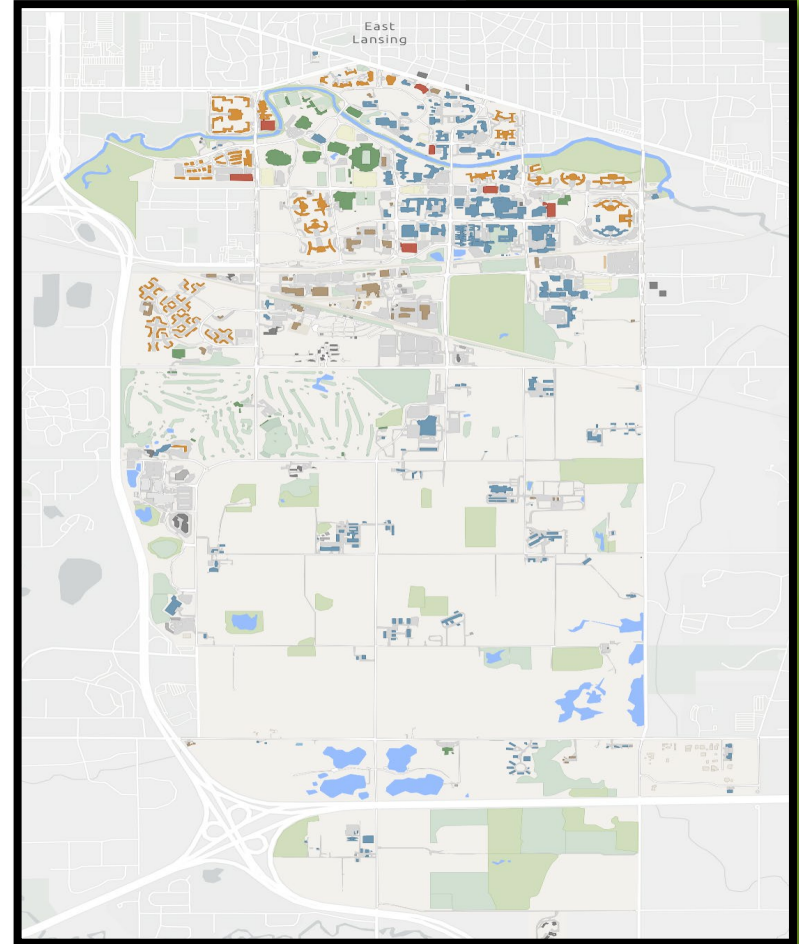
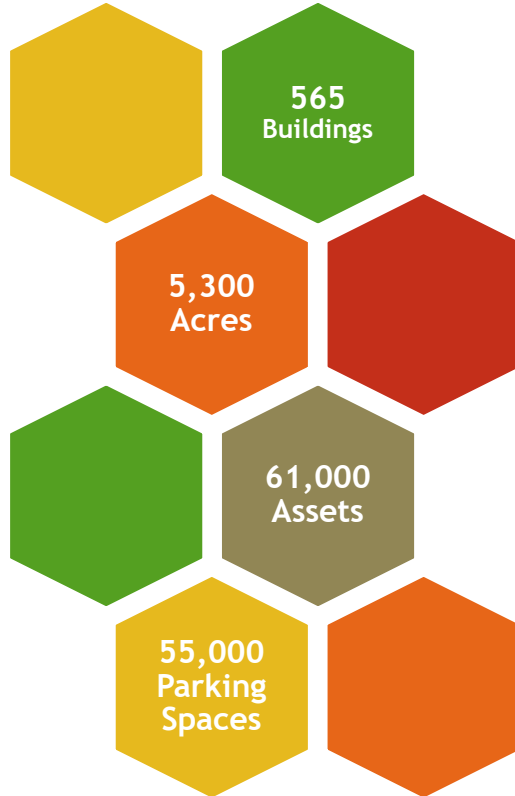
SDM - Spatial Data Management

- ▶ Team members
 - ▶ Jade Freeman - Team Lead
 - ▶ Joel Lenz - Sr. GIS Developer
 - ▶ Nick Voss - GIS Coordinator
 - ▶ Scott Holland - GIS Analyst

Conversation Leading to Exploration

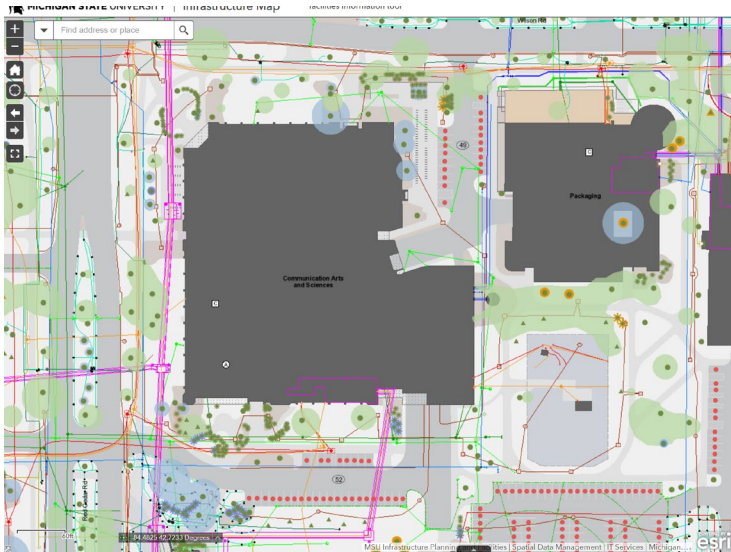
- ▶ “...They don’t know where the building is, what door to use, or where to go once they are inside.”
 - Rich Brown, MSU Infrastructure Planning & Facilities

Campus is a Big Place



Where to Begin?

