

Using Direct Database Connect with Power BI



HARD ROCK
CASINO & HOTELS

TULSA | MAR 30 – APR 02

Introductions



TAMMY NEAL

Senior Consultant, TMA Systems

Seasoned Senior Consultant with 17 years of experience at TMA Systems focusing on WebTMA implementation and optimizing workflows.



SARAH MORRIS

Director of Facility Planning & Project Programming, Baylor University

Over 15 years experience in higher education with a background in interior architecture and construction. Self taught, I began working in CMMS systems about 10 years ago.



Agenda

About Baylor University 4

Direct Database Connect 6

Dashboards 9

Power BI 21

Demo 16





Campus Details

Year founded

1845

by the Republic of Texas

Location

Waco, TX

R1 Private University

Acres

~1,000

Buildings

~180

Graduate population

6-7K

Undergrad population

16-17K

Facilities Operations (Request Intake):

- Online Service Request Form (TMA)
- StarRez API
- Text Message
- Phone
- Email



WebTMA at Baylor University



On campus since 1990s

Current version went live June 1, 2024

~80K

Work orders per year (~20K per quarter)

Q4 2024

Added Direct Database Connect

- Complex KPI scoring for our vendors
- Lack of iService Desk at launch of WebTMA 7



What is Direct Database Connect?

- DDC mirror version of TMA Database hosted on Microsoft Azure
- Provides read-only copy of production database
- Allows for analyzing data without fear of editing



Overview of Uses of DDC

- What's the Status?
- The 1600 Work Order Batch Closure
- Can You Run That Report Again?
- Complex KPI Metrics
- Where are the Leaks?



Overview of Uses of DDC

- How to we make best use of the funding?
- “You saved me a full day every month”
- Where did this record go?
- How do we prove we need more staff?
- Are we paying for ghost accounts?
- Did that batch operation actually work?



What's the status?

Work Order Status

Last Updated: 2/16/2026 11:11:32 AM

Search Request Number

Enter request number or partial number. You may enter in multiple values by hitting "enter" after each number. →

Search Work Order Number

Enter work order number or partial number. You may enter in multiple values by hitting "enter" after each number. →

Search Requestor

Enter requestor or partial text →

Search Vendor

- Select all
- Custodial
- Grounds

Search Created Date

6/3/2024 2/16/2026

Search Finish/Complete Date

7/16/2024 2/16/2026

Search Building Name or Code

Search

- Select all
- > 801 Washington Tower
- > 821 Washington Gym
- > Armstrong Browning Library
- > Baylor Ballpark

Details on open work orders or work orders closed within the past 6 months are shown here. Residence hall work orders are excluded from this search. Please utilize StarRez for information on residence hall work orders.

Request Number	Requestor	Action Requested	Work Order Number	Status	Created Date	Finished or Closed Date	Priority	Location	Room Number	Technician Comments
82061		The Garden Level within the glass doors is cold. Please raise temperature	M-127502	Work In Progress	2/16/2026		3 Routine	Moody Memorial Library		02/16/2026: [redacted] 02/15/2026 10:17 PM - per grover handoff to controls emailed heaven.jeff.z3 02/16/2026: [redacted] -Went and looked at it on desigo. Then went on site and took temperatures. The area that was cold is commed out on the desigo. Need controls to look at it. 02/16/2026: [redacted] 02/15/2026 10:17 PM - per grover handoff to controls emailed heaven.jeff.z3
82066		urgnet- there is a door stuck wide open- on the waco creek side of building	M-127504	Work Closed	2/16/2026	2/16/2026	2 Urgent	Baylor Sciences Building		02/16/2026: [redacted] 02/15/2026 11:53 PM - ok to close per tech 02/16/2026: [redacted] -See notes 02/16/2026: I arrived on site and met up with BUPD to inspect the door. Upon inspection the door came off its tracks at the top. I then put the door back on its tracks. I tested the door and found it was still not operating. I then found the power switch for the door and saw it was turned off. I turned it on and the door began to work properly. The door is fully functional and operating properly I then exited the location. Pictures attached. 02/16/2026: [redacted] 02/15/2026 8:06 PM - notified tech

- Embedded report into our Facilities Departmental website
- Open for any BU student, faculty, or staff member to access
- FERPA compliant

Work Order Status

Last Updated: 2/16/2026 11:11:32 AM

Search Request Number

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Search Work Order Number

Enter work order number or partial number. You may enter in multiple values by hitting "enter" after each number. →

Search Requestor

Enter requestor or partial text →

Search Vendor

- Select all
- Custodial
- Grounds

Search Created Date

6/3/2024 [calendar icon] 2/16/2026 [calendar icon]

Search Finish/Complete Date

7/16/2024 [calendar icon] 2/16/2026 [calendar icon]

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- Select all
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Work Order Status Recording

Work Order Status

Last Updated: 1/23/2026 8:38:23 AM

Baylor University
FACILITIES MANAGEMENT

Search Request Number

Enter request number or partial number. You may enter in multiple values by hitting "enter" after each number. →

Search Requestor

Enter requestor or partial text →

Search Created Date

6/3/2024

📅

1/23/2026

📅

Search Building Name or Code

🔍 Search
 Select all
 801 Washington Tower
 821 Washington Gym
 Armstrong Browning Library
 Baylor Ballpark

Search Work Order Number

Enter work order number or partial number. You may enter in multiple values by hitting "enter" after each number. →

