# Item 25-0288: Northland-Bellaire Flood Study Update

## Utilities Committee

Tue, Mar 25, 2025 4:30PM

**Alderperson Vered Meltzer (District 2)** 02:45
Moving down, we have one information item, 25-0288, the Northland Bellaire flood study update.

**Deputy Director Pete Neuberger (Public Works)** 02:56
All right, if it's okay with the chair, I would like to walk through the memo that was provided and attached to the agenda and then pause at each section and see if there are any questions that the committee would have

**Alderperson Vered Meltzer (District 2)** 03:10
Wonderful. And I know that there are members of the community who are very interested in this. There are no members in the chamber right now. So, as we keep in mind that this meeting video will probably be shared to them, I just like us to make sure that we do take the time to go over everything there very thoroughly.

**Deputy Director Pete Neuberger (Public Works)** 03:33
That sounds good. All right, as indicated in the memo, on November 20, 2024, the Common Council authorized DPW to contract with storm water consultant Brown and Caldwell for the 2024D Northland Creek and Bellaire Watershed storm water evaluation. This was done in response to significant flooding that occurred following severe rainfall events in July of 2024. The study limits are approximately bound to the north, by I 41, by State Highway 441 to the east, by Mason Street to the west, and by Packard Street to the south. So DPW staff have been coordinating closely with Brown and Caldwell, and we would like to report the following progress, ongoing activities, and upcoming tasks that are anticipated under this contract.

**Deputy Director Pete Neuberger (Public Works)** 04:29
So for completed tasks, a kickoff meeting was held between city staff and Brown and Caldwell staff on December 11, 2024, and then Brown and Caldwell has subsequently completed the following tasks under this contract: they review the location and descriptions of the July 2024 and prior historic flooding reports with DPW staff; they updated the previously developed system models to reflect current industry standard rainfall distributions and depths; they merged the previously developed Northland watershed model and the Bellaire watershed model into one combined model; and then they performed field site visits to verify the previously modeled existing conditions, including flow paths that were identified in those model models against conditions on the ground.

**Deputy Director Pete Neuberger (Public Works)** 05:28
So, I think I'd just like to pause at that at this point and see if there are any questions related to completed work.

**Alderperson Vered Meltzer (District 2)** 05:35
All right. Alderperson Croatt, what's your mic number?

**Alderperson Chris Croatt (District 14)** 05:40
Go ahead. Thank you, Chair, and thank you Deputy Director Neuberger. As it relates to kind of the completed task in the initial phase of this, have there been any I'll call it surprises, but that might not be the right word. Have there been any like, "Oh, we didn't know that" moments?

**Deputy Director Pete Neuberger (Public Works)** 05:58
Yeah, I would say they had to do—those things had to do mostly with model calibration. Brown and Caldwell staff were the ones that were primarily responsible for the initial creation of the Northland study model, but a different consultant had developed the Bellaire study model. And so I would say one of the big takeaways there was them really digging into the guts of the other consultant's model and trying to make sure that some of the input assumptions that that consultant had built into that that model was consistent, not only with Brown and Caldwell's standard approach to trying to deal with these some of these things, but they made a good point of like pointing out those differences to the city and helping city staff have an opportunity to kind of weigh in on our perspective on how to resolve those differences.

**Deputy Director Pete Neuberger (Public Works)** 06:53
And so, I think at the end of the day, most of those differences had to do with the way some inlet capacities were being handled, and then, not to get into the weeds too much, a little bit, but about how some of the some of the flow paths that were built into the model were—how the model was handling some of those things. But at the end of the day, I would say it was a fair amount of effort, just because of the scope of the modeling that was involved. But I would say nothing, nothing in there was super shocking in terms of the approach that the other consultant had taken. It was just—mostly it was just different.

**Alderperson Chris Croatt (District 14)** 07:37
Okay, thank you.

**Alderperson Vered Meltzer (District 2)** 07:39
Thank you. I have one question. So on—it describes the area being bound by Packard Street to the south. What is the north—or, sorry, what is the south eastern most boundaries? Does that include after Packard street becomes North Street?