- Expand the Spatial Data Infrastructure



Spatial Data Infrastructure

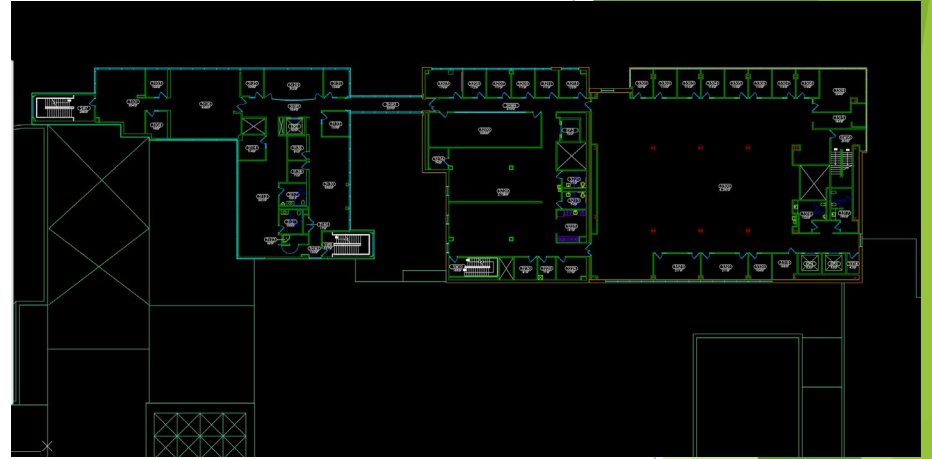
- Utilities
- Plants (trees, shrubs, etc.)
- Roads/parking, sidewalks (road areas, edges, centerlines)

Benefits of Expanding SDI Inside Buildings

- Improved GIS experience
- Reduction of waste
- Same level of information access
- Improved staff onboarding

How to Expand the SDI?

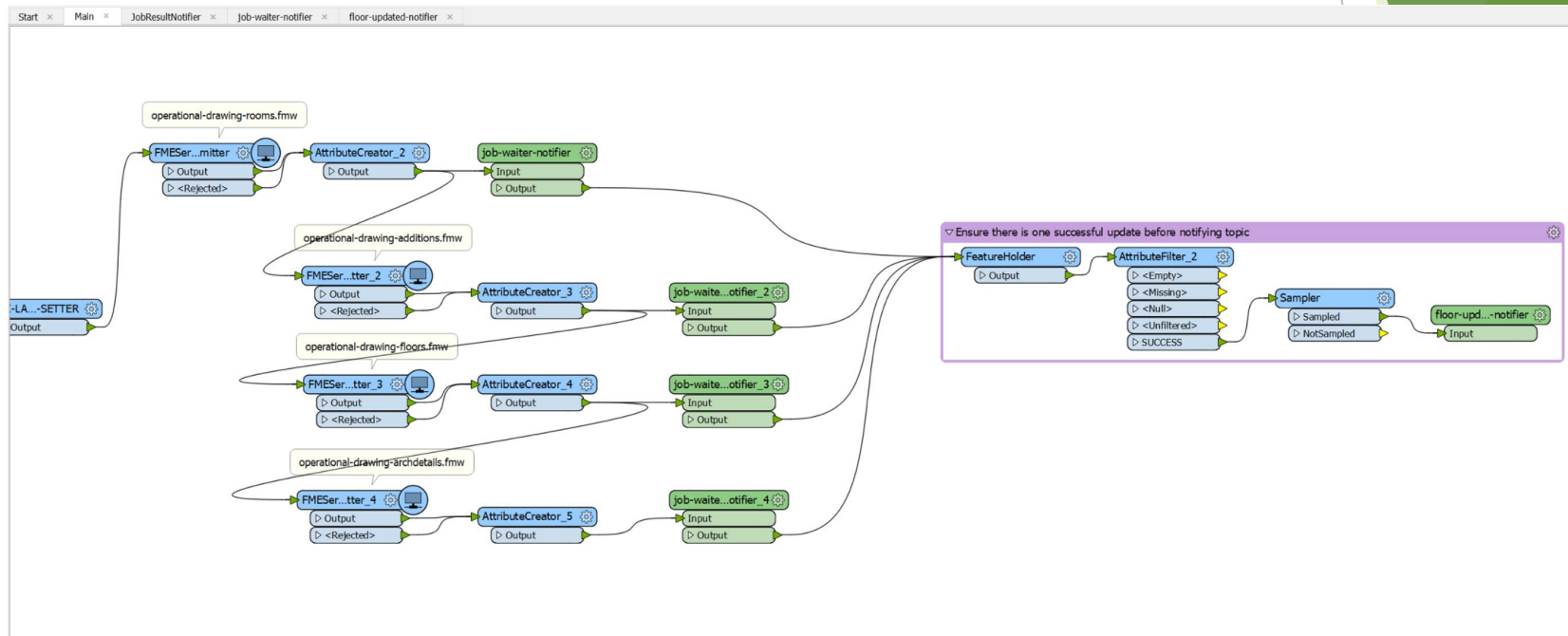
- Create an Indoors Basemap



- Steps to get there:



FME Automation



Establishing Security for Critical Data

MICHIGAN STATE UNIVERSITY | Office of the Controller

Search...

