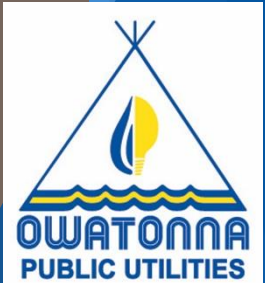# Utility Network Conversion Experiences

Presented by: Shannon Petty – GIS Coordinator

2023 Southeast MN Users Group Meeting

October 26th, 2023

# Agenda

▶ Where to Start?

▶ Available Resources on Migration

▶ How I Learned to Stop Worrying and Love the Data Model

▶ Working With Stakeholders

▶ Mapping Data and Reconciling Anomalies

▶ Gap Analysis

▶ Benefits

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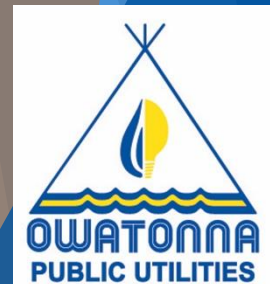
# The Project and the Problem

▶ How hard could it be? Converting our existing geometric electrical distribution network to a Utility Network. With only a year or so into a GIS career as when we started the project, it looked pretty hard. But also fun!

▶ What did I know? From information on the web, conferences, presentations – and especially diving head-first into a partial gas Utility Network implementation my first day on the job; I knew there was a huge difference in schemas.

▶ What did I know I need to know? I knew that we needed a clear path forward with converting the data. The data models (existing and UN) needed to be clearly understood, carefully and *thoughtfully* data-mapped, and with an understanding (and acceptance) that not everything would make the cut.

▶ Will you need to know? While you might not be doing a Utility Network conversion, maybe you'll see a few things here that'll give you some ideas.

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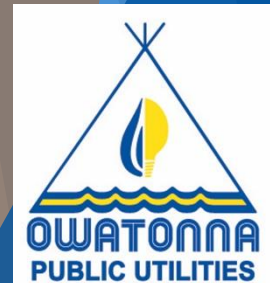Mission:  We enhance the quality of life in our community by safely and reliably delivering customer-focused utility services

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# "Yabbit – What do I <span style="color:red;">do</span>?"

▶ **A Bird's Eye View** – From looking at information out there, I could see some things were similar – and simple (features, attributes, domains). But it was also clear that the Utility Network was going to be fundamentally different in many ways (structural and domain networks, containment associations, subnetworks, asset groups, asset types, etc).

▶ **Where to start?** - Esri's white papers, training, presentations and demonstrations of the Utility Network were often packed with (great!) information, but often left me with questions: Where do I start? HOW do I start? What should I look for (first)? What questions should I ask? So many questions!

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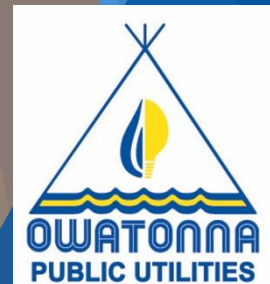
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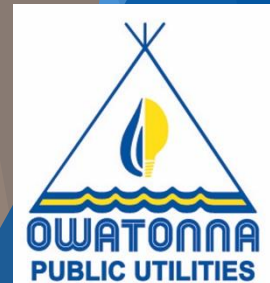
# What's out there for migrating to a Utility Network?

1.  **Esri and the UN** - Esri's information on the Utility Network is quite robust – but the bulk of the information out there deals with how it was designed and what it can do.

2.  **Training** - Taking Esri's training courses on the Utility Network helped (though I took them WAY too early) but the bulk of that training was in how to use the tools in ArcGIS to migrate the data and setup your Utility Network. Little of it dealt with what to consider before and during your migration – it was there, but it was ambiguous.

3.  **The Tools** - There is a sizable amount of reasonably detailed information on how to use the tools you'll use to migrate to the UN. Things like the Data Loading Tools (to Excel) and the Feature Manipulation Engine (FME). But I wasn't looking for how to use the tools – I needed to know what I should use the tool *on*?
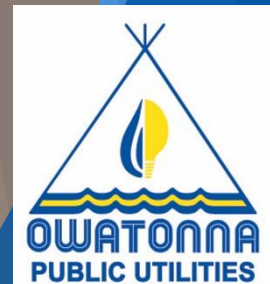
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# What's out there for migrating to a Utility Network?