**Deputy Director Pete Neuberger (Public Works)** 08:00
Right. So, so the way it's described is basically a rectangle, right? So, I real—it's not a perfectly rectangle shape. It's a little bit awkward. But if you could think about the southeast corner, there's a point where, like, it's in the Packard Street area, kind of toward Owaissa where the far southeast corner actually bumps right into the Fox River at that point. So, I've got a drawing here I can also share with you on that. But that's broadly speaking, what the southeast corner of it looks like. And then it kind of follows up on a kind of a northeast angle. It kind of cuts through the (I still call it AMC. I think it's Theda ThedaCare now) kind of the AMC area, and then kind of cuts over toward 441 kind of along the Glendale Avenue alignment. Is that—does that work for you?

**Alderperson Vered Meltzer (District 2)** 08:58
Thank you.

**Deputy Director Pete Neuberger (Public Works)** 08:59
Okay, so are there any other questions? Okay. All right, so then I'll talk about tasks that are ongoing at the moment. The consultant is currently performing sub watershed level inlet capacity calculations. The purpose of this is to try to identify areas that, on a high-level basis, may indicate that the amount of water that gets into—that's being conveyed by the storm sewer is limited not by the storm sewer capacity but by the ability of the inlets above to get water into the storm sewer. So, another way of looking at that is there are potentially a couple of different throttles that regulate how much flow can go through the storm sewer system. One of them is the capacity of the pipes themselves. The other is the delivery mechanism which is, broadly speaking, it's the street inlets.

**Deputy Director Pete Neuberger (Public Works)** 10:05
They're also running sensitivity analyzes for two different antecedent moisture conditions. This is something new that we're doing this time, and it's related to some extent to the fact that the July flooding events followed a period of relatively wet weather conditions. So, the industry standard for the models assumes a relatively low baseline level of moisture condition within the soil. And of course, if you get a half inch of rain on a relatively dry patch of soil, you're going to get more soaking into the ground than if that same amount of rain fell on soil that had already gotten a half inch of rain, for example. So that's what we're talking about when we when we mean "antecedent moisture conditions".

**Deputy Director Pete Neuberger (Public Works)** 10:56
So, I would say, broadly speaking, the observed runoff that we that we witnessed during the July 5 event, by some measures it produced more runoff, maybe, than we would have expected if the ground had been dry to begin with. So that got us thinking along the lines of, hey, maybe it's worth modeling an unusual condition similar to what we had, where you had more saturated soil conditions before that first drop of rain even fell out of the sky on July 5. So, we're hoping that we might learn a little bit more about how conditions on the ground react to that sort of a situation.

**Deputy Director Pete Neuberger (Public Works)** 11:36
And then finally, the other ongoing task is running a sensitivity analysis for concept level scenarios for the 10 year and 100-year storm events to narrow down potential locations and types of practices for more detailed evaluation. So, this is really about us starting out at 30,000 feet and trying to work with relatively large pieces of the model to figure out if we if we turn off flows coming from different segments of the model that broadly simulate providing storage within that area of the model. How does the rest of the model react to it in terms of the predicted flows, and the value of this is it lets us make—pull big levers to see what the big results are on that before we start zooming in too much. It's just—it's kind of a way of eating the elephant in an efficient way by and trying to really get some direction moving forward on where we think it makes the most sense to pay closer attention in future steps. Are there any questions on the ongoing tasks?

**Alderperson Vered Meltzer (District 2)** 12:51
Did any of you have questions? For the two different antecedent moisture conditions then, so I assume that being completely saturated would be one. But could you give me some more detail about what those two different moisture conditions are that we're looking at?

**Deputy Director Pete Neuberger (Public Works)** 13:10
I'm gonna have to talk in very general terms here, because if I try to get too specific, I'll probably miss the mark. So broadly speaking, the wetter of the two conditions is not is not fully saturated but it's close to it. And the other one, the more conventional one, is where there's a little—it's not a drought condition. There's a little bit of moisture in the soil, but it's by no means close to saturated.

**Alderperson Vered Meltzer (District 2)** 13:38
Okay, so is kind of 100% saturation—is that something that's being looked at with this?

**Deputy Director Pete Neuberger (Public Works)** 13:46
It's not. We had to kind of pick and choose our battles. So, we picked something a little bit below that, because that represents—you could probably say that represents, like an absolute worst-case scenario, but we felt it had greater value to pick a scenario that wasn't extreme on top of extreme. It was extreme on top of slightly extreme, probably something pretty close to what we actually experienced in July. And by the way, that also—

by doing that, that might also give us a little bit of insights on being able to have the value of those real, real-world conditions that were actually witnessed against something close to what's being modeled.