Search Vendor

Select all
 Custodial
 Grounds

Search Finish/Complete Date

7/16/2024

📅

1/23/2026

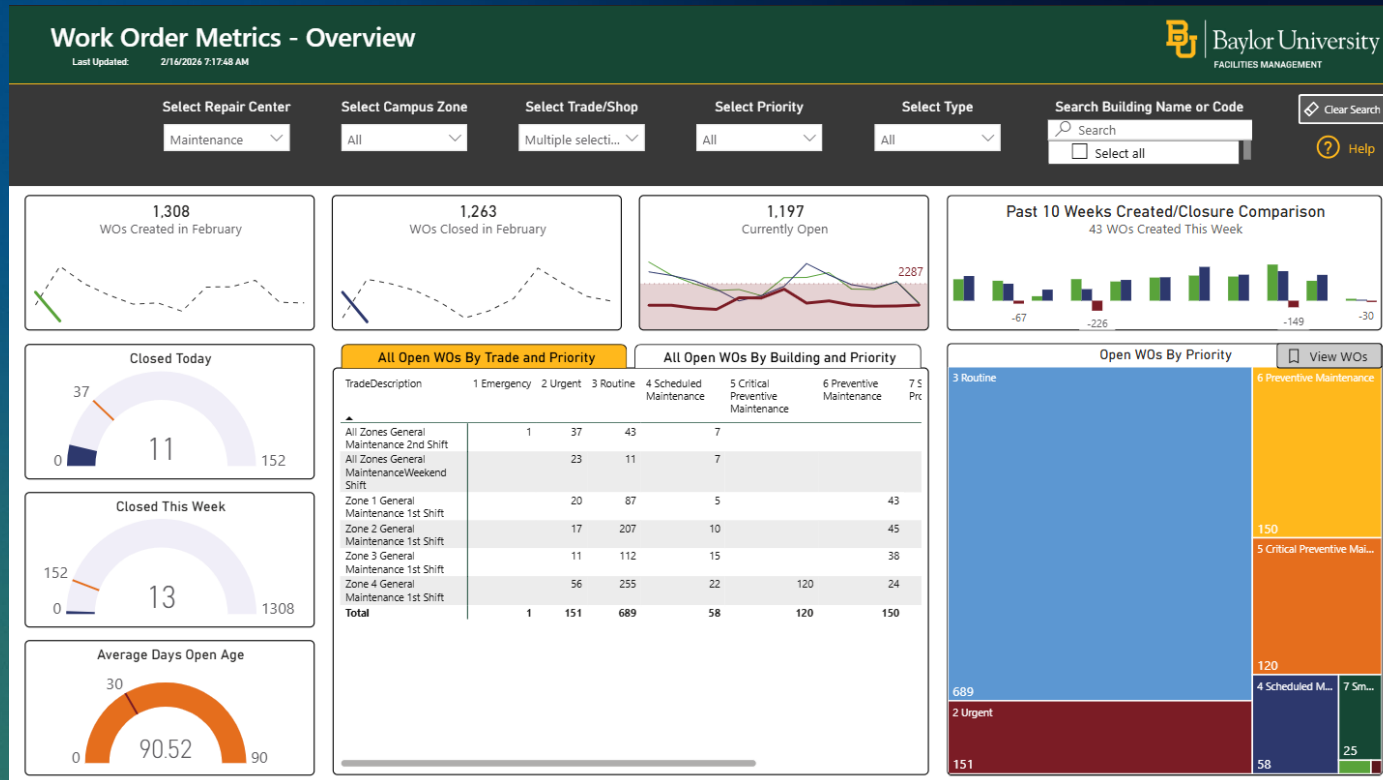
📅

Details on open work orders or work orders closed within the past 6 months are shown here. Residence hall work orders are excluded from this search. Please utilize StarRez for information on residence hall work orders.

Request Number	Requestor	Action Requested	Work Order Number	Status	Created Date	Finished or Closed Date	Priority	Location	Room Number	Technician Comments
78816	Landon.Johnstone	Pavilion - Chiller 1 - Replace evap flow sensor	M-122626	Assigned	1/23/2026		3 Routine	Paul and Alejandra Foster Pavilion		No comments found
78817	Landon.Johnstone	BRIC - Chiller 2 - Replace eductor iso solenoid valve, leaving evap liquid temp sensor, and VSD bleed resistors	M-122625	Assigned	1/23/2026		3 Routine	Baylor Research & Innovation Collaborative		No comments found
78819	sheryl_page	The toilet in the women's restroom large stall has a leak near the handle. This is in MMGYM 1st floor, women's restroom, Fountain Mall side of the building. Please repair the leak.	M-122628	Work Closed	1/23/2026	1/23/2026	2 Urgent	Rena Marrs McLean Gymnasium	114	01/23/2026: Pedro Rodriguez2-Arrived on site to inspect a toilet with a minor drip. Upon arrival, the door was knocked on and presence was announced. Inspection revealed a small leak at the connection between the flush head and the shut-off valve, indicating a worn O-ring. The flush head was removed, the old gasket replaced with a new one, and the connection was reassembled and tightened. The toilet was tested to confirm proper operation. Any water was cleaned up, and the closed sign was removed. 01/23/2026: Andrew Rivera-Went to location to inspect toilet having a small drip to it upon arrival did knock on door and announced my presence after inspecting toilet did see a small drip from where flush head connects to the shut off valve which calls for a bad O-ring took off flush head removed the old gasket placed new one in place head back and ensured got a tight fitting toilet was tested afterwards work completed cleaned any water spill and removed closed sign from door 01/23/2026: Natasha Athey 01/22/2026 7:24 PM - called johnnyo 01/23/2026: Natasha Athey 01/22/2026 7:24 PM - called johnnyo



1600 Work Order Batch Closure



- Daily monitoring of open work orders by:
 - Repair Center
 - Campus geographical zone
 - Priority
 - Type
 - Trade
 - Building
- Current year vs previous year
- Gauges for closures and average age
- Interactive

Work Order Metrics - Overview

Last Updated: 2/16/2026 7:17:48 AM

Select Repair Center

Maintenance

Select Campus Zone

All

Select Trade/Shop

Multiple selecti...

Select Priority

All

Select Type

All

Search Building Name or Code

Search

Select all

Clear Search

Help

1,308

WOs Created in February



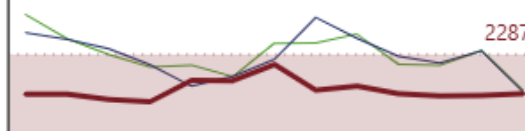
1,263

WOs Closed in February



1,197

Currently Open



Past 10 Weeks Created/Closure Comparison

43 WOs Created This Week



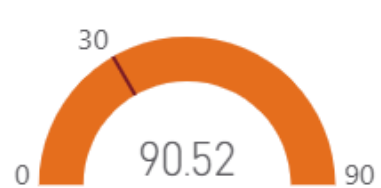
Closed Today



Closed This Week



Average Days Open Age



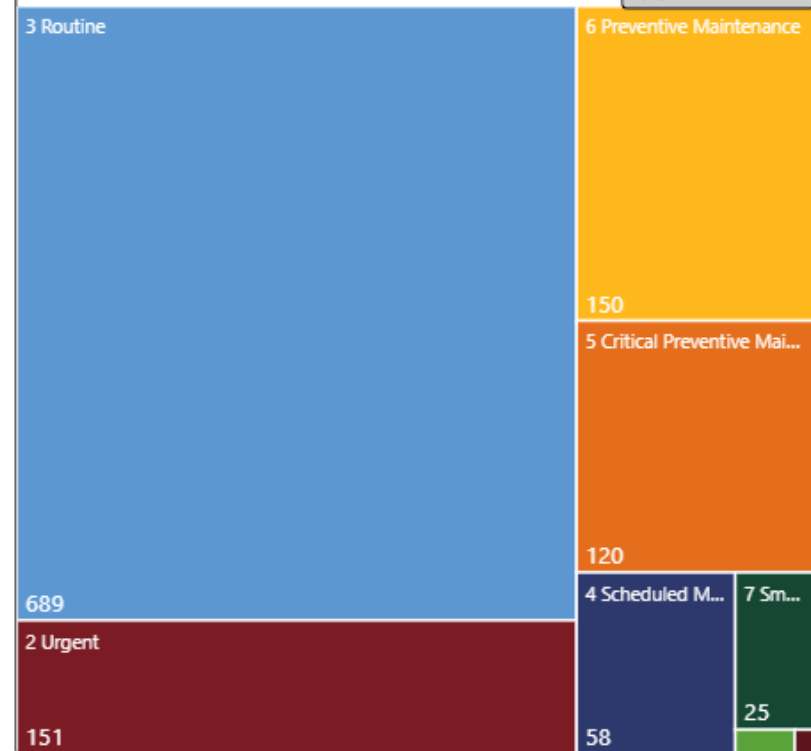
All Open WOs By Trade and Priority

All Open WOs By Building and Priority

TradeDescription	1 Emergency	2 Urgent	3 Routine	4 Scheduled Maintenance	5 Critical Preventive Maintenance	6 Preventive Maintenance	7 S Prc
All Zones General Maintenance 2nd Shift	1	37	43	7			
All Zones General Maintenance Weekend Shift		23	11	7			
Zone 1 General Maintenance 1st Shift		20	87	5		43	
Zone 2 General Maintenance 1st Shift		17	207	10		45	
Zone 3 General Maintenance 1st Shift		11	112	15		38	
Zone 4 General Maintenance 1st Shift		56	255	22	120	24	
Total	1	151	689	58	120	150	

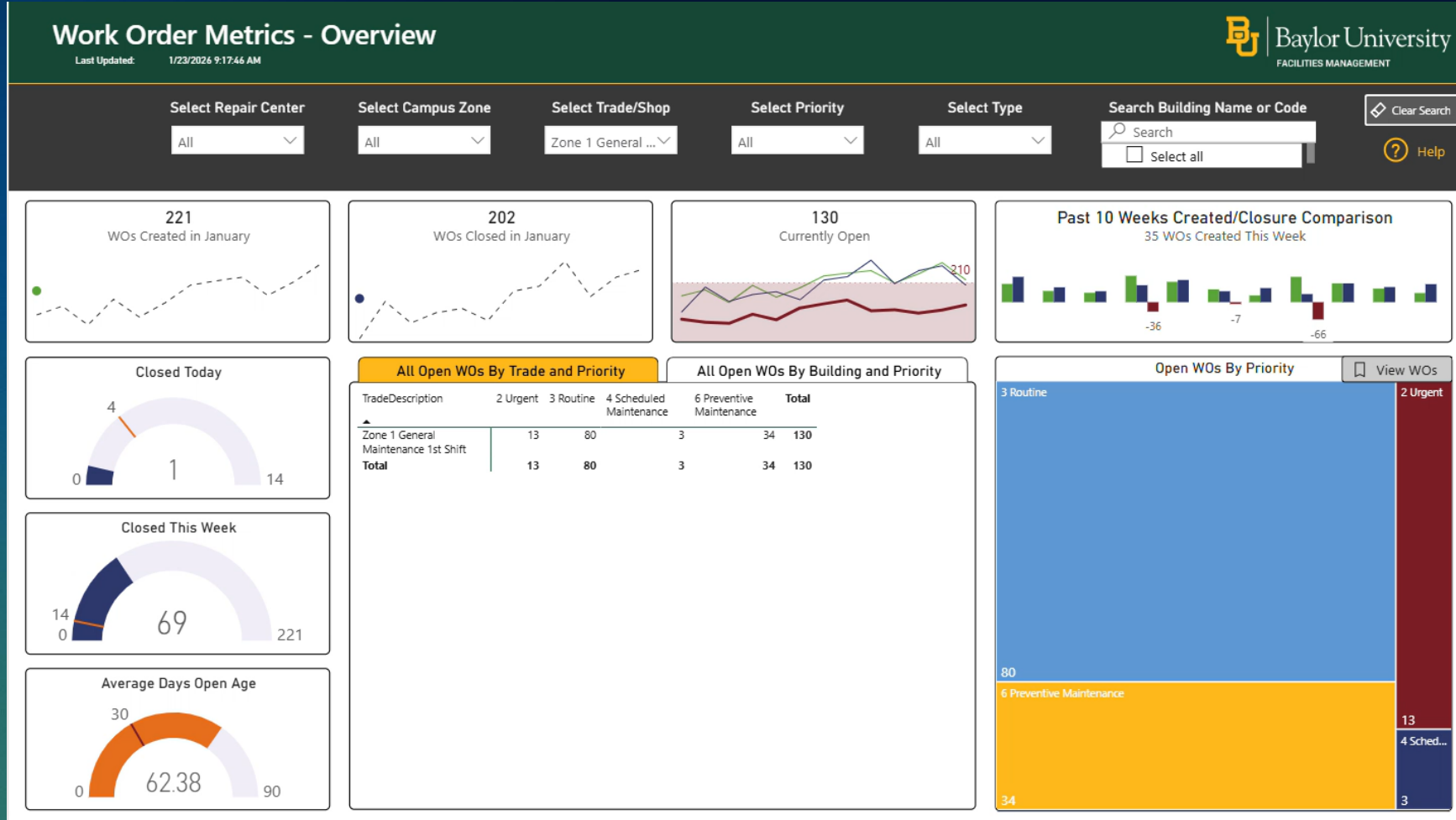
Open WOs By Priority

View WOs





Vendor Metrics Recording





Can you run that report again?

Manage security roles

Create new security roles and use filters to define row-level data restrictions.

Roles

+ New

- Full Access
- Repair Center C
- Repair Center G
- Repair Center M
- Zone 1: Athletics
- Zone 2: Student Life**
- Zone 3: Administration
- Zone 4: Academic

Tables

- vr_WebTMAIte...
- vr_webtmaWin...
- vr_WorkOrder**
- vr_WorkOrderT...
- vr_zone
- vr_Zoneltem
- vrpt_surveyRes...
- vrpt_Task
- vrpt_WorkOrd...
- vrpt_WorkOrd...
- WO_Helper_C...

Rules

Switch to default editor

```

1 [BuildingCode] IN
2   CALCULATETABLE(
3     VALUES(vr_Building[Code]),
4     vr_Building[ContactName] = "Zone 2: Student Life"
5   )

```

Filter the data that this role can see by entering a DAX filter expression that returns a True/False value. For example: [Entity ID] = "Value"

Save Close

Row-Level Security

Full Access (14)

Repair Center C (0)

Repair Center G (0)

Repair Center M (2)

Zone 1: Athletics (2)