▶ **Examples of how to approach this?** – Esri's 'Utility Network Data Migration: Best Practices.pdf' was a decent start on how to tackle this project. It had maybe a three pages of important project concepts I could use. It still left me with questions, but it gave me some ideas: A need for 'object mapping' (converting to UN asset groups/types, field conversion, domain value changes).

▶ **ArcGIS Solutions** – Esri had something more to offer in the form of the 'Electric Utility Network Foundation' solution (new). It has an ArcGIS Pro project and a file geodatabase that has several maps and a long list of 'Tasks' that outline steps.

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# Which brings it back to: Where do I start?
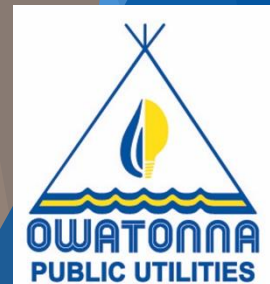
▶ In summary: Esri has massive amounts of information on the Utility Network, Esri has great training, there's all kinds of information on the tools you'll use, there's even examples and sample Solutions.

▶ But how to do this conversion with OUR data, not do it wrong, and not waste time going in the wrong direction (and doing it wrong)? What's the best way to start?

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# The Data Model

▶ A big part of this first step of the actual data conversion was, well… the data. But the Utility Network introduces a huge new data model. It was new and structured differently than ours.

▶ While the schema of the UN was the foundation, I decided the data underneath it was the ground, the dirt. I'd start there. In the dirt.

  ▶ I was happy to later discover (from Electric UN Foundation Solution) that learning the data structure was high on their Task list as well.

▶ For me, the 'Electric Utility Network Foundation Data Dictionary' is the greatest and most critical asset out there for wrapping your head around the UN!

▶ The very beginnings of everything (eventually) starting to click, was when I just dove in and asked myself, "Well – where do electric meters sit in this thing? Maybe I'll figure something out when I see it. Let's go find electric meters…"

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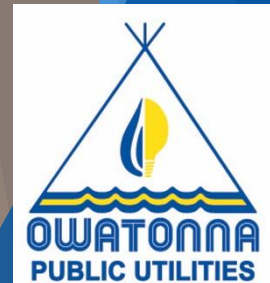
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# My Data Dictionary Workflow

▶ The joyous wonder that is the Electric Utility Network Foundation Data Dictionary.

▶ What 'Feature Class' are we looking at (Electric Device, Electric Line, Structure Junction, etc).

▶ What 'Subtype' most closely matches our existing Feature (Class)? The lightbulb going on that *our* Feature Classes basically got bumped down a tier in the data model was a big (bright?) one.

  ▶ Is this Subtype in the UN the right one?

  ▶ Is there a definition of what the heck I'm lookin' at? Is it the right *thing*?

▶ What does the UN have for attributes? Can I find a match with ours?

▶ What are the domains?

▶ Do I need a domain?

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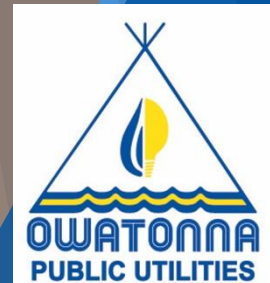
# My Data Dictionary Workflow

► That first search through Esri's data dictionary was such a minor and seemingly obvious first step (now), but it really was the moment when the dam broke.

► I have repeated that workflow *countless* times. I'm convinced that is a very key first step – just getting a feel for what the UN data structure is, and how you're going to fit your data into it.

► I even went so far as to migrate (ie copy/paste) the structure of the Data Dictionary to a spreadsheet so I could edit things. Create my own little notes.

► Selectively moving parts of it to a spreadsheet was immensely helpful.

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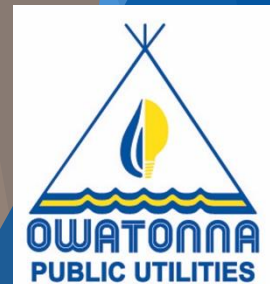
# Working With Stakeholders

▶ Working with Engineering and Operations is going to be a part of this project - they have to be.

▶ An early idea to keep my stakeholders informed didn't work out. I created an Excel workbook (that I went overboard on) to use in weekly meetings to show them what attributes they'd one day be seeing, talk about the data model, and solicit feedback on how some of these new features and attributes might change or create workflows.

  ▶ We'll revisit this review process after the UN is published. Hopefully in small, focused meetings.

▶ There was still a need to bring in Engineering and Operations for areas that I didn't have answers for, like how to translate the information we had on wire into what the Utility Network had available.

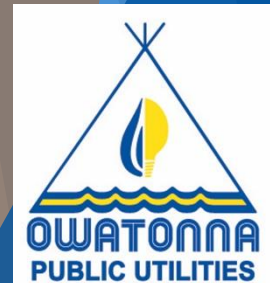Vision:  We are recognized for excellence in our community, our state and nationwide
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# Mapping Attributes and Review

▶ From here, it was months of working with PSE on mapping features and attributes I was identifying in the Data Dictionary.

▶ Repeated review of multiple iterations of the Asset Package, involving lots of notes that were taken as I found issues for review, and then adds to our spreadsheet of change requests.

  ▶ This started out in overly detailed spreadsheets seen earlier.

  ▶ Eventually a simple list of line items worked just fine.

  ▶ Does anybody really need to be told that keeping a Tasks List is a good idea? No, but it's good to see a couple of ideas. Also, and maybe most importantly – I should stress that it helped tremendously (hopefully PSE agreed, because I inflicted my spreadsheets and lists upon Tyler remorselessly).

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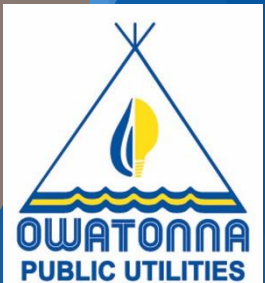
# Coming Phases: Related Tables and Conditional Values

▶ We have a healthy number of tables where Relationship Classes will need to be created in the Utility Network – but we'll wait on those until after we publish.

> ▶ I want to create a solid, base, core deployment

> ▶ I'll circle back and re-establish those relationships after things get rolling, identifying and fixing as we get closer to the published UN being ready for live connectivity to the user(s) maps.

▶ We also have some forms and inspections in Field Maps that have some conditional magic happening in them that are tied to specific attributes. Those will be fixed shortly before go-live as well.

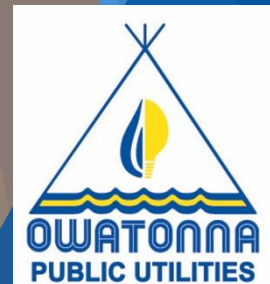Vision:  We are recognized for excellence in our community, our state and nationwide
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# Gap Analysis

▶ During the analysis and data modeling phase, you will find things that (a) exist in your data, that (b) is important enough that is *must* migrate to the UN, but (c) it doesn't exist in the Utility Network (more spreadsheets!). Don't be afraid to do this but know that while that feature creation workflow is the same, you'll need to be mindful of the Rules.

▶ Domains you need that aren't in the UN are gonna come up. It's ok to add all the domains you want. What you don't want to do is modify existing UN domains – they're often tied to Rules, which might break or need to be modified. Also be mindful that your new Domain might spill into a Rule or require a new one.

▶ A less than ideal change might be modifications of Asset Groups or Asset Types. This will almost certainly require Rule changes/adds.
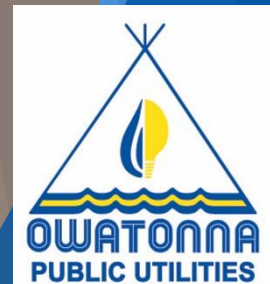
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# Benefits

▶ **Data Accuracy** – Taking it step by step and understanding the data model first, and then slowly working through iterations with WSB was a great boon for data accuracy.

▶ **Data Cleanup** – Eliminating things we don't need. While there was a great deal of wonderful data in our old system, the Utility Network doesn't really have a place for some of it. That's ok.

▶ **Rules** – A blessing and curse, but the oh so sweet data integrity moving forward. There will undoubtedly be some Rule tweaking ahead, but I haven't reached that phase yet.

▶ **A Fresh Start** – While we'll be recreating many maps with this new data, it's a fresh start, which is gonna be fun!

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