**Alderperson Vered Meltzer (District 2)** 14:31
Okay. Go ahead, Alder Croatt.

**Alderperson Chris Croatt (District 14)** 14:34
Thank you, Chair. And kind of following up or tagging on to that, obviously fully saturated would be one scenario that would be interesting to know the data about. But what about the—is there any consideration given for the time of year that an event might happen? I'm just thinking of, you know, in our area, we go through dry periods, maybe in the summer, but in the spring it might be really wet.

**Deputy Director Pete Neuberger (Public Works)** 14:59
Mm. Hmm. So, I would say, I would say it's not—it's not that we're trying to simulate a an April 15 rainfall or an August 3 rainfall. It's more along the lines of what types of conditions under certain scenarios are we likely to run into. So, it's not it's not date focused based on here's what we expect on this date. It's more along the lines of for a given probability event. Let's take the 100 Year event, for example. We call it a 100-year event, but everybody here has been focused on this topic long enough to know these events don't happen like a calendar once every 100 year. What we're really talking about is a 1%—a one in 100-year event, or a 1% probability event based on based on history—what's actually fell out of the sky in the kind of like the Green Bay, Appleton area. So, it all gets kind of mushed into a probability table. And again, this is kind of at 30,000 feet, having the benefit of a long record of weather history.

**Deputy Director Pete Neuberger (Public Works)** 16:11
So, I wouldn't look at it in terms of like what's likely to happen in the spring versus what's happened likely to happen in the summer. It's more along the lines of, what's the what's the—if we take a rainfall event that has a 1% chance of happening every given year, in terms of worst-case scenario, we apply that that event, we model that rain falling out of the sky, and then under the two antecedent moisture conditions represented. And you could probably make an argument that the wetter one is probably an event that you're more likely to encounter in the spring, and the drier event is probably one that you're more likely to encounter in, say, August. That's how I would say it matches into your scenario.

**Alderperson Chris Croatt (District 14)** 16:58
Makes sense.

**Alderperson Vered Meltzer (District 2)** 17:00
All right. Alder Hayden.

**Alderperson Patrick Hayden (District 7)** 17:01
Thank you, Chair. One question I have, when you're looking at it at this 30,000-foot level, are you looking at it—I know you did the northern bounds at 41. Are you looking at the impact of those areas that are outside of that zone? One of my concerns is that there's a great deal of grassland just north of 41 that's about to be converted to impervious surfaces that could drastically alter these models. Is that being taken into account? Because once we start building huge parking lots up there, then there's going to be a lot going into those ponds that then drain into the sewer ducks that that this area is on top of that could completely blow up the model.

**Deputy Director Pete Neuberger (Public Works)** 17:44
Yeah, yeah, that's a really good question. So, it gives me an opportunity to point out that the decision to stop the north end of the model at 41 was not an arbitrary decision. It was actually based on what direction the water flows. So, the water north of 41 does not flow toward the Northland Avenue watershed. It actually goes north and east.

**Alderperson Vered Meltzer (District 2)** 18:10
Thank you.

**Deputy Director Pete Neuberger (Public Works)** 18:10
So, for example—oh, I'm sorry, I didn't mean to interrupt you chair.

**Alderperson Vered Meltzer (District 2)** 18:13
No, you can continue. Just noting that Alder Croatt will speak next.

**Deputy Director Pete Neuberger (Public Works)** 18:18
I was going to I was going to say, so for example, if we're talking about that area just north of 41 and west of Ballard road that goes into Apple the Apple Creek corridor, which goes along the Apple Creek Trail, goes north by northeast, and then that leaves, leaves the city that way.

**Alderperson Vered Meltzer (District 2)** 18:37
Go ahead.

**Alderperson Chris Croatt (District 14)** 18:38
Thank you, Chair. And I'm glad you asked that question, Alder Hayden, because one of the comments that I've heard from my constituents is, what about all the development on the north side that has occurred already, but yet will be occurring in the future? And how has that impacted the, you know, the areas that are that saw some flooding?

**Deputy Director Pete Neuberger (Public Works)** 18:58
Yeah. So, so again, same thing there. Those areas north of 41 do not enter. The Northland watershed.