SITEMAP | MAP

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SECTION 227: Access to Facility Information and Critical Data

Last updated: September 29, 2017
Last reviewed: June 30, 2016

Policy Owner: Michigan State University Police Department (MSUPD) and Infrastructure Planning and Facilities (IPF)
Policy Owner Contact: MSUPD, 355-2221 and IPF, 353-1760

I. Purpose
II. Access To Facilities Data At MSU
III. Conditions And Operations

I. PURPOSE

The purpose of this policy is to provide MSU employees with a process for providing appropriate access to, and distribution of, facility information, plans, data, documents, drawings and photos.

This policy is not intended to restrict academic research or its publication. This policy covers all forms of access to MSU facility information and all media through which it may be disseminated.

Requests for facility information should be made as far in advance as possible in order to receive timely consideration of their requests.

This policy does not impact Michigan Freedom of Information Act requests.

Requestors will be responsible for adhering to the nondisclosure agreement/user acceptance agreement upon receipt of MSU facility information.

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II. ACCESS TO FACILITIES DATA AT MSU

Access to facilities data at MSU is divided into three different levels: General Access, Administrative Access, and Limited Access. These levels were developed to balance the need for access to institutional data against relevant security and safety considerations.

A. LEVEL ONE: GENERAL ACCESS

General access information is information that is typically available to the public to facilitate wayfinding, planning, and safety.

Examples of General Access Data

- Campus maps and photos representing building features and placement with no more detail than publicly available from industry sources.
- Floor plans excluding room descriptions, occupant information and room functions.
- Institutional facility tabular data used for visitors, students, staff, interagency units, and peer universities, such as official building name, number reference, street address.

B. LEVEL TWO: ADMINISTRATIVE ACCESS

Administrative Access information is information necessary for certain MSU employees or MSU students to promote the conduct of business or education. Administrative Access to facility information may also be granted to representatives of governmental agencies and vendors through mutual assistance agreements.

Access granted to this information may include restrictions based on authorization of Schools/Colleges, Departments or administration units.

Examples of Administrative Access Data

- Scaled drawings of any campus location, including maps, floor and mechanical plans for construction, planning, and maintenance. Building, room, and/or equipment or other property records necessary for any business, or administrative purposes. Construction drawings, utility infrastructure, equipment locations

Evolution of the Indoor Basemap

Asset Mapping Summary

Filters

Building No
No category selected

Floor No
No category selected

Room No
No category selected

Asset Class
No category selected

Equipment Group
No category selected

Equipment Type
No category selected

Keyword
No category selected

Status
No category selected

Use these controls to filter the map and statistics.

Total Assets
38,350
43,727

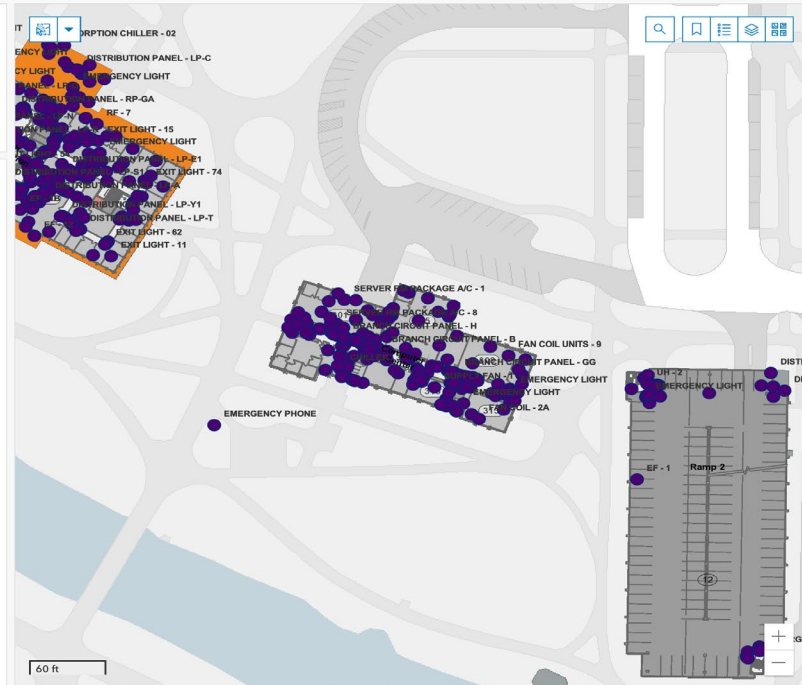
Last update: a few seconds ago

Number of assets mapped by month



Last update: a minute ago

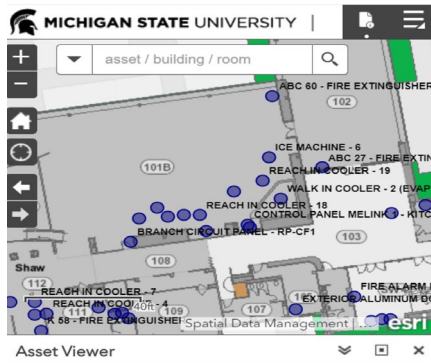
Assets mapped per month



Eri Community Maps Contributors, Michigan State University, Province of Ontario, © OpenStreetMap, Microsoft, Eri, HERE, Garmin, Safe... Powered by Eri
Summary statistics of the IPF asset mapping effort.