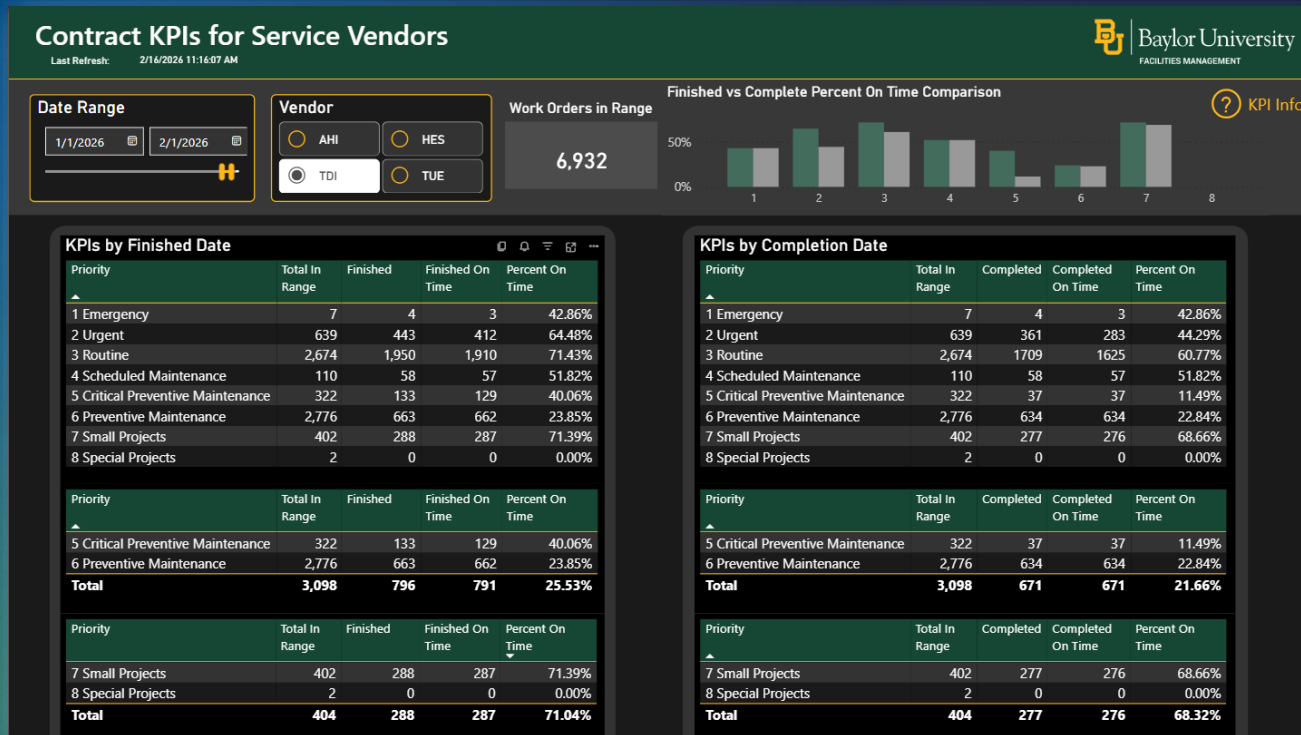
Zone 2: Student Life (2)

Zone 3: Administration (3)

Zone 4: Academic (3)



Complex KPI Metrics

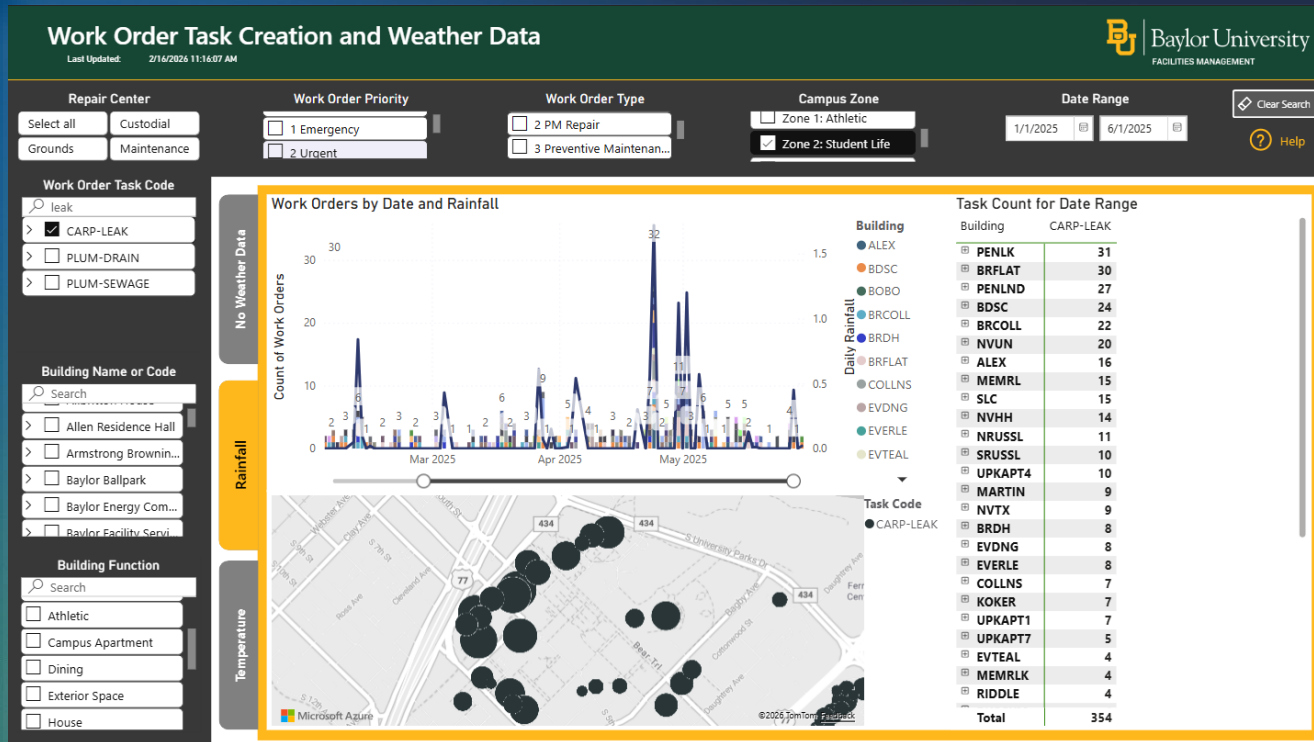


Complex KPIs based on WO closures in a window of time

- Work orders created during window
- Work orders closed during window
- Work orders active during window (created before window and closed after window)
- Different due dates based on priority
- Time consuming and inconsistent prior to DDC



Where are the leaks?



Two Sources of Data: NOAA Weather Station Monitoring + DDC WO Data

Custom API call to NOAA (free) for data

Used to track WO creations based on task in conjunction with weather events

- Rain
- Min/Max Temperature

Primarily used for identifying which take priority for replacements

Work Order Task Creation and Weather Data

Last Updated: 2/16/2026 11:16:07 AM

Repair Center

- Select all
- Custodial
- Grounds
- Maintenance

Work Order Priority

- 1 Emergency
- 2 Urgent

Work Order Type

- 2 PM Repair
- 3 Preventive Mainten...