**Alderperson Vered Meltzer (District 2)** 19:05
Director. Go ahead, Director Jungwirth.

**Director Laura Jungwirth (Public Works)** 19:09
Thank you. I also did want to add that we now have more stringent storm water ordinances that require each development as it occurs, ongoing, since, I think 2004—that properties, as they develop, are required to detain up to the 100-year storm event and then also convey the 10—the 10-year storm event in in the system. So, there are requirements out there already for when development does occur, that each site has to meet their own requirements before discharge into the waterways. So, they are required to have a certain level of reduction that shouldn't be realized in other areas, because they will be treating it on their respective property.

**Alderperson Vered Meltzer (District 2)** 19:56
And could the results of what we're talking about today—could these results potentially lead to those requirements having to be adjusted?

**Deputy Director Pete Neuberger (Public Works)** 20:12
So, I would—I would say that we cannot discount that possibility. Yes. I think we need to keep an open mind and be prepared to provide recommendations that potentially could apply not only to this watershed, but maybe those—maybe what we learned from this might inform future—our outlook toward future regulatory approaches.

**Director Laura Jungwirth (Public Works)** 20:35
And I'll add to that with my experience in previous municipalities. We did have certain water sheds that were—we called them in our code, "areas of known flooding". So, if there was a development occurring in an area of known flooding, the requirements for peak flow control were more stringent than in other areas, just purely because it's a known problematic area that needs that added attention.

**Alderperson Vered Meltzer (District 2)** 21:00
Thank you. Do we currently have any areas like that identified in Appleton?

**Deputy Director Pete Neuberger (Public Works)** 21:06
So, my approach to that would be, it's not—it's not predetermined geographic areas, but there's a there's a phrase in the storm water ordinance that talks about "critical sites", and what that language does is—the typical cut off point for when the storm water ordinance can be applied to a development is one acre of land disturbing activity or more. But the language in the ordinance includes this phrase about a critical site where if staff know that there are, for example, downstream concerns, staff have—are empowered to have the flexibility to say, "You know what? We're going to apply the storm water ordinance to this site, even if it's less than an acre of disturbance."

**Alderperson Vered Meltzer (District 2)** 21:59
Thank you. Any other questions? All right. Director Neuberger, we can continue on.

**Deputy Director Pete Neuberger (Public Works)** 22:06
So for future—future tasks include the following. And basically, what you'll see here is a trend where we start at this 30,000-foot level and we continue to zoom in to specific locations that look like they would provide cost effective management of storm water, and those include evaluate individual storage and conveyance alternative components and present initial findings to DPW for some initial feedback. For the highest ranked components that come out of that process, evaluate potential conflicts with other utilities and develop preliminary cost estimates. Develop WinSLAMM water quality models to identify potential storm water pollution reduction measures that could be incorporated into the alternatives under consideration. So, I'll just add that, even though this is a this is a flood reduction study, we're always looking for opportunities to get a twofer, and there are, there are some practices that lend themselves well to baking water quality improvements into them, and we don't want to miss an opportunity to identify where those might happen.

**Deputy Director Pete Neuberger (Public Works)** 23:17
Then group the most highly ranked individual alternative components into three combined alternatives and present those to the utilities committee with recommendations for approval. So basically, what it is, it's a it's a little bit like going to like a buffet, and you've got—let's say there's 20 items on the buffet that look like they're they would do some good and they're cost effective. So, it's like, what do you put on your plate? So, we would basically have three plates with us, and we would grab a bunch of combinations onto those plates, and then ultimately, we'd present those three combinations of things for—with a recommendation.

**Deputy Director Pete Neuberger (Public Works)** 23:58
And then develop design refinements for selected combined alternatives to facilitate resolution of utility conflicts in preparation of future design phases. So, identifying and resolving utility conflicts can be very, very time consuming in terms of hours, because sometimes it can, it can take a while to track down all those potential locations and then figure out how you want to resolve them. So, this is again, a way of cost effectively addressing how best to resolve those by focusing the concentrated efforts on where we think it's likely we're going to be pursuing those practices.

**Deputy Director Pete Neuberger (Public Works)** 24:46
And then lastly, prepare a technical memorandum that documents the procedures, recommended improvements, and conclusions for all the tasks under this project. That will have the benefit, not only of providing immediate understanding for how the conclusions would reach—would be reached, but doing so in a way so that people that are here 10-20, years from now understand the processes and assumptions that we used moving forward, in case we want to take another look at it down the road.

**Alderperson Vered Meltzer (District 2)** 25:20
Thank you. Comments or questions? Alder Croatt.

**Alderperson Chris Croatt (District 14)** 25:24
Thank you, chair. My only question—and thank you for all this information. My only question is really trying to understand the timeline for the ongoing tasks and then the future tasks. I assume the next update for the utilities committee would be when ongoing tasks are nearing completion or completed? Is that accurate?

**Deputy Director Pete Neuberger (Public Works)** 25:42
That is what I anticipate as well. So, without trying to put the consultant in a in a box, because it's—obviously it's very important for staff to do this thoroughly without wanting to be heavily constrained by a set of timelines that are set up now before we really have an opportunity to dig into the model and understand what kind of alternatives we're looking at. So, I would just kind of condition my response with that understanding. Like, we are focused on giving this a thorough review while continuing to make reasonably expedited progress. So, with that in mind, I would anticipate coming back to committee in approximately three months, which I believe at this point in time will be close to coinciding with when these ongoing tasks will be nearing completion, but we'd like to reserve the right to kind of tweak that date a little bit. If it makes sense, for example, to move it back a little bit to coincide with a more complete report, we'd like to have the flexibility to approach it that way.

**Director Laura Jungwirth (Public Works)** 26:56
We've also discussed internally that if there are any glaring items that rise to the top as we work through these ongoing items, that would be a project that we could jump on and expedite, we would certainly consider that and bring it, bring it forward for consideration. While that we have not put that expectation on the consultant, we have made that statement that if something stands out that we can try to start working on, we certainly will do, will do so.

**Alderperson Vered Meltzer (District 2)** 27:26
Thank you. I was going to ask about the timeline as well, and I also—I agree that we don't want to put the consultant in a box, but just for a very kind of rough estimate as far as that, the last future task on the list, preparing the technical memorandum, how far out would you estimate that's going to be?

**Deputy Director Pete Neuberger (Public Works)** 27:56
Are you going to hold me to that answer? So long as it can be done appropriately and thoroughly, I would say it's a safe bet to say that that'll be done by the end of the year, if not, if not sooner.

**Alderperson Vered Meltzer (District 2)** 28:11
Okay.

**Director Laura Jungwirth (Public Works)** 28:12
And I think Pete and I can speak to the fact that, you know, we've both been in storm water for a number of years at our respective positions, and they've really been working hard and diligently on this. And this has been an expedited time frame. They have been working quite fast on something like this. I—usually we see it, in my opinion, see it take longer, but because we've reiterated the importance of it, they've really been staying on it, and we've been checking in with each other very frequently.

**Alderperson Vered Meltzer (District 2)** 28:45
Thank you.

**Deputy Director Pete Neuberger (Public Works)** 28:46
If I could add one other thought, there is very much the possibility of engaging in third parties with potential solutions that might arise out of some of the initial analysis here. So, I would probably want to also say, like, another caveat here is there may—those discussions come with, like, a varied timeline, right? Because it's not just city staff and the consultant that might drive the pace of that progress. So, I want to be clear too, again, we would rather allow a timeline to be extended for the sake of having useful discussions that could lead toward a successful outcome as opposed to, again, creating this artificial timeline and say, "Nope, time's up. We're done talking."

**Alderperson Vered Meltzer (District 2)** 29:33
Yeah, yeah. And I definitely, I think that an artificial timeline could be very dangerous for the whole project when our priority is to be thorough. It's just, how do we balance that with kind of the emergent or kind of the urgent nature of the situation? You know, I would hate to see the same types of issues happen again. So hopefully this timeline will allow us to get out ahead of things as much as possible. But I definitely think that being as thorough as we can, you know, this is probably kind of a generational opportunity to look into what needs to be done. And like you were saying earlier, you know, like 20 years from now, how is this going to have the maximum benefit 20 years from now?

**Alderperson Vered Meltzer (District 2)** 30:26
All right, any other comments or questions? All right. Well, thank you so much. And keep us updated. Looking forward to these items as they come forward.