Issues with Original Attempt

View on iPhone



Asset Viewer

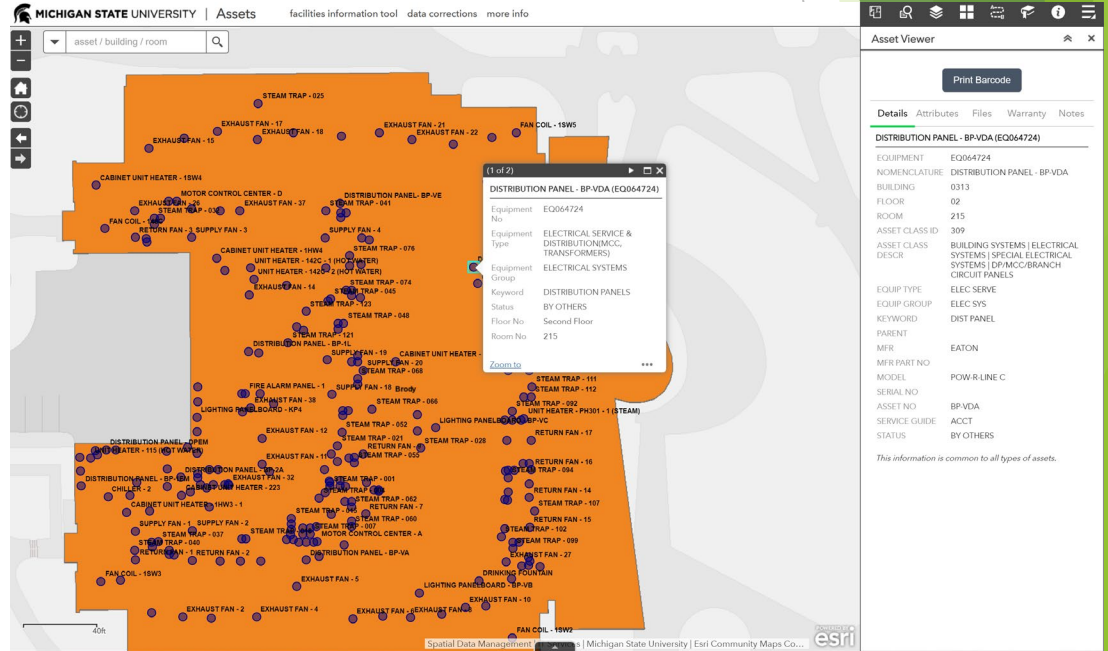
Print Barcode

Details Attributes Files Warranty Notes

CONTROL PANEL MELINK 4 - KITCHEN VENT SYS (EQ074945)

EQUIPMENT	EQ074945
NOMENCLATURE	CONTROL PANEL MELINK 4 - KITCHEN VENT SYS
BUILDING	0317
FLOOR	01
ROOM	101A
ASSET CLASS ID	692
ASSET CLASS DESCR	BUILDING SYSTEMS HVAC SYSTEMS MISCELLANEOUS

View on Desktop



Asset Viewer

Print Barcode

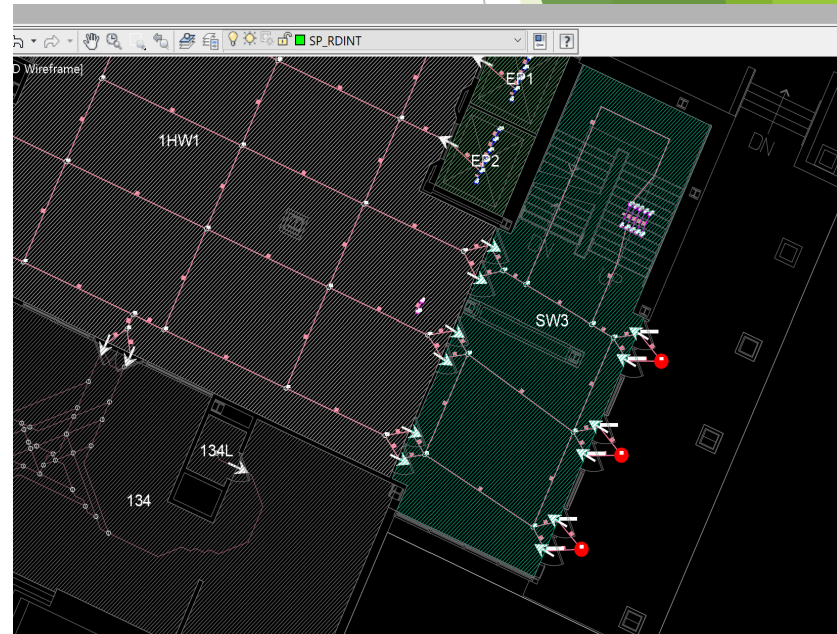
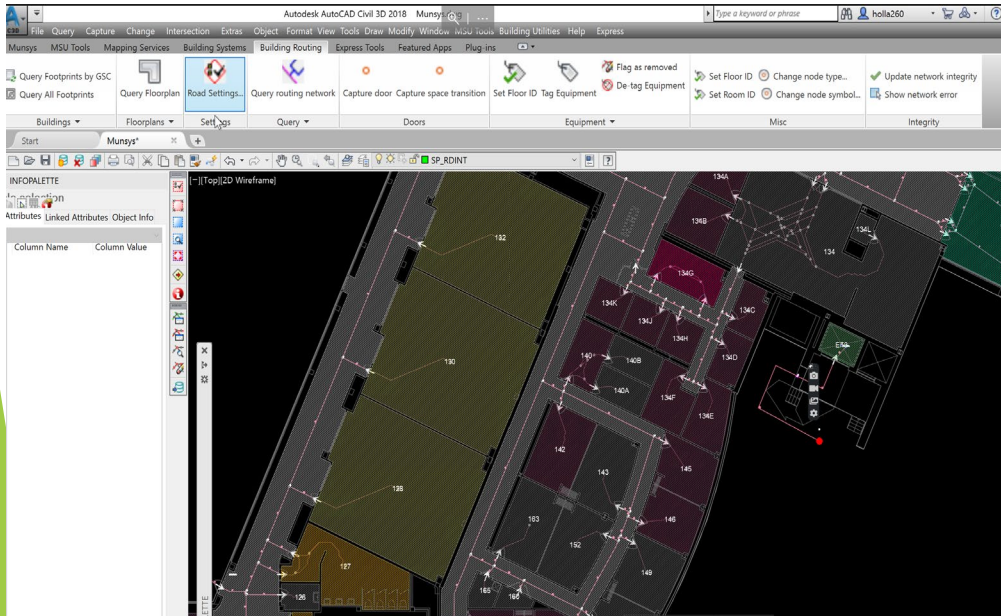
Details Attributes Files Warranty Notes

DISTRIBUTION PANEL - BP.VDA (EQ064724)

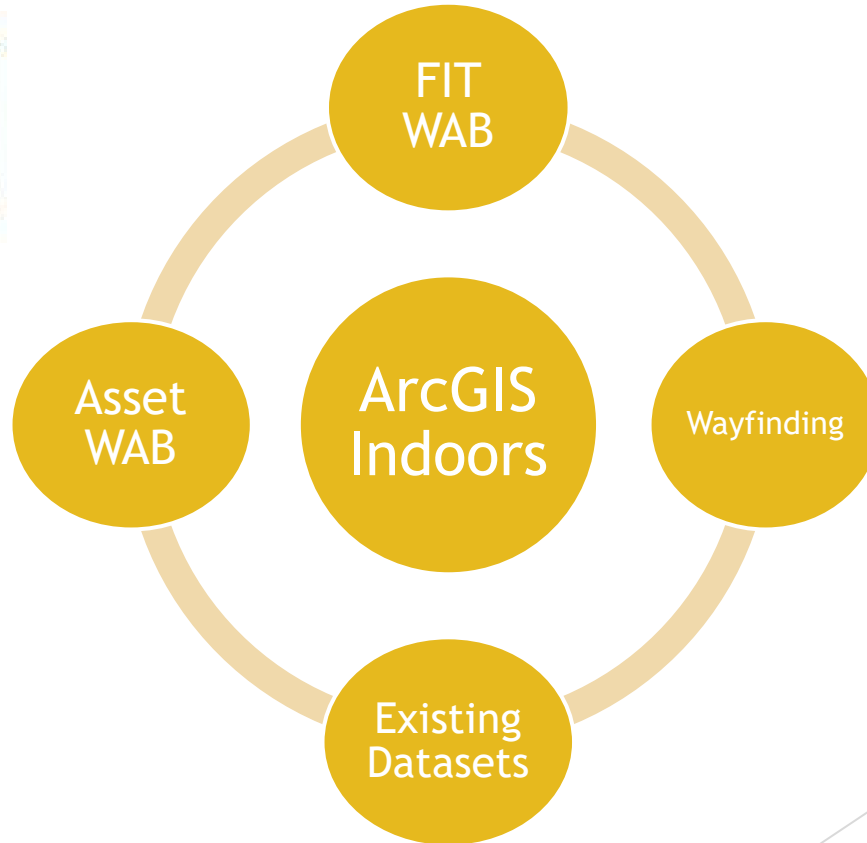
EQUIPMENT	EQ064724
NOMENCLATURE	DISTRIBUTION PANEL - BP.VDA
BUILDING	0313
FLOOR	02
ROOM	215
ASSET CLASS ID	309
ASSET CLASS DESCR	BUILDING SYSTEMS ELECTRICAL SYSTEMS SPECIAL ELECTRICAL SYSTEMS EP/MCC/BRANCH CIRCUIT PANELS
EQUIP TYPE	ELEC SERVE
EQUIP GROUP	ELEC SYS
KEYWORD	DIST PANEL
PARENT	EATON
MFR PART NO	
MODEL	POW-R LINE C
SERIAL NO	
ASSET NO	BP.VDA
SERVICE GUIDE	ACCT
STATUS	BY OTHERS

This information is common to all types of assets.

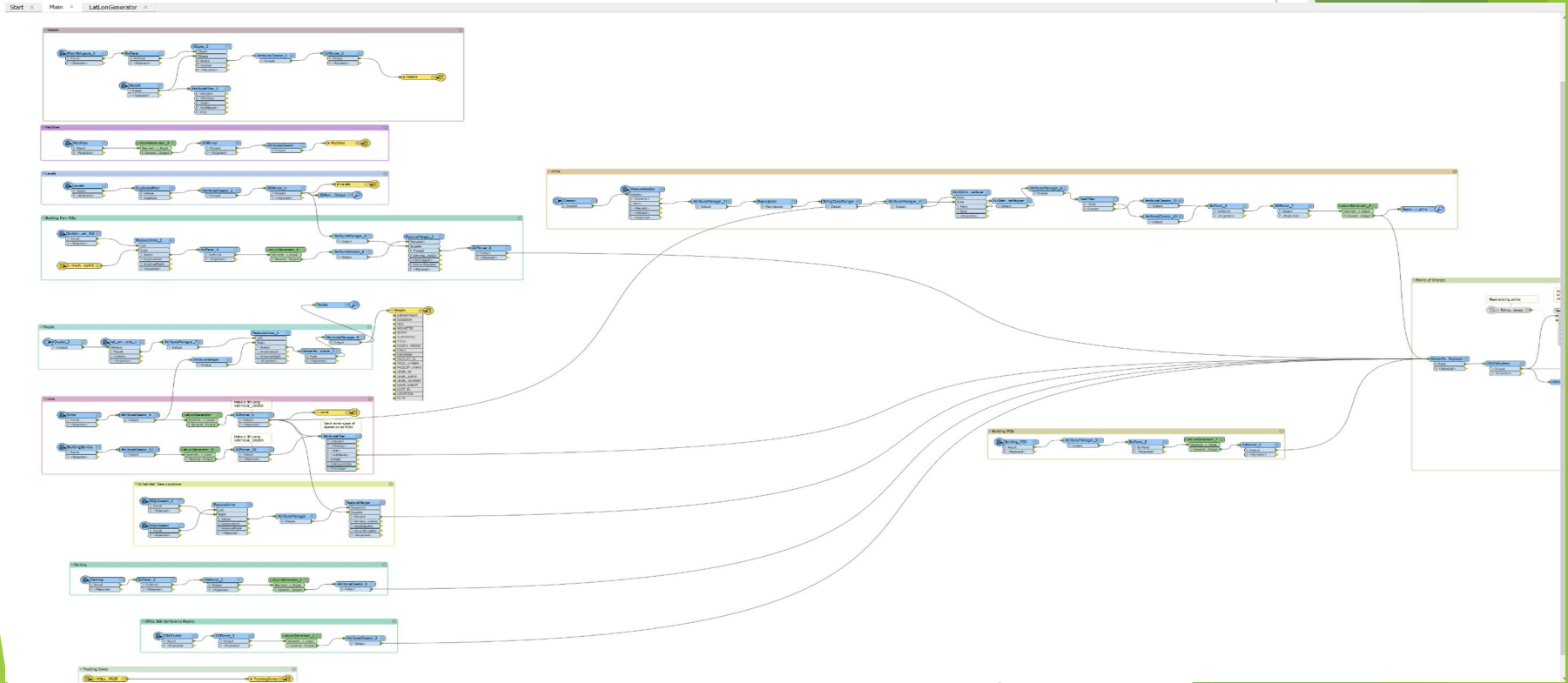
Wayfinding: Creating Exterior and Interior Network Data



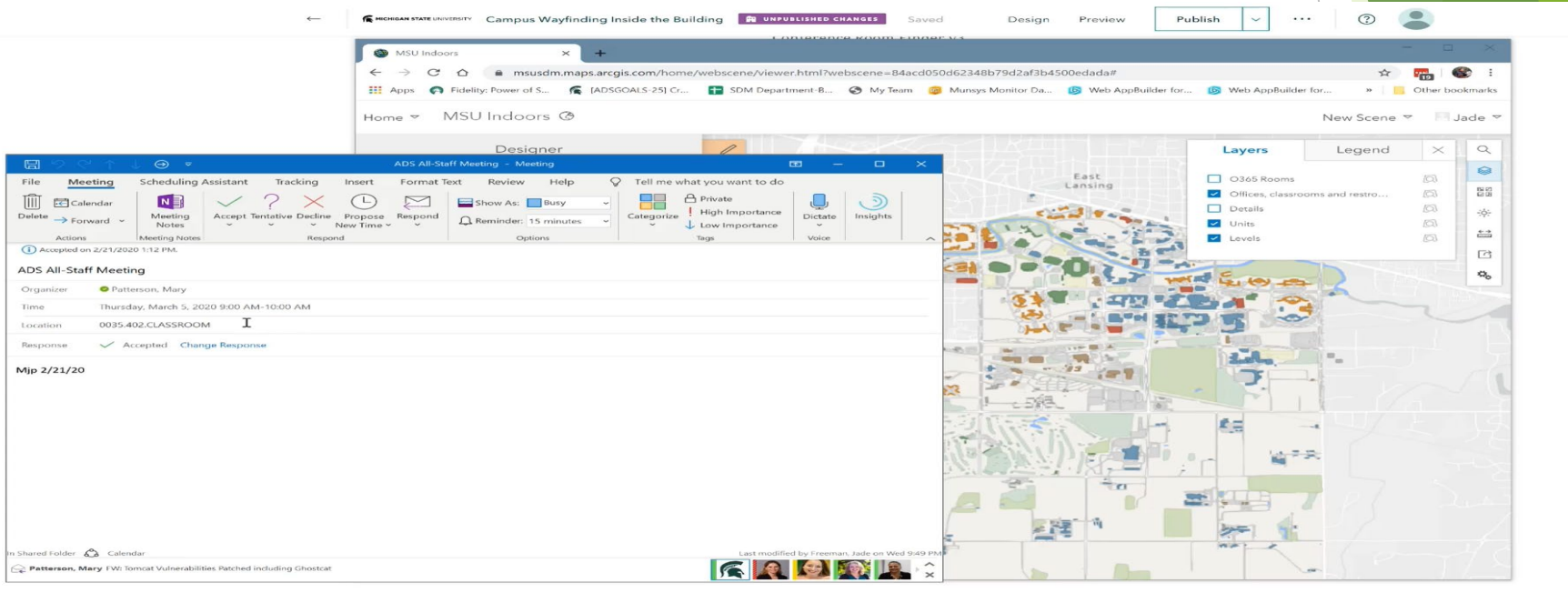
ArcGIS Indoors: Bringing It All Together



The Indoors Data Model: Leveraging the Existing Data Infrastructure



Initial Explorations: 3-D Proof of Concept Application



The screenshot displays a web application interface for a 3-D proof of concept application. The main window shows a 3D map of a building complex, likely a university campus, with various buildings and structures rendered in different colors. The map is titled "MSU Indoors" and is viewed through a browser window. The browser address bar shows the URL: msusdm.maps.arcgis.com/home/webscene/viewer.html?webscene=B4acd050d62348b79d2af3b4500edada#. The browser window also shows the "MSU Indoors" title and a "New Scene" dropdown menu.

Overlaid on the map is a meeting management window titled "ADS All-Staff Meeting - Meeting". The window has a menu bar with "File", "Meeting", "Scheduling Assistant", "Tracking", "Insert", "Format Text", "Review", and "Help". The "Meeting" menu is open, showing options like "Delete", "Forward", "Meeting Notes", "Accept", "Tentative", "Decline", "Propose", "New Time", "Respond", "Show As: Busy", "Reminder: 15 minutes", "Options", "Categorize", "Private", "High Importance", "Low Importance", "Tags", "Dictate", and "Insights".

The meeting details are as follows:

- Meeting Title:** ADS All-Staff Meeting
- Organizer:** Patterson, Mary
- Time:** Thursday, March 5, 2020 9:00 AM-10:00 AM
- Location:** 0035.402.CLASSROOM
- Response:** Accepted

The meeting window also shows a "Mjp 2/21/20" section and a "Last modified by Freeman, Jade on Wed 9:49 PM" timestamp. At the bottom, there is a "Shared Folder" section with a "Calendar" icon and a "Patterson, Mary" profile picture.

Pilot Group Training

Indoors Training Guide

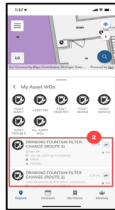
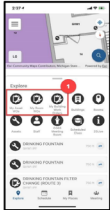
Using the Explore Widget

After selecting the **Explore Option**, you will be brought to a screen as shown below. The highlighted widgets are all items that will use the campus map to help locate and provide directions to the work order on campus that you seek.



To view a list of the work orders closest to you:

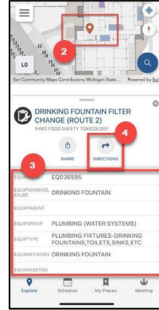
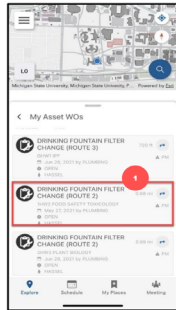
1. Select the **Work Order Group** your desired work order is categorized in. A Work Order Group refers to one of the following: **My Asset WOs**, **My Room WOs**, or **My Building Work Orders**.
2. Once you've selected the **Work Order Group** that you would like to explore you will be brought to a screen similar to the one below on the right. The highlighted area is a list of the WOs arranged from those closest to your current location going down to the list to the WO farthest away.



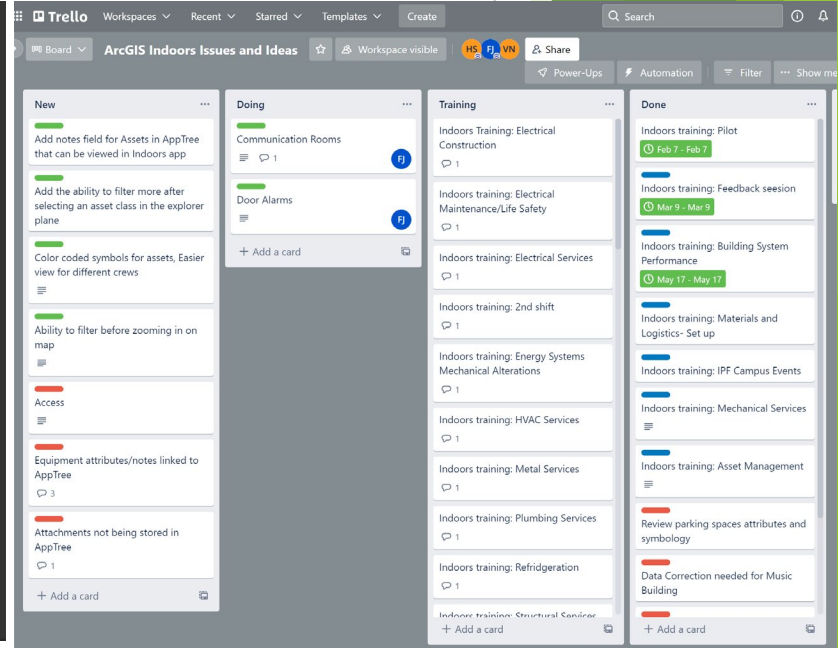
Viewing Item Details

To see more details about a specific item:

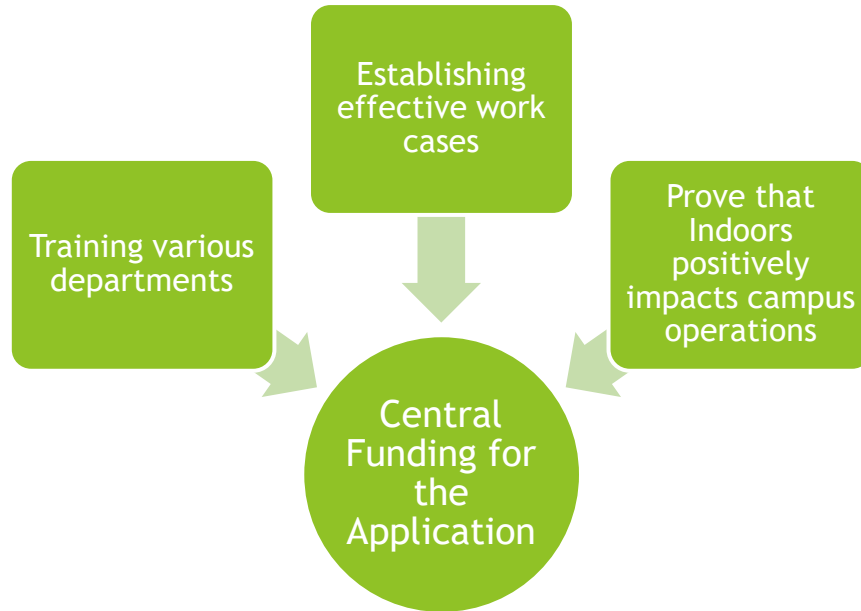
1. Select the item you wish to see more details.
2. After selecting an item to view, the map within your application will move to the exact location of that item.
3. Scroll in this area to view details about the selected item.
4. Select the **Directions** option to view directions to your selected item.



App for Bugs & Improvement Ideas



Pilot Group Training Cont.



Calculating the Efficiency Net Gains

- ▶ “Even if the app saves just a minute or two during a job, helping staff navigate a new workspace, over time that savings will add up to thousands of work hours.”
 - Adam Lawver, MSU Infrastructure Planning & Facilities

Indoors Demo

The screenshot displays a web browser window titled "MSU ITS Spatial Data Management" and "Indoors Viewer". The address bar shows the URL: <https://gis.msu.edu/portal/apps/indoors/index.html?appid=86ebb70206d44ddcaf6250f540fecb584>. The application interface includes a search bar at the top, a user profile for "holla260", and a left-hand navigation menu with options for "Explore", "My Places", and "Directions". The main area features a 3D architectural map of a campus building complex, with a scale bar indicating 0 to 0.4 miles. On the right side, there are interactive buttons for "Browse", "Zoom to", and "Collapse". The bottom of the browser window shows a Windows taskbar with various application icons, a system tray with weather information (67°F Sunny), and the date and time (9:25 PM 6/2/2022). A small circular profile picture of a man is visible on the right side of the application interface, with the name "Holland, Scott" below it.

Limitations

Currently No
Editing
Capabilities in
Indoors



```
graph LR; A[Currently No Editing Capabilities in Indoors] --> B[Network Issues when Traveling in Obscure Areas]; B --> C[Cost of the Platform];
```

Network Issues
when Traveling
in Obscure
Areas

Cost of the
Platform

The Future: Opportunities for Growth of Indoors Data

Multimodal Wayfinding

- Public Access/ MSU Maps
- Kellogg campus

Hoteling of Office Space

- Remote/hybrid workers
- Reusing space on campus

Emergency Phone App

- Routing for staff
- Reporting

Capital Assets

- Asset reporting

Hasmatiz

- Hazardous material reporting

Recycling

- Locating recycling stations
- Condition assessments

Indoor/Outdoor Campus Events

- Management of all campus events

Opportunity for a Prize...

Kahoot! Quiz

- MSU Indoors and Mackinac Island questions
- On any Wifi-Connected Device go to kahoot.it
- You'll enter the code that I display in a bit, then add your name to play for a prize

Thank You!