Campus Zone

- Zone 1: Athletic
- Zone 2: Student Life

Date Range

1/1/2025 6/1/2025

Clear Search

Help

Work Order Task Code

- leak
- CARP-LEAK
- PLUM-DRAIN
- PLUM-SEWAGE

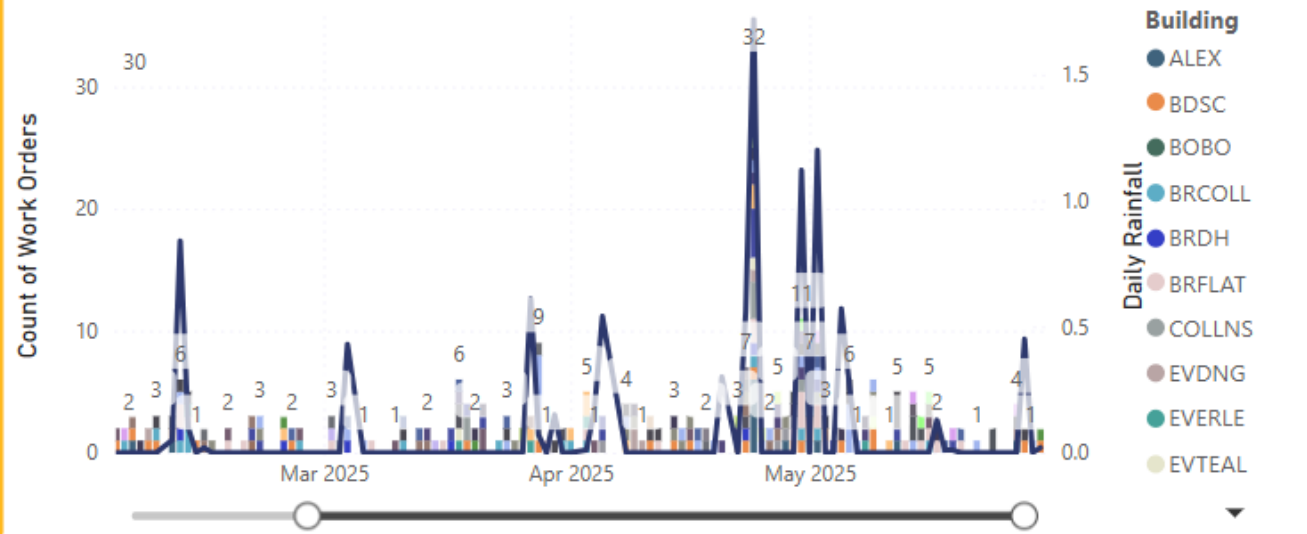
Building Name or Code

- Search
- Allen Residence Hall
- Armstrong Brownin...
- Baylor Ballpark
- Baylor Energy Com...
- Baylor Facility Servi...

Building Function

- Search
- Athletic
- Campus Apartment
- Dining
- Exterior Space
- House

Work Orders by Date and Rainfall



Task Count for Date Range

Building	CARP-LEAK
PENLK	31
BRFLAT	30
PENLND	27
BDSC	24
BRCOLL	22
NVUN	20
ALEX	16
MEMRL	15
SLC	15
NVHH	14
NRUSSL	11
SRUSSL	10
UPKAPT4	10
MARTIN	9
NVTX	9
BRDH	8
EVDNG	8
EVERLE	8
COLLNS	7
KOKER	7
UPKAPT1	7
UPKAPT7	5
EVTEAL	4
MEMRLK	4
RIDDLE	4
Total	354

No Weather Data

Rainfall

Temperature



Tasks and NOAA Recording

Work Order Creation and Weather

Last Updated: 1/16/2026 1:33:00 PM

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FACILITIES MANAGEMENT

Work Order Task Code

- Select all
- > APTR-SMRCARP
- > APTR-SMRELEC
- > APTR-SMRFLR
- > APTR-SMRHVAC
- > APTR-SMRPLMB

Campus Zone

Repair Center

Date Range

Building Name or Code

- Select all
- > Blank Building
- > 60 Cottonwood
- > 801 Washington To...
- > 821 Washington Gym
- > 86 Cottonwood

Building Function

- Select all
- Academic/Administration
- Administrative
- Apartment
- Athletic
- Campus Apartment

Work Orders by Date Only

Task Count for Date Range

Building	HVAC-TEMP
LAW	43
MCLSTA	40
SRUSSL	36
ALEX	35
801WSH	32
COLLNS	31
MEMRL	29
RT	25
BSB	23
PENLND	23
BRCOLL	22
DRAPER	22
BDSC	21
HANKAC	21
MARTIN	21
NVHH	20
OMAIN	20
NRUSSL	19
TRUETT	19
BRFLAT	15
CRLSCI	15
FRLCTR	15
MMSCI	15
Total	908

No Weather Data

Rainfall

Temperature

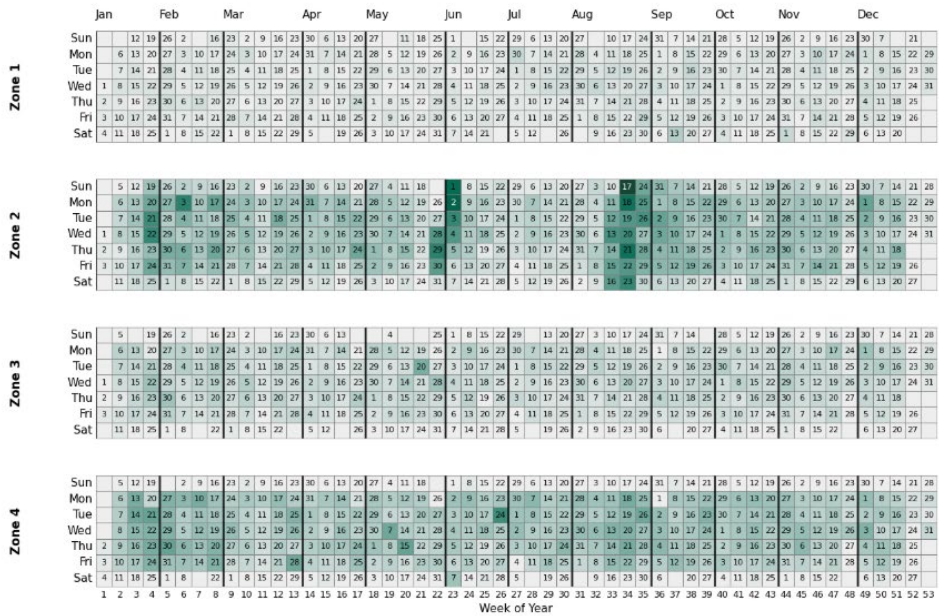
19



Other Capabilities – Custom Python/R

- If PBI doesn't have a visual that works
- Work Orders created across zones 1 year

YEAR OVERVIEW: WORK ORDERS CREATED PREVIOUS YEAR DAYS WITH BLANK NUMBERS HAD NO WOS CREATED ON THAT DATE



Work Order - Zone Overview

Select Report Center Select Priority Select Type

Year Overview: Work Orders Created Previous Year

Python script editor

```

# Duplicate rows will be removed from the data.
1 import pandas as pd
2 import seaborn as sns
3 import matplotlib.pyplot as plt
4 import numpy as np
5 from matplotlib.colors import LinearSegmentedColormap
6
7 df = dataset.copy()
8
9 # Pre-filter data
10 df_filtered = df[df['C_Created_Last_Yr'] > 0]
11 df_sorted = df_filtered.sort_values('Day of Wk Num')
12
13 # Define zones
14 zones = ["Zone 1: Athletic", "Zone 2: Student Life", "Zone 3: Administration", "Zone 4: Academic"]
15
16 # calculate global scaling
17 global_min = 0
18 global_max = df_sorted['C_Created_Last_Yr'].max()
19
                    
```



Why Power BI?

- Live Data Connections
- Interactivity
- Big Data Capacity
- Connections between Tables
- Visualizations
- Data Validation



Data Best Practices

Keep production data and analysis separate

- Queries in production slow down operations
- The more complex, the more the database is taxed

Data integrity and safety

Different tools for different purposes



Power BI Components

- Semantic model
- Calculated columns
- Measures
- Slicers



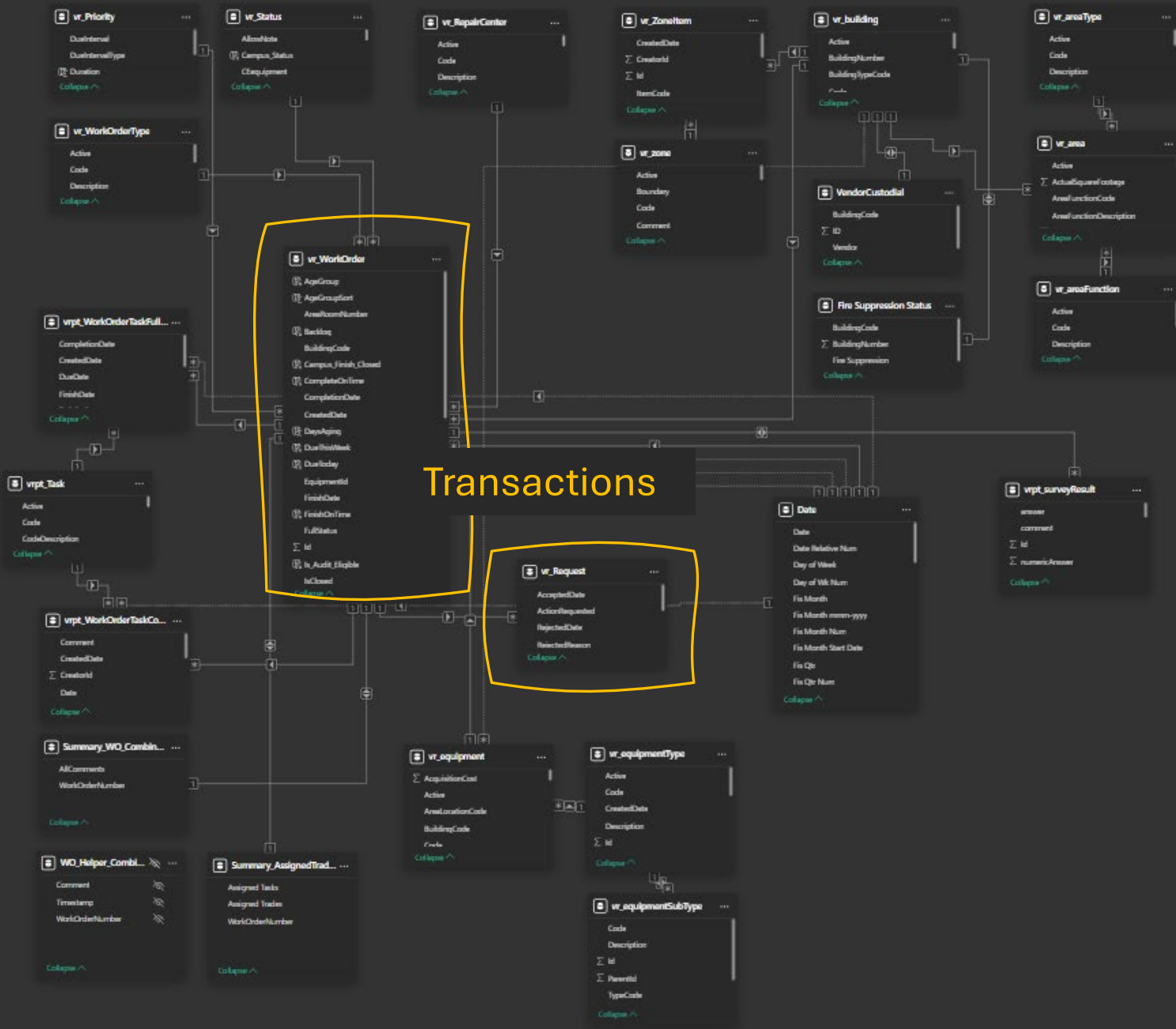
Power BI Structure

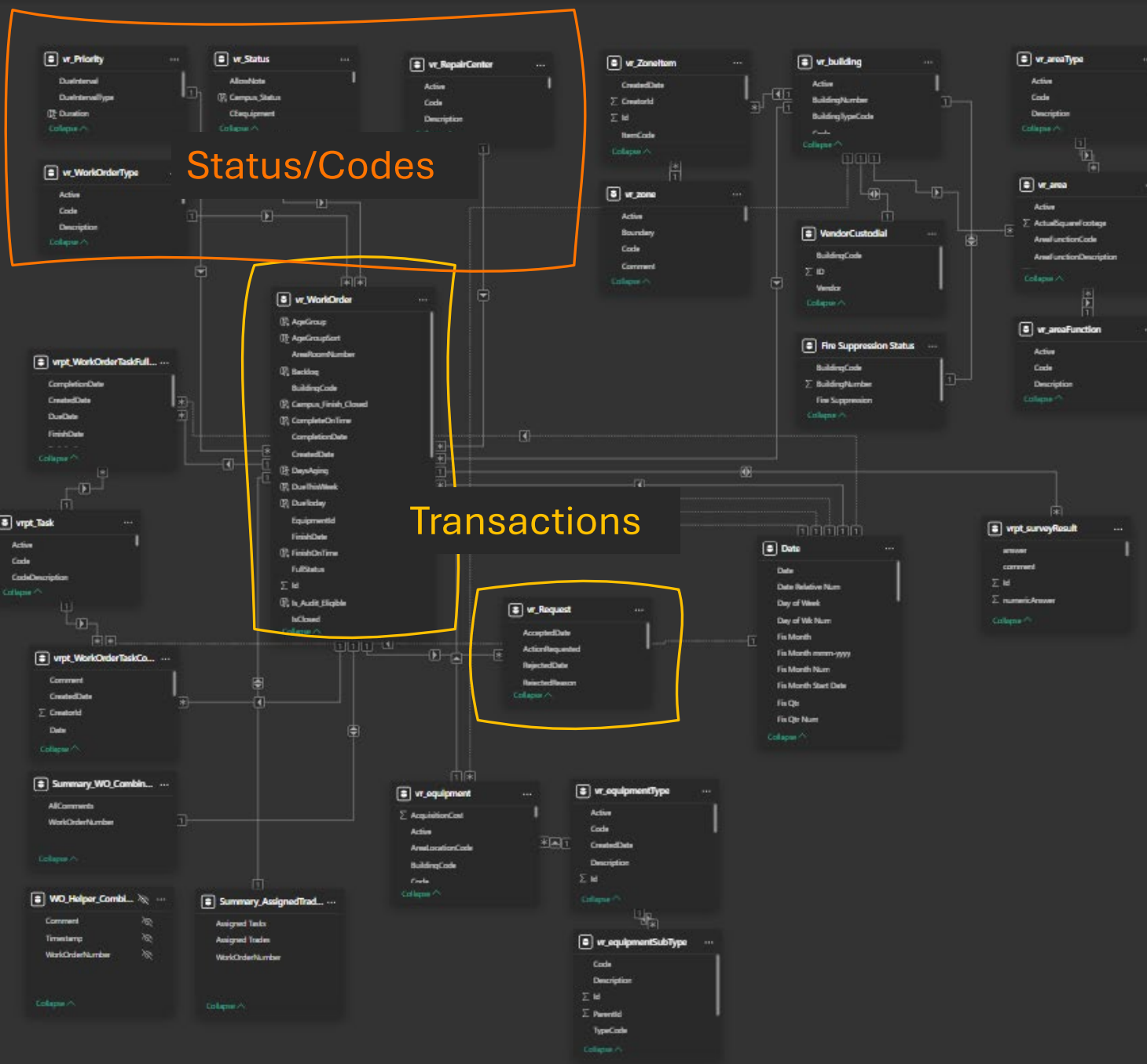
- Central Semantic model
- Reports use core semantic model to avoid rebuilding model each time
- Repeated measures stored in core model

Semantic Model Structure



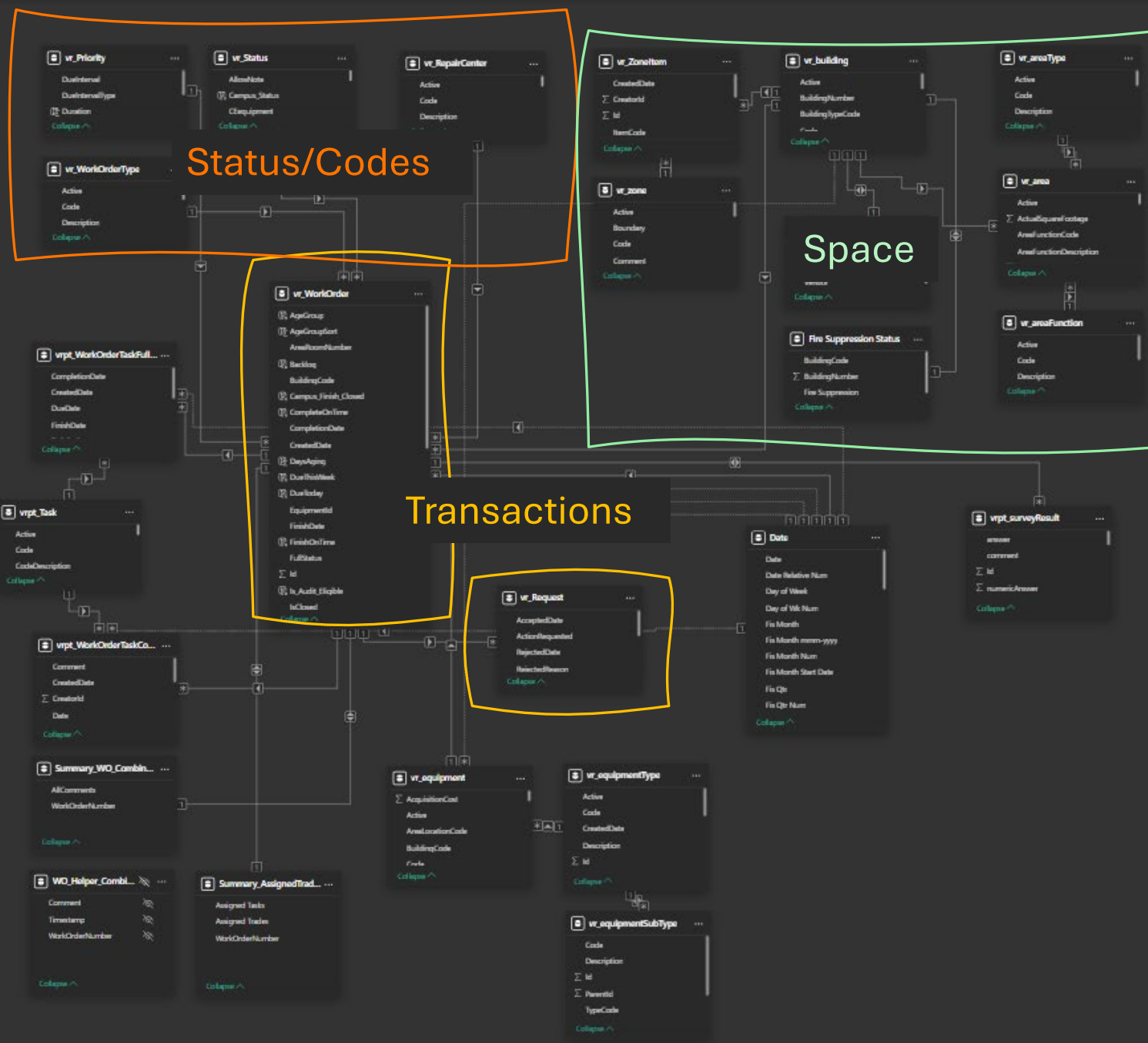






Status/Codes

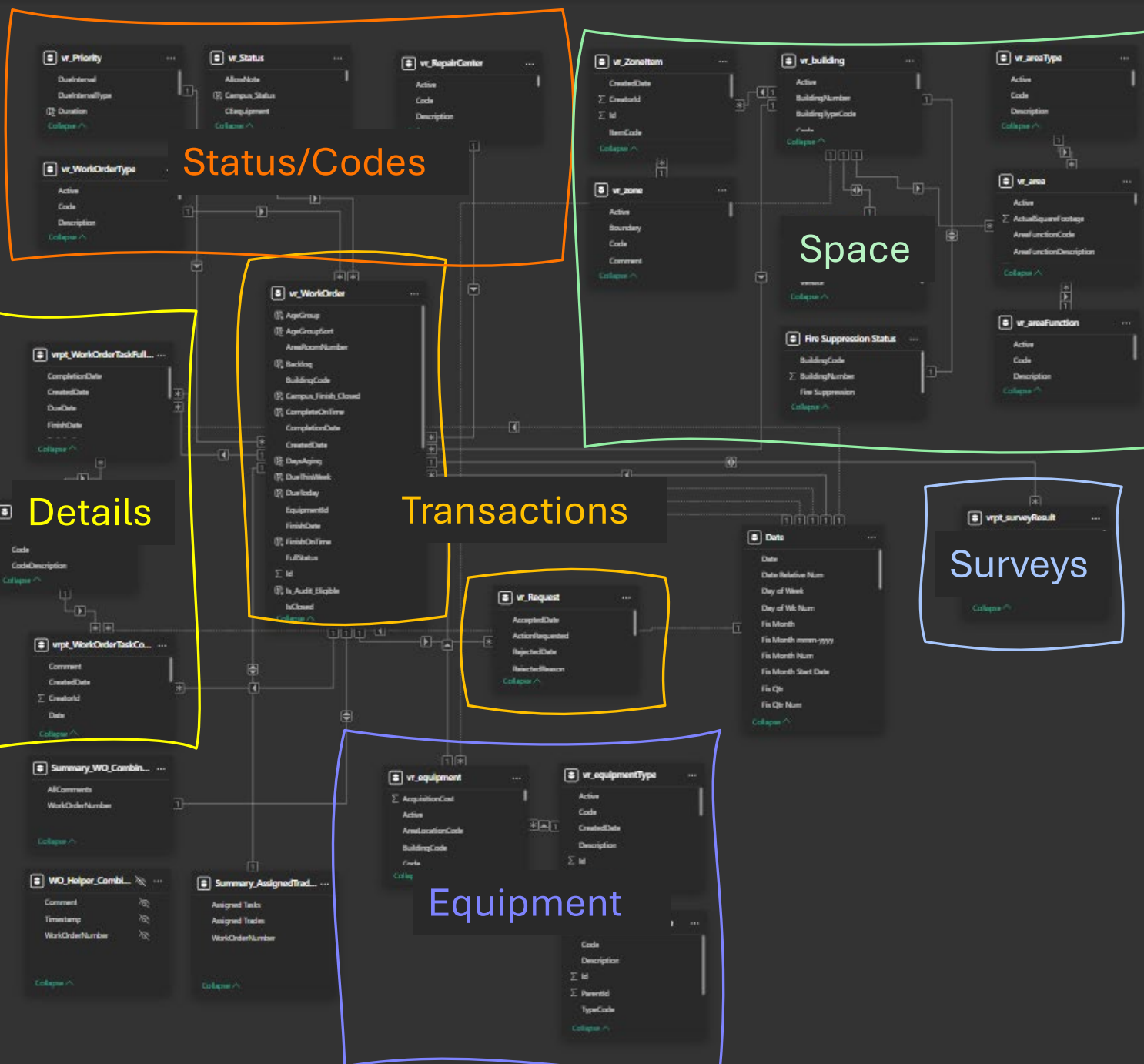
Transactions

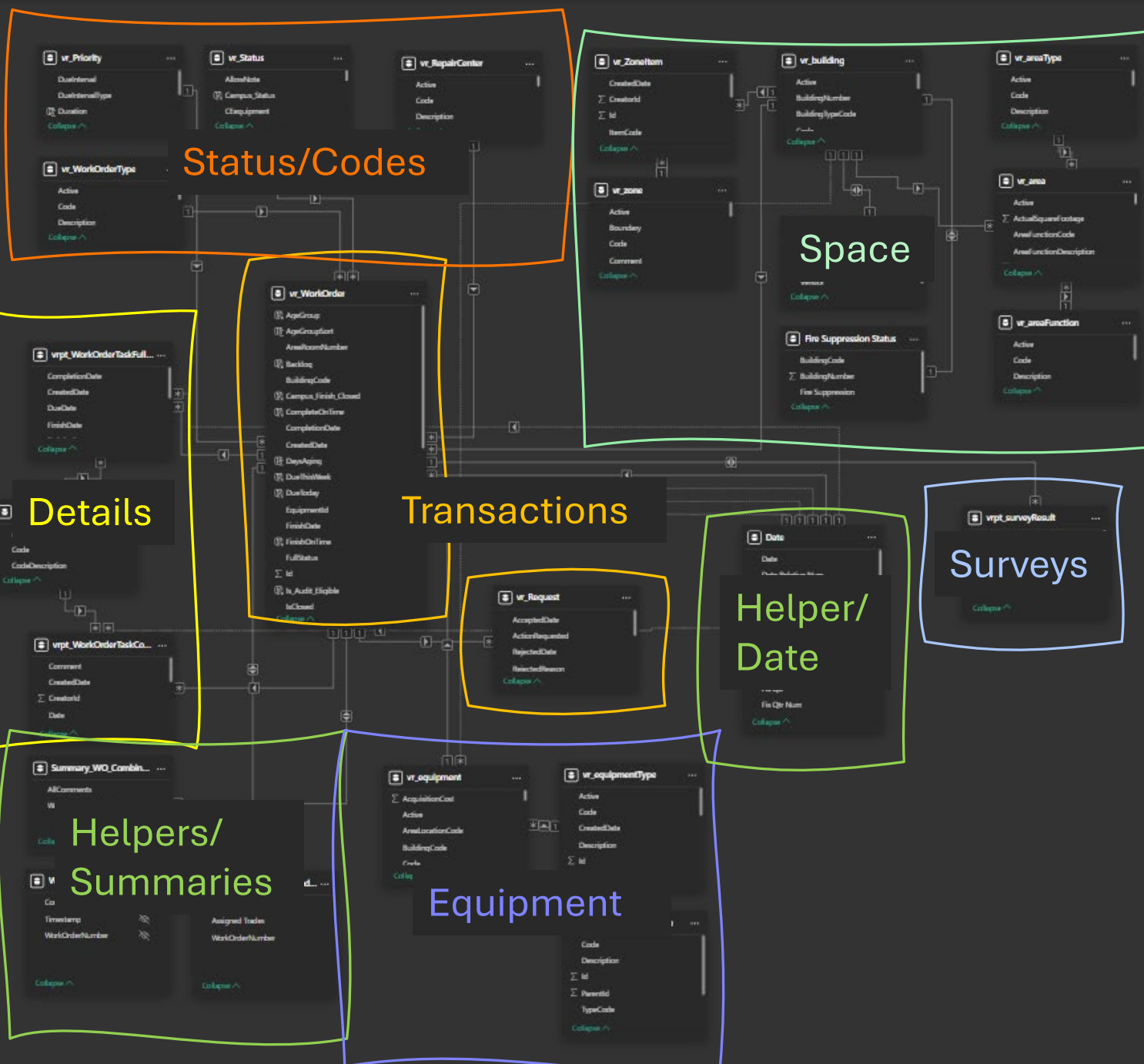


Status/Codes

Space

Transactions









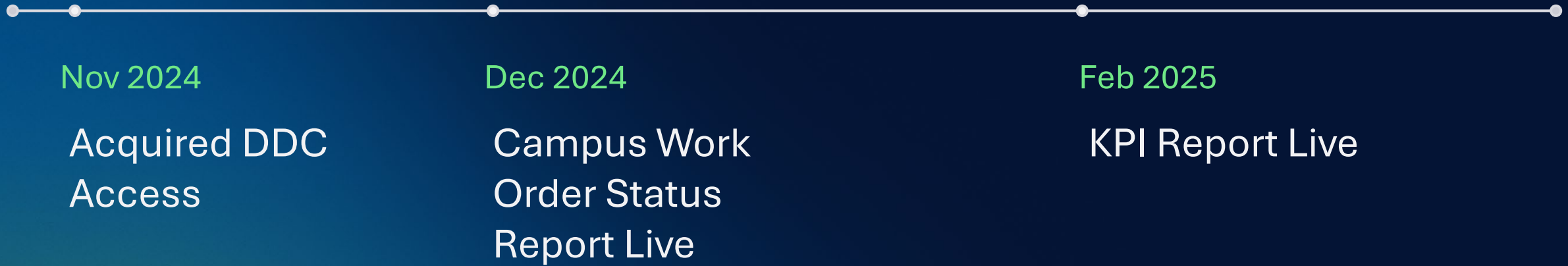
Maintaining the Report

Once it is published to Power BI Online Service, schedule your refresh and it's maintained on its own

Check in on occasion when Microsoft publishes a major update



Timeline



Typically a new report every 1-2 months depending on user input and requests



Final thoughts

- More time series analytics beyond what production TMA site can provide
- Dynamic visualizations to help stakeholders contextualize your data
- Automatically updated reports where you can control access and user can control their interactions with the data
- Keeps TMA doing what it does best– recording work order data and activities across your site
- Allows analysis-based tools to perform detailed analysis



Final thoughts

- You do not have to be a full-time data analyst
- You do not have to have a degree for this
- You just need a willingness to learn and a desire to help your stakeholders have additional tools to view their data



Resources

- [SQLBI](#)
- [Guy in a Cube](#)
- [Pragmatic Works](#)
- [r-graph-gallery](#)
- [python-graph-gallery](#)

Q&A



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TULSA | MAR 30 – APR 02

Thank you



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