Urban Stormwater Working Group

Meeting Minutes

Wednesday, February 21, 2024
1:30 – 2:30 pm
Via Zoom

Meeting Summary

Kane County Stormwater Infrastructure Mapping and Tools
Rob Linke, Kane County Department of Environmental & Water Resources
Rob Linke from the Kane County Department of Environmental & Water Resources discussed the development of a comprehensive stormwater infrastructure map for Kane County using GIS, aimed at enhancing collaboration and improving flood modeling, drainage investigations, and stormwater permit processes. The initiative includes creating a storm flow path network, analyzing flood potential, educating the public on watershed management, and utilizing high-resolution Lidar data and digital elevation models to accurately map water flow paths and flood risks.

Stormwater Resource Repository Updates
Eliana Brown, University of Illinois Extension
Eliana Brown shared updates on the stormwater resource repository project led by Katy Solack at UIUC, highlighting efforts to update and expand the repository with new and corrected entries, based on interviews with stormwater professionals. The updated repository, now featuring 182 records, aims to provide a comprehensive resource for data, tools, policies, and educational materials on stormwater management, accessible through the Illinois Groundwork website.

Round Robin Member Updates
Members shared updates on various projects, including the City of Urbana's ordinance to update stormwater utility fees based on impervious area analysis, and CMAP's efforts to update its flood susceptibility index.

Meeting Details

Kane County Stormwater Infrastructure Mapping and Tools
Rob Linke, Kane County Department of Environmental & Water Resources

Rob Linke, Senior Engineer and Wetland Specialist from the Kane County Department of Environmental & Water Resources, discussed the initiative to map out stormwater infrastructure across Kane County, highlighting the collaboration between unincorporated and incorporated municipal areas and the use of GIS for creating online interactive maps for various applications such as collaborative work on drainage investigations, stormwater permit checking, and flood modeling. The online tools allow users to answer the fundamental questions of watershed area and water flow path tracing from anywhere in the county. Rob pointed out that Kane County has jurisdiction over 60% of the area, with the remainder managed by municipal jurisdictions.

Kane County, like any location, faces challenges in mapping infrastructure and flow paths due to shared boundaries and political divides. The main goals were to create a storm flow path network, analyze depressional areas for flood inundation potential, and improve public education on watershed connections. Applications of the interactive map and tools include drainage investigations for residents and road districts, stormwater permitting decisions and verification, design engineering planning, watershed planning efforts with CMAP and other groups, floodplain modeling and remapping, MS4 illicit discharge tracing, and also public education on

water quality and watershed with relation to home and business stormwater best management practices. He pointed out that the MS4 illicit discharge tracing is an important tool for first responders and has been shared with emergency management and hazard mitigation units.

Rob discussed and showed slides of the methodologies used to make the layers that drive the analytical tools in the interactive map, starting with the use of high-resolution QL1 data (2017 Lidar), accurate to 0.2 feet on hard surfaces. A digital elevation model (DEM) was created and the infrastructure was "burned" into the DEM layer as storm sewers and stream centerlines to show where the water is going. Then that new layer was brought back to ArcGIS to conduct a "fill" analysis comparing 2 raster files, the 2021 and 2023 engineering-grade aerials of the county. The end results show where the water goes as well as a visual on the volume and depths of water that will pond in pits, ponds, or other manmade depressions in the landscape. This final layer overlaid onto aerial imagery reveals threats to roadways, homes, and more and can be useful in making permitting and building decisions.

Rob noted that even without the infrastructure burned into the DEM layer, it is useful to see the hydrology. For example, should the entire infrastructure fail, it allows visualization of where the water would be expected to go. He noted plans to integrate the new LiDAR data expected in 2025, which would capture new construction and would align with aerial imagery.

Following the presentation, Rob demonstrated the online interactive map, showing the GIS report viewer and teaching how to turn on imagery, stormwater, stream, detention basins, flood inundation, display data, and flow path layers. He noted the software's disclaimer about not being engineering-grade mapping, but at this stage, it is sufficient for planning. He demonstrated how to trace a flow path using "themes" and "stormwater" and how the analysis could be exported as a .shp file or as a .kml file for use with Google Earth. He also demonstrated the watershed mapping capability and noted the short amount of time to do these analyses. He mentioned that a larger 30,000-acre watershed may take 5 or more minutes to compute.

Other uses of this technology included analyzing stream and overland flow paths that are crossing manmade infrastructure, such as an agricultural farm crossing, driveway, railroad bridge, or footbridge. He categorized the crossings where flow drained greater than 100 acres and found that of 1,038 roadway crossings; there is no data for 70% of them. FEMA maps, municipal data, and even sheriff's office anecdotal data have been collected to show that 150 of these locations overtop in heavy rain events. Rob noted that the 100-acre threshold was based on the maximum probable discharge for impervious urban systems with underground infrastructure that can fill to capacity and could reasonably expect 50-60 cubic feet per second (cfs) flow across the location.

Rob also showed a 100-year and 500-year storm event graph noting that most of the events had occurred within the last 12-13 years and had caused a huge amount of damage. Importantly, he mentioned that if the folks in a jurisdiction haven't lived through one of these events, then there doesn't seem to be much institutional memory of how to plan for or manage them.

Finally, Rob noted that the interactive map also supports Best Management Practice mapping. Municipal data has been added to the model. From these sites, drainage areas can be mapped. He and others are currently working on an impervious cover layer to use alongside the Fox River watershed model, which will be handy in making projections.

Q (Sally, retired from Illinois State Water Survey, now with WPS): What is the grid size for the digital elevation model?

A (Rob): 2017 Lidar at 20 points per meter square. The derivative was 2x2 horizontal resolution with 0.2-foot elevation resolution for hard surfaces. The primary job of burning the storm sewers into the DEM layer works better than using ArcGIS. Once I have a hydro-conditioned DEM, then I bring it back to ArcMap and fill in the sinks. For a countywide process, it takes about 6 days.

Q (Sally): How are the storm sewers attributed?

A (Rob): We use any information that we have available. The initial round of information was collected from municipalities in 2020-21, and it contained a wide range of data. Some had very accurate positional data with rims and inverts, but others had only had pipe diameters. This is probably because some started mapping and tracking these in the mid-2000s, and accuracy was lower. We have corrected everything in our layer to match the DEM using 2017 Lidar and the 2021 and 2023 engineering-grade aerials of the county.

Q (Sally): What was the source of the 100-year rainfall depths?

A (Rob): Both the 100-year and 500-year are Bulletin 75.

Comment (Sally): This is all very imaginative and hard work you are doing. It is amazing.

Comment (Rob): We want to work more with adjacent counties for spatial continuity. We have several counties on the east side that drain to us, such as DuPage and Cook counties. Several organizations may be working on mapping now; for example, the Center for Neighborhood Technologies in Calumet is actively on a project. We want to help increase the level of knowledge for everyone.

Stormwater Resource Repository Updates

Eliana Brown, University of Illinois Extension

Eliana Brown presented the results of work by Katy Solack, a graduate student at UIUC working with the NLRS team. Katy researched the stormwater resource repository at Illinois Groundwork and worked with several stormwater professionals statewide. She fixed 71 broken website links, bringing the repository up to 182 updated records. She also conducted many interviews with stormwater professionals. Eliana thanked members of this group who participated in those interviews. Interview questions included:

- What are some stormwater resources that you use day to day? Ones that you rely on?
- What type of resource is this, and what is its purpose?
- Who is the tool/information intended for? Who would benefit from this resource?
- Are there any resources that you wish existed?
- Is there anyone you would recommend I reach out to for more stormwater resources?

The interview data resulted in approximately 60 nominated resources, which were then organized by category, type, and target user to align with the Illinois Groundwork resource repository library. The categories included:

- Data and Tools
- Design and Implementation
- Education and Outreach
- Funding and Financing
- Policies and Regulations
- Training and Maintenance

Wishlist items included a list of contacts, cost-benefit analysis information, funding information, and navigation support. Eliana plans to recirculate the updated resource repository spreadsheet after this meeting and requests comments by April 19, after which she and Layne will work to integrate the records into the resource library on Illinois Groundwork at https://illinoisgroundwork.org/resources/resource-library/.

Eliana briefly reviewed some of the filters in this repository, noting that an additional filter would be added to show the records curated by the NLRS Urban Stormwater Working Group. She noted that the existing resource repository is also linked to the Floodplain and Stormwater Manager's website.

Q (Eliana): Sally, could you help us get connected to help get this page updated.

Comment (Sally): I am a member, not an officer, and can help get the executive secretary information to you, Eliana.

Q (Betsey Liggett Richardson, UIUC Facilities & Services): I glanced at Illinois Groundwork. Is there a resource there or on the wish list for mapping? The new state MS4 permit draft had potential language on stuff like that. Would this have resources that could help?

A (Layne): There are currently a few resources for mapping. Additional records could be added. If anyone knows of any, please send them to us. Potentially, this could be another filter to build in.

Q (Betsy): With Facility and Services at UIUC and with the I-CAP portal, some have discussed mapping GI locations for the campus. This could be better designed. For example, if there is mapping at the state level somewhere, we could contribute those GI data from campus.

Comment (Eliana): We will send out the resource spreadsheet; please comment on it if anyone knows of additional mapping resources.

Round Robin Member Updates

Eliana invited announcements of any member projects or updates.

Update (Carmen Franks, City of Urbana): The City of Urbana's city council voted to approve a new ordinance to update stormwater utility fees. It increased the rate and changed the structure of billing. Now, billing is based on impervious areas for everyone. Previously, billing was based on a flat rate for all single residential units. Last fall the city completed an aerial imagery analysis and documented all individually impervious areas. These data allowed the city to change the billing structure and rate.

Update (Holly Hudson, CMAP): CMAP is updating its flood susceptibility index, and I will speak more on this in the future.

Eliana thanked the members for their participation and Rob for his presentation. The meeting was adjourned at 2:21 pm.