



**Department of Public Works
Engineering Division**

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**PUBLIC WORKS COMMITTEE
MEETING NOTICE AND AGENDA**

Thursday, March 9, 2023

4:00 PM

City Hall Common Council Chambers
W240N3065 Pewaukee Road Pewaukee, WI 53072

-
1. Call to Order and Pledge of Allegiance
 2. Public Comment - Please limit your comments to 2 minutes. If further time for discussion is needed, please contact your local Alderperson prior to the meeting.
 3. Discussion and Action Regarding the Minutes of January 26, 2023
 - 3.1. Discussion and action regarding the minutes of the January 26, 2023 meeting.
 4. Storm Water Management Division
 - 4.1. Discussion and possible action regarding the Takoma Hills - Lexington Drive Drainage Study.
 5. Water and Sewer Division
 - 5.1. Gun Club Lift Station Design
 - 5.2. Well #1 Motor Failure Feb. 2023
 - 5.3. Discussion and possible action regarding the Water Utility debt repayment to the Sewer Utility.
 6. Public Comment - Please limit your comments to 2 minutes. If further time for discussion is needed, please contact your local Alderperson prior to the meeting.
 7. Adjournment

Magdelene Wagner
Director of Public Works

March 9, 2023

NOTICE

It is possible that members of other governmental bodies of the municipality may be in attendance to gather information that may form a quorum. At the above stated meeting, no action will be taken by any governmental body other than the governmental body specifically referred to above in this notice.

Any person who has a qualifying disability under the Americans with Disabilities Act that requires the meeting or materials at the meeting to be in an accessible format must contact the DPW Main Office, at (262) 691-0804 by 12:00 p.m. the Tuesday prior to the meeting so that arrangements may be made to accommodate your request.

**CITY OF PEWAUKEE
PUBLIC WORKS COMMITTEE AGENDA ITEM 3.1.**

DATE: March 9, 2023

DEPARTMENT: PW - Water/Sewer

PROVIDED BY:

SUBJECT:

Discussion and action regarding the minutes of the January 26, 2023 meeting.

BACKGROUND:

FINANCIAL IMPACT:

RECOMMENDED MOTION:

ATTACHMENTS:

Description

1-26-2023 Minutes

In Attendance:

Mayor S. Bierce, Alderman J. Wamser; Committee Members: M. Kreiter, D. Swan, J. Tormey

Also in Attendance:

Director of Public Works M. Wagner (via Remote), Chief Engineer-Utilities R. Wirtz, Chief Engineer-Streets & Development M. Gabbey, Utility Manager J. Mueller, DPW Administrative Assistant S. Smaxwill

1. Call to Order and Pledge of Allegiance

Mayor Bierce called the meeting to order at 4:00 p.m. and requested everyone stand for the Pledge of Allegiance.

2. Public Comments - None

3. Discussion and Action Regarding the Minutes of October 27, 2022

A motion was made and seconded, (D. Swan, J. Tormey) to approve the October 27, 2022 minutes.

Motion Passed: 5-For, 0-Against

4. Communications

4.1 Discussion and possible action regarding the Diciaula Well Hardship request.

Ms. Wagner reported on a communication she received from the property owner who is requesting to drill a new well on his property and not connect to the municipal water available at that location. City ordinance, Chapter 16 specifically prohibits drilling of new wells on a property when municipal water is available to the parcel, and there are no exemptions for properties that are a distance off the roadway, or for agricultural use of a property. It is the opinion of staff that the property should be required to connect to municipal water if they are abandoning their current well in accordance with city ordinance.

Mayor Bierce asked Ms. Wagner if it was her opinion that we should deny this request because that is what our ordinance states, or is it for other reasons? Ms. Wager stated the reason is two-fold: 1) It is what city ordinance requires, and 2) to protect the overall water system from potential contamination into the aquifers that we use to pull our municipal water from.

Mr. Diciaula stated that the issue is his house is 600 feet from the street because that is what the soil allows for septic and foundation. Most usage will be for agricultural reasons. Currently the well is non-compliant and located in the basement. To build a new home they need to abandon the current well and dig a new well; this would be the easiest route. His back-up option would be to move the house over so he could use the existing well and not have to use city water.

Ms. Mueller suggested he look into boring the water service for a better price.

Ald. Wamser asked more about the current well. Mr. Diciaula stated that they attempted to remodel the house, but found that it was cheaper to build a new house rather than remodel a 100+ year old farmhouse. At one time the well was an external structure; previous owners put an addition on top of the well and that's what made it internal and that's why it is non-compliant. Ald. Wamser said if they take down the current structure will the well be exposed, and asked if it was pumping at a good rate? Mr. Diciaula said yes, it is. He said that keeping the well would be his Plan B.

Mr. Tormey asked if he had already built the new house or if the old house was torn down? Mr. Diciaula said no to both questions.

Mr. Swan asked if he looked into moving the house over? Mr. Diciaula stated he had that discussion with Tim O'Brien homes, but has to wait until they tear down the old house and have it mapped out to see if everything is going to fit.

Ms. Wagner stated that at this time she is not aware of any exemptions to long laterals that have been granted in the city. She said that long laterals are less susceptible to issues with water and we have adequate water pressure in this area, so she doesn't see a problem serving a property 600 feet off the roadway.

A discussion took place regarding other locations in the city where properties are a long distance off the roadway and had to connect to municipal water.

Ms. Mueller stated that Mr. Diciaula has to prove the well is bacteriologically safe and it has to be code compliant in order to use the well, otherwise it must be properly abandoned. Mr. Diciaula mentioned that putting an extension on the well casing is an option. He stated that he would rather bring the existing well up to code. It has been tested for bacteria and is clean.

Ms. Wagner stated that if his plan is to bring the current existing well up to code then we don't object to that, but she suggested that we do not allow an exception to our ordinance for the drilling of a new well. Mr. Diciaula stated that he wanted to change his request from drilling a new well to bringing his current well up to code and build the new house. Ms. Wagner stated that at this time the city does not require connection to municipal water if the well is up to code, but he will need to provide records from the contractor to prove that his well is compliant. Mr. Diciaula said he would agree to that.

Mayor Bierce explained that there are discussions taking place at the Council level to push for properties that haven't connected to municipal water to connect. The mayor wanted to make sure that Mr. Diciaula understood that he still may be required to connect to municipal water in the future.

5. Old Business

5.1 Discussion and possible action regarding city entrance signage and city logo on street signs.

Ms. Wagner reported on the committee's request from last August's meeting about the cost of putting up new "Welcome to Pewaukee" signs at the major entrances to the city; and a request for the cost to add the city logo to street signs.

Ms. Wagner estimated there are 40 major entry points on county, state, and local arterials (see map). Pricing for 40 Welcome to Pewaukee (25x30") entrance signs is approximately \$125 per sign, for a total estimate of \$5,000, plus labor.

Pricing to replace the estimated 450 street signs to add the logo is approximately \$75 per sign, for a total estimate of \$33,750, plus labor.

Ms. Wagner pointed out that signs were replaced by the highway department over the last 4-5 years for the whole community. She did not include any funds for signs in the 2023 budget. She also did not include a cost estimate for the decorative signs that Ald. Wamser requested, as the cost would depend on the design of the sign and that the city might look for donations for decorative signage.

Mayor Bierce asked if there was a recommended life span for this type of street sign? Ms. Wagner stated the signs were replaced because regulations changed. The style of letters on the signs

changed to make them easier to read, and for reflectivity. She said there is a 20-year life cycle on the signs, though many signs that were replaced were much older.

The committee agreed to replace the street signs with the new city logo signs as needed.

Regarding the city entrance signs, Mayor Bierce stated that it is a less expensive and much smaller project. The committee discussed where entrance signs are currently located. The committee was in favor of forwarding the entrance sign project to the Council. Council will decide funding for this project.

A motion was made and seconded (J. Wamser, J. Tormey) to recommend to Council the Welcome to Pewaukee entrance signs project, and put the city logo/street sign replacement project into a running change mode by replacing signs as necessary. Motion Passed: 5-For, 0-Against.

5.2 Update on the Lindsay Road and Redford Boulevard (CTH F) intersection.

Ms. Wagner stated an update on this intersection was requested by a committee member. The Council cancelled the R-Cut intersection project last year that was funded by the Highway Safety Improvement Grant. The city notified the county of its decision, the county notified the state, and the state withdrew the funding for the project. The city has not yet received the final bill from the county, estimated at \$150,000, for the work the county on the project. In discussions with the county and staff, Ms. Wagner stated there are no further plans to do any improvements at that intersection.

Mayor Bierce reported that at Council level, the only discussions since they decided to pull the project were regarding potential development there. As part of the development, the city would see how to tie in and put a light there, but it is a county road and all we can do is ask. Mr. Farrow from the county stated there is no appetite for a light there. The mayor stated the study/project was well discussed at Council level and they felt it was only making a bad situation slightly better and that it was worthwhile to pull out and hope something better comes along in the future.

6. Storm Water Management Division

6.1. Discussion and possible action regarding the Springdale Estates Drainage Easement Public Information Summary and direction of the project.

Mayor Bierce acknowledged a group of people in the audience.

Ms. Wagner reported that the city surveyed drainage issues Springdale Estates to determine the problem areas. Preliminary plans are in your committee packets that show what would correct the drainage issues within the easement. Wachtel Tree Service walked the site with staff to provide input on the trees that are located within the easement to determine high-value trees and how those trees would respond to the work that would be done around them, and to ultimately save as many trees as possible if we move forward with the drainage project.

A public information (PI) meeting was held on December 13, 2022, at City Hall and had very good attendance from residents of Springdale Estates.

Ms. Wagner provided the committee with a summary of the PI meeting. She reported that many of the residents on the west end and the east end of the project stated they do not have any flooding issues and did not see a need for the project. Many expressed concerns about the damage the cleaning out of the drainage easements might do to the aesthetics of the properties. The residents with properties located in the middle of the project who are having flooding issues in their yards and around the electrical/cable boxes supported the project.

Ms. Wagner asked the committee if they want to move forward with the project plan as originally laid out, or if there are other design issues they would like staff to consider. There is \$150,000 in the 2023 budget to finalize the design and obtain any access easements that may be necessary for the project. This would be a construction project in 2024.

Mr. Swan asked Ms. Wagner how sure she was that this plan would take care of the problem. She replied that she is certain that there will be positive drainage from the west to the east once the impediments within the drainage swale are cleaned out. The committee discussed the drainage area and what would be corrected with the current plan. She also noted that they would be installing a culvert for a couple of high-value trees. She said that they meandered the swale to minimize a number of trees that could potentially have damage to the root system when cleaning out the drainage swale.

Mayor Bierce asked if there would be grass or concrete in the swale. Mr. Wirtz responded that there would be no concrete; it would be seeded. Mayor Bierce then asked how long would the project take, and how disruptive would it be for people? Mr. Wirtz stated it would be difficult due to the length of the project and additional access points are needed, and some of the trees to be removed are very large. The mayor asked if the goal would be to have all the water run from Aspenwood to Stonewood? Mr. Wirtz replied yes, that was the initial intention when they built it.

Ald. Wamser stated he spoke with most neighbors and doesn't feel that a third of the project needs to be done on the western edge. He said the problem is from the drainage from the roads, and from neighbors throwing brush and debris in the area, and from residents putting retaining walls in the easement area. He noted that Ald. Dziwulski noticed the electrical box and wires exposed. Ald. Wamser feels that most people on the west end are opposed to this project, especially because the houses are closer together and they may lose the buffer of the trees for privacy.

Mayor Bierce asked if consideration was given to the idea of starting the project in the middle where the problem begins. Mr. Wirtz explained that the project is designed to provide positive drainage through the whole area. He prefers to do the full project so the city does not have to go back in and disrupt everything again in the future.

Ms. Wagner stated it was the long-term lack of maintenance on the drainage easements that caused the problem. She said we were instructed to clean out the corridor to achieve positive drainage which this project accomplishes. If the Council wants us to just look at the section where there are drainage issues from the middle to the east, we could truncate the project, but it wouldn't help with the issues on the west end of the project.

Mayor Bierce opened the meeting up for public comments.

Don (Diane) Koss, N26W22616 Oakwood Ln: Located three houses down from the western end of the project, they have lived there over 16 years and are closest to the ditch than any others. He can attest to only three times after a major rainstorm where he saw a stream going down the ditch. The flowage drains east and after a couple hours the water is gone. They do not have a problem with water or their sump pump. He asked the committee to address the problem fiscally. He is opposed to the project.

Ken (Leah) Oliver, N26W22620 Oakwood Ln: They have lived there 33 years. He thanked Ald. Wamser for walking with them. He said that even with the pipe broken there is no ponding, and when the water comes up, it drains in a couple of hours and is gone. The ponding starts at the 30" drainpipe coming off Burningwood. From that point east is where the ponding starts, and from the 14" and 18" drainage pipes coming from the Ridgewood side.

Mayor Bierce asked Ms. Wagner to explain about the drainage pipe they are mentioning. Ms. Wagner said that is the storm sewer in the roadways and has outletted to the drainage swales, which

ultimately runs down to Springdale Road and to the wetlands south of Springdale. There is no way to reroute this drainage away from the swale; it was planned and designed that way.

Lee (Valerie) Penton, N27W22653 Burningwood Ln: Thanked Ald. Wamser. He has lived there about 30 years and said he has no drainage issues; he saw water flowing down there but it is gone in a few hours. He stated that the west end is a foot higher than the east end so there is a natural flow of water. He asked Ms. Wagner about 30" pipe; he heard that a scope was put in and they found where the pipe was broken. Did they determine how high the pipe needs to be raised up? She replied, approximately a foot.

Vickie Dedolph, N26W22326 Ridgewood Ln: They have lived there 29 years. She said they are located on the very edge of the far east end. A few times after a large storm they may get water in there, but within a day it is gone. They have never had water in their basement and don't have any issues with flooding.

Tom Farley, N27W22431 Burningwood Ln: Lives right next to where the road drainage comes out into the ditch. He said the ponding behind his home (and the neighbor behind him) does last for weeks. He did not realize when he moved there in 1991 that he had given the city the right to come in and maintain the flowage capacity of the drainage. He feels the city has more than just the right, they have the duty, and there could be push back because there are many residents who are negatively impacted. It's been a long time and there has been a need to spend money to fix the issue. He doesn't want the city to feel that simply because many who have given the city the drainage easement aren't impacted, that there is no impact, because there is negative impact.

Joe Zanella, N26W22598 Oakwood Ln: Lives on the western half of the easement for over 30 years and has never had a water or drainage issue. He stated that it is clear the four laterals that start at the mid-point is where all the water is coming in and it goes east. There is no water coming from the western end adding to the eastern problem. He said it needs attention but spend the money and fix the problem only where it needs the attention.

Tom Boelter, N26W22482 Oakwood Ln: He lives in the problem area and has lived there for 44 years. The city, going back to the late 70's, would sand instead of salt the roads and all the sand went right into the ditch. He has four or five trees from 50-100 feet tall that are rotted or dead. There are two trees down there now with 1-1/2 foot diameter trunks. In June, when this started, a tree ended up on the electrical junction box. We Energies came out, sawed it, and just left it. The water was a foot high in the middle of the electrical box, and the electric company wouldn't even open it. This is the second box in 12 years, and we were without power for a week. Our kids play down there. The city had no clue that this was there.

Peg Zanella, N26W22598 Oakwood Ln: Thanked Ald. Wamser and Ald. Dziwulski for the walk. She suggested that the neighbors clean out the easements before the city spends any money. She said it's the homeowner's responsibility to get rid of the trees from the easements. It's the people that don't remove the trees that fall that create this problem. We keep our easements clean because our yards are smaller and easier to clean than the problem areas, but this might be the first step before any money is spent. She suggested that maybe the city could ask the residents to clean out their easements.

Kelly Barnes, N26W22366 Ridgewood Ln: Has lived there 11.5 years and keeps the area very clean. She doesn't have water issues but said there is a ton of water that goes through there from the pipes that come down and creates a lot of standing water. It doesn't cause a problem with them because they are higher and set back. It is too muddy for their kids to play down there. She is not 100% opposed to this plan, but she is not in agreement with it either. She said they have a couple of trees that are slated to come down that are not dead, and some that are dead that are not slated to come down. She thinks the tree company should come back out and take another look when there are leaves again. If this goes through, she would like some sort of voucher to a local nursery to plant trees on the outside of the easement to bring back some nature. She doesn't think planting

grass will work down there and there is no sun. She thinks the natural erosion will just be a band-aid and the city will eventually come back again saying the same thing.

Bernd Bruhnke, N27W22633 Burningwood Ln: Has lived there since 1988 when they built their home. He is on the western end, and even with significant rains they have never had any issues at all. Based on the proposals, going from east to west, he doesn't feel there was a decent root cause analysis done. There has been talk of ongoing maintenance; he is not aware of what culvert maintenance would be other than going down there and occasionally doing regular clean up. He would like the project to be reconsidered as proposed so that 1) there isn't any more damage done to property than needs to be; 2) we don't incur any costs other than what is necessary; and 3) we address only the areas where the problems are. He looks forward to a practical and efficient solution.

Brian Dziwulski, N24W22637 Meadowood Ln: He is an alderman in this area. He stated that when he was contacted by Tom there was water around a live electrical box. He has seen and walked the area. He is not of the opinion that if it's not broke let's fix it anyway. If the west end doesn't have a problem other than that one pipe coming down, let's fix the pipe and leave the west end alone – and same on the east end if there isn't a problem. It does appear that there is a problem in the center where it hasn't been maintained and people are blocking it. Let's clean it up and fix that center section. If we haven't had a problem on the east or west end in 40 years, we shouldn't have a problem in five years if we fix the center so it works like it's supposed to.

Ed Dedolph, N26W22326 Ridgewood Ln on Ridgewood Ln: He stated that too many people blow their leaves towards the easement, and he spends all summer cleaning them up so there isn't anything backing up from his property. He keeps it raked out. His neighbor piles up leaves and they end up down there. His opinion is the city is dumping way too much water in there and we should be putting it in a storm sewer like the rest of the subdivision.

Mayor Bierce thanked all who provided input and participated. He said there is an issue and asked the committee for their recommendations. A discussion took place regarding altering the project. He said the city has developed and has a responsibility to make it safe for the community. He agrees that the full-scale project may not be what is needed there.

The committee agreed to send this project back to staff for revision to attempt to scale the project down to the problem area in the center and go from there east.

7. Water and Sewer Division

7.1. Discussion and possible action regarding the Comprehensive Financial Plan for the Sewer and Water Utilities.

Ms. Mueller reported this as a cursory conversation, indicating that it will be presented by our consultants at an upcoming council meeting. The utility is working with Ruekert-Mielke on submitting a water rate increase package for the Public Service Commission (PSC) in the next month or two with large funding issues to pay for borrowing from last fall. The consultant is reviewing the overall financial situation as it currently stands and is indicating a potential rate increase of 147% over three years. One of the decisions we will need to discuss in detail is what to do with the water debt to the sewer utility. We currently owe \$7 million to the sewer utility that has accumulated over the years. In 2014, the PSC said we cannot co-mingle the water and sewer debt. At that time, they found the water utility owed the sewer utility \$5 million. Since that time, we have borrowed another \$2 million on top of that. One of the options is a partial forgiveness of the debt, which would help with the rate issues. We need to look at more options than just the repayment of the full \$7 million.

Mr. Swan asked Ms. Mueller if she felt the first \$5 million was accurate. Ms. Mueller said it is her understanding based on previous conversations that the original debt had both water and sewer

projects in it, so our previous financial consultants put both utilities into one account. In retrospect, it was very damaging to the water utility. The sewer utility does have some items that they need coming up, but they are in a much better position financially than the water utility.

Also, costs for the Well 5 radium remediation project to loop the water main connection to the Bluemound Industrial Park are currently up to \$4.2 million. The utility will be incurring more water debt to come into compliance with that consent order. That is on top of the debts we are working through. Baker Tilly will provide a presentation to Council at the second meeting in February. After that, we will bring the pieces back to you for recommendations on how to proceed. This information was provided today because there are some hard decisions to make between the utilities. We want to make sure you have the information and time to digest it before we come back and start making decisions on how to move forward to make/keep the utility financially sustainable.

Mr. Swan asked if Baker Tilly will provide recommendations on how they feel we should do this, or is it strictly up to the committee to decide? Ms. Wagner replied that this is outside of Baker Tilly's scope. This is where we need to have discussions with Baker-Tilly in conjunction with this committee. Does the sewer utility forgive 100% the debt to the water utility with no repayment at all? We have to look out for the health of the sewer utility as well. We need to take this information and work with our accountant to run some scenarios to see what the best decision would be, while being cognizant of what is going on now and how we will fix this moving forward, and then remain on track. We have not had a lot of support from our current accountants. We are cautiously optimistic that with Baker Tilly we will be able to iron out these issues quicker, and for the betterment of the utilities moving forward.

Mayor Bierce asked Ms. Wagner to put this item back on the agenda for the next meeting for further discussion.

8. Engineering Division

8.1. Discussion and possible action to designate the Public Works Committee as the Tree Board in accordance with Tree City USA requirements.

Ms. Wagner reported that as part of the Tree City USA designation that the committee recommended to Council and they agreed with pursuing, the city has to designate a Tree Board in order to oversee the forestry in the City of Pewaukee. Since the Tree Board is to be a mix of citizens, council members and Engineering staff, we thought this committee would be a good fit for this Board. The Tree Board would be utilized for matters such as questions about tree plantings, or if there is a significant tree removal project being considered, or if there is a contentious issue with the removal of a tree with a property owner. Information about matters like these would be brought before the Tree Board for review and recommendation.

Ms. Wagner recommended that the Public Works Committee be appointed by the Council as the Tree Board for the City of Pewaukee. The committee agreed with her recommendation.

A motion was made and seconded (J. Tormey, J. Wamser) to propose to the Council to appoint the Public Works Committee as the Tree Board for the City of Pewaukee in accordance with Tree City USA requirements. Motion Passed: 5-For, 0-Against

8.2 Discussion and possible action regarding establishing Quiet Zone Crossing for the Canadian Pacific Railroad, specifically Springdale Road (CTH SR) and Duplainville Road.

Ms. Wagner reported that the City of Brookfield approached her to consider whether the City of Pewaukee would be interested in partnering with them and split the cost of a quiet zone at the Springdale Road intersection, which is owned by the county. The county stated it has no problem issuing a permit, but would not pay for anything associated with a quiet zone.

The City of Pewaukee already has under contract the study of Green Road and Weyer Road for quiet zones. This corridor could be done if we added Duplainville Road, which would be a pretty substantial stretch east to west from the City of Brookfield to the Village crossing on Forest Grove. This is more favorable in the FRA and the Railroad's opinion of these quiet zones. This is more favorable in the FRA and the Railroad's opinion of these quiet zones. There are no funds in the 2023 budget for work on Springdale Road or Duplainville Road for quiet zones. Brookfield has offered to cover the costs for the Sprindale Road crossing and have the city repay them in 2024. Estimates for the studies range from \$45,000 to \$60,000 for the intersections. The estimates do not include the improvements, which can range from \$60,000 to \$750,000 depending on what is proposed to make them a quiet zone. Ms. Wagner's recommendation is to have the committee recommend to the Council to fund the studies for the Springdale Road and the Duplainville Road, and to partner with the City of Brookfield to make it the most economical quiet zone that we can.

Mayor Bierce referred to an email from Tom Grisa from Brookfield, which indicated the cost of the improvements would be \$90,000. He asked if that cost was just for the study, referencing previous estimated which indicated the costs would be much higher. Mr. Gabbey stated that it was his understanding that the \$90,000 was the total for the improvements for a raised median. He said the costs depend on the geometry of the crossing. The biggest impediments are the adjacent driveways and roadways. The FRA has a set of standards, and if you hit that standard, it is an automatic yes.

The committee discussed the Weyer Road and Green Road intersections and improvement costs regarding those quiet zones. Mayor Bierce stated that the Village of Pewaukee intends to change all of their crossings into quiet zones.

Mayor Bierce stated that he is in favor of this recommendation and of partnering with the City of Brookfield to fund the project. The committee agreed.

A motion was made and seconded (J. Wamser, D. Swan) to send to Council with a positive recommendation of establishing a quiet zone at Springdale Road and Duplainville Road.

Motion Passed: 5-For, 0-Against

8.3 Discussion and possible action regarding requesting signals at the intersection of Lindsay Road and Pewaukee Road (STH 164).

Ms. Wagner stated that this item was brought before the committee at the request of Mr. Swan. She reported that there is a project planned on STH 164/Pewaukee Road by the Wisconsin Department of Transportation (DOT). Ms. Wagner had a discussion with the DOT about lights being placed at the intersection of Lindsay Road and Pewaukee Road. The DOT reviewed the intersection and found that because it does not meet any warrants, it would not signalize this intersection as part of the project. The project is a resurfacing project with some improvements at specific intersections.

Mr. Swan feels the state should take another look at the intersection for more updated data. Ms. Wagner feels their information is fairly recent. Ms. Wagner said the DOT performed traffic counts in the last year and a half, and last year they counted all the intersections throughout the county. She asked the DOT in June 2022 and in September 2022, and was told that because the intersection hadn't met any warrants for signals, they will not add any. Ms. Wagner suggested the city could fund an independent traffic study, but if there aren't any warrants found the state still will not install the lights.

Mayor Bierce instructed Ms. Wagner to contact the DOT and ask them again to review this intersection.

8.4 Discussion and possible action regarding Milkweed Lane Road Rehabilitation and possible speed deterrence.

Mr. Gabbey reported that staff has received some complaints about traffic speed on Milkweed Lane, which is up for reconstruction this year. Currently there are three speed humps which exist on the eastern end of Milkweed Lane. Staff evaluated three speed deterrent options: 1) construct a raised concrete curbed median that squeezes drive lanes to make drivers uncomfortable and slow down, at a cost of \$26,000; 2) raise the intersections, which is basically an extended speed table which raises the intersection to slow traffic down as they come to it, at a cost of \$90,000; 3) install additional speed humps similar to those already in place. There are six locations where they could be installed.

Mr. Swan asked if they would be willing to take the three existing speed humps out? Mr. Gabbey said the speed humps were special assessments and plan to remain.

Lt. Moonen recently completed a speed study which indicated there is a very small percentage of drivers through that area who are actually speeding. He stated in his email that only 0.25% of drivers would actually get a citation. He indicated that volume is more of a problem than speed.

Ms. Wagner stated that the three speed humps were placed where they are because there aren't any impediments with driveways and mailboxes. She recommended against speed humps because this is a traffic volume issue, not a speed issue.

Mayor Bierce discussed his walk on Milkweed Lane, and how the speed of cars driving by seem fast when you are a pedestrian. Ms. Wagner offered the option of installing sidewalks to separate pedestrians from traffic.

After further discussion, the committee agreed not to add any additional speed deterrents to this road.

9. Public Comments

10. Adjournment

A motion was made and seconded (J. Tormey, D. Swan) to adjourn the meeting at 5:55 p.m.

Motion Passed: 5-For; 0-Against.

Respectfully Submitted,

Magdelene Wagner
Director of Public Works

**CITY OF PEWAUKEE
PUBLIC WORKS COMMITTEE AGENDA ITEM 4.1.**

DATE: March 9, 2023

DEPARTMENT: PW - Stormwater

PROVIDED BY: Magdelene Wagner

SUBJECT:

Discussion and possible action regarding the Takoma Hills - Lexington Drive Drainage Study.

BACKGROUND:

Lexington Drive in the Takoma Hills subdivision experiences flooding. Staff has been reviewing and studying this area for several years ahead of the upcoming road construction project.

Last year, the City contracted with AECOM to review staff findings and further study the areas to recommend improvements to the area. Please see the attached Drainage Study. The study reviewed the area for the 2-year, 10-year, and 100-year storm events.

The study reviewed three alternatives.

1. Install a Low Flow Pipe. This would supplement the existing drainage swales with a 24 to 48-inch storm sewer under the edge of the pavement.
2. Install Storm Sewer/Ditch Enclosure. This would include the pipe from Alternative 1 and install a 42 to 48-inch pipe in the North Ditch line.
3. Regrade the ditch/replace culverts. This would essentially leave the current conditions in place (ditches/culverts) with minor improvements to improve drainage.

Alternatives 1 and 2 do not provide a large improvement to the flooding conditions and these projects will cost \$790,000 and \$1,290,000, respectively. It should be noted, the costs in Alternative 1 and 2 do not include costs to relocate laterals which will likely be in conflict with the new storm sewers. For these reasons, staff is recommending Alternative 3.

FINANCIAL IMPACT:

RECOMMENDED MOTION:

Committee recommend to the Common Council selecting Alternative 3 to move forward in the upcoming road project.

ATTACHMENTS:

Description
Drainage Study Memo

Technical Memorandum

To	Magdelene Wagner, Director of Public Works, Pewaukee Rich Wirtz, PE, CFM, Chief Engineer-Utilities, Pewaukee	Page	1
CC			
Subject	Takoma Hills Drainage Study AECOM Project #: 60339891		
From	Vince Christensen, Rick Eilertson, PE, Ashley Leisgang, PE		
Date	January 31, 2023		

A. Introduction

The Takoma Hills neighborhood receives a significant amount of storm water runoff from an adjacent watershed located in the City of Waukesha. Runoff from Waukesha is collected and conveyed to two open channels maintained by the City of Pewaukee on either side of Ruben Drive. Historically, significant storm events would flood the street cross-section at Ruben Drive and Lexington Drive. Per the City's request, AECOM has completed a hydrologic and hydraulic analysis of the watershed using the XP-SWMM 2D computer program. This analysis focused on the area in the Takoma Hills subdivision along Ruben Drive, from the Pewaukee city line to Lexington Drive and Lexington Drive from Ruben Drive to its northwest dead end. The water flows east to west, south to north, and leaves the City of Pewaukee storm drainage system where it discharges to the storm sewer system within Bluemound Road (County Road JJ).

The City contracted with AECOM to evaluate the existing drainage system and propose alternatives that would improve the storm water drainage along Ruben and Lexington Drives in the Takoma Hills subdivision and mitigate the localized flooding issues.

B. Watershed Characteristics

The Takoma Hills watershed is approximately 221 acres in area, with approximately 174 acres of the watershed originating within the City of Waukesha. The adjacent City of Waukesha basin is a mix of residential and commercial land uses which drain from east to west. Upon entering the City of Pewaukee, the flow is diverted into open channels on either side of Ruben Drive and conveyed west toward Lexington Drive. The open channels continue northwest within the right of way of Lexington Drive before discharging to a large, eroded ditch at the west end of Lexington Drive. Flows from the ditch are collected by a large diameter storm sewer system in Bluemound Road (County Road JJ). In addition to flow from the City of Waukesha, the Lexington Drive drainage system collects flow from the City of Pewaukee's Takoma Hills residential neighborhood.

The open channels through the Takoma Hills neighborhood are bisected by numerous driveway and street culverts ranging in size from 12-inch round to 36x48 inch arched pipes. Roughly half of these driveway culverts have been replaced in the past five years. The open channels discharge into a ditch located northwest of the Lexington Drive dead end. The ditch is located within an undeveloped portion of a property owned by Payne and Dolan, Inc. The City informed AECOM that discussions with the property owner to obtain an easement are taking place. Additional survey information indicated that ditches throughout the project extents had high points and back pitches which promote the pooling of water. In general, the contributing watershed is heavily developed and predominantly contain soils in hydrologic groups C and D. The high level of development coupled with the poor hydrologic soil group ratings indicate that very little infiltration occurs within the studied watershed.

Based on anecdotal evidence from the City and residents, certain areas within the Takoma Hills watershed experience localized flooding during moderate to heavy rainfalls. Water levels within the open channels on both sides of Ruben Drive from the City line to Lexington Drive and on Lexington Drive from Ruben Drive to its northwest dead end overtop resulting in standing water on the roadway pavement. No impacts to adjacent structures have been reported. The watershed developed for this analysis is shown in Figure 1.

Data Sources

Data collected from the following sources were used in the analysis:

- Waukesha County GIS data including 1-foot contours
- City of Pewaukee storm sewer, sanitary sewer, and water utility GIS data
- City of Waukesha storm sewer GIS data,
- A partially completed previous study of the area by the City of Pewaukee which includes a PCSWMM model, pdf point plot of a survey, and draft proposed plans.
- Videos and testimonials of residents indicating extents of localized flooding.
- Supplemental field survey

Hydrology

Utilizing the ArcMap computer program, subbasins for the entire study area were delineated using 1-foot contour data from 2015. Once the subbasins were delineated, the longest flow paths were drawn for each subbasin and a HydroCAD model was created to determine the Time-of-Concentration (Tc) values for each basin. The Tc value represents the time that it takes for a drop of water, at the hydraulically most distance point, to travel to the outlet of the subbasin. It was assumed that runoff in the area consisted primarily of sheet flow, shallow concentrated flow, and channel flow. Slope, flow length, land use type, and other factors were all considered in the Time-of-Concentration calculations.

In addition, an SCS curve number (CN) was calculated for all subbasins based on a weighted average using the formula below.

$$CN_{Basin} = [(Area_{Impervious} * CN_{Impervious}) + (Area_{Pervious} * CN_{Pervious})] / Area_{Basin}$$

A CN value of 98 was used for impervious surfaces, and values for pervious surfaces were selected based on the land characteristics of the area, considering that soils are primarily within soil groups C and D, per Web Soil Survey.

Model Setup

The existing and proposed conveyance system was modeled using Version 2019.1.3 of XP-SWMM 2D software. XP-SWMM is a dynamic model using a link-node representation for ditches/conduits and junctions and a DTM surface to represent surface elevations to create a 2-dimensional (2D) model. The hydrologic calculations for the study area were completed using the SCS runoff method. The amount (volume) and peak flow (rate) of runoff, generated by each sub-basin area in XP-SWMM is dependent on the input acreage, CN, and Tc values.

The models were run for multiple rainfall events using NOAA Atlas 14, MSE3, 24-hour rainfall distributions and the rainfall depths identified in the City of Pewaukee Technical Standards. The storms and rainfall depths included in the analysis were:

- 2-year, 24-hour - 2.69 in
- 10-year, 24-hour - 3.80 in
- 100-year, 24-hour – 6.17 in

C. Existing Conditions

The existing model includes ditches and culverts within the watershed. The watershed area upstream of the outfall (the 54x88 inch storm sewer located at Bluemound Road) is approximately 221 acres. As-built drawings, survey information, and GIS culvert and topographic contour information were used to build the model. A supplemental site survey was conducted and an analysis of the collected information was performed to verify the validity of the information. This was done to verify the record drawings, GIS information, and to locate or correct the location of additional storm water structures that were not included in the original data provided. Cross sections of the existing ditch and roadway elevations were taken from the PCSWMM model provided from the City and used as a starting point. The ditch cross sections were then updated based on GIS data, the point plot drawings provided from the City, and the surveyed/field verified information. The existing GIS shapefiles of ditch and storm sewer segments were then updated with this data. After the shapefiles were finalized, the data was then imported from GIS into the XP-SWMM software.

Stormwater from the Takoma Hills drainage basin is collected and conveyed through the subdivision via open channels and culverts on the north and south side of Ruben Drive and Lexington Drive. The drainage basin outfalls to a large capacity storm sewer within the Bluemound Road (County Road JJ) right of way. The 54x88 inch arch storm sewer in the Bluemound Road right of way was used as a free-flowing outfall in the models.

The existing models were run, and a set of initial flooding extent figures were developed for the three storm events. The initial model results were presented to and discussed with the City. During this discussion, the City noted that the model's flooding extents and depths appeared to be greater than what had been documented during past flood events.

Taking into account the City's review notes, flow calculations from the City's previous study for this area, and documentation of flooding during previous storm events, AECOM determined the existing conditions model was overestimating the flows entering the City of Pewaukee's storm drainage system from the City of Waukesha basin. The model was then calibrated by adjusting the time of concentration value used in the model for the City of Waukesha basin. The value was increased until the peak flow and surface ponding extents represented observed conditions. The peak flows produced by the City of Waukesha basin in the XP-SWMM model were then compared to the peak flows in the City's original PCSWMM model. A summary of the model calibration is provided below in Table 1.

Table 1. Existing Conditions Model Calibration – City of Waukesha Basin

Model	Tc (mins)	Storm Event Flows (cfs)			Furthest northwest property on Lexington Drive under water during 10-year storm event?
		2 year	10 year	100 year	
PCSWMM (City)	NA	92	155	323	-
Initial Model (AECOM)	45	200	328	604	Yes
Final Model (AECOM)	80	129	214	397	No

The calibrated existing drainage conditions are illustrated on Figures 2, 3, and 4.

D. Flood Relief Alternative Evaluation

Following the completion of the existing conditions analysis, three potential flood reduction alternatives were evaluated. The existing conditions model was used as a starting point for the alternatives. The flood relief alternative's main goal was to mitigate the flooding throughout the Ruben Drive and Lexington Drive corridor. Two alternatives were initially developed that focused on improving the existing drainage system, potentially adding new sewer, and re-grading the existing ditches and culverts. A third alternative that improved the existing drainage system through ditch re-grading and culvert improvements was developed after additional discussions with City of Pewaukee staff members on January 12, 2023.

Alternative 1 (Low Flow Pipe Model)

Alternative 1 involves constructing a low flow pipe beginning from the open channel on the north side of Ruben Drive and crossing under Lexington Drive, then continuing northwest along the southern pavement edge of Lexington Drive, and terminating the sewer at the large ditch northwest of the Lexington Drive dead end. As the sewer progresses northwest, it will increase in size from 24-inch to 42-inch diameter. The storm sewer will connect to the open channel on the south side of Lexington Drive at various locations to help drain the ditch following a storm event. The open channel and storm sewer connections are located at the driveway culvert of W225N363 Lexington Drive, intersections of Takoma/Lexington Drive, Mt Vernon/Lexington Drive, and near the driveway culvert of N4W22711 Lexington Drive. The bypass sewer terminates with the outfall of the 42-inch pipe at the ditch northwest of the Lexington Drive dead end. The inverts of the pipes are set to maintain a minimum slope of 0.3% and to provide adequate cover for the RCP storm sewer pipe. This storm sewer would supplement the flow capacity of the open channels and help drain the channels of standing water once a storm event has passed.

Additional work would include replacing one (1) driveway culvert to upsize the pipe, replacing eleven (11) old and deteriorating driveway and cross culverts with the same diameter pipe, and re-grading roughly 485 ft of the open channel on the south side of Lexington northwest of Mt Vernon to accommodate the culvert replacements and to eliminate high points in the ditch. The layout for Alternative 1 along with the flooding extents for the respective storm events are found in Figures 5, 6, and 7.

Alternative 2 (Optimized Model)

Alternative 2 builds upon the improvements in Alternative 1 and includes additional improvements that are needed to fully mitigate the flooding at the intersections of Takoma Drive and Lexington Drive and Ruben Drive and Lexington Drive. Alternative 2 includes an additional proposed 42-inch and 48-inch storm sewer located along the alignment of the north open channel from the intersection of Lexington Drive and Ruben Drive, ultimately discharging into the drainage ditch northwest of Lexington Drive. The open channel on the north side of Lexington Drive will be converted into shallow ditches with inlets into the new storm sewer. The proposed storm sewer and re-graded ditch on the north side of Lexington Drive would increase the flow capacity relative to the existing open channel.

The layout for Alternative 2 along with the flooding extents for the respective storm event is found in Figures 8, 9, and 10.

Alternative 3 (Minimalist Model)

Alternative 3 proposes that the majority of the ditches on the north and south side of the Lexington Drive corridor are re-graded and that twelve (12) old and deteriorating driveway culverts are replaced. The proposed driveway culvert replacements would result in one (1) driveway culvert being upsized and eleven (11) driveway culverts being replaced with the same diameter pipe. Survey of the driveway culverts and ditches along Lexington Drive indicate that larger diameter driveway culverts are not feasible in many areas because minimum cover and side slope standards cannot be achieved. The proposed re-grading and culvert replacement work would improve the areas throughout Lexington Drive where flat and back pitched ditches cause water to stagnate.

The layout for Alternative 3 along with the flooding extents for the respective storm event is found in Figures 11, 12, and 13.

Result Comparison

The results of the proposed alternatives were compared to the existing condition results. The peak water surface elevation (WSE) and the peak flow of selected nodes and links were used to perform the evaluation.

Table A.1 in the Attachment summarizes the water surface elevation for the existing conditions and two proposed alternatives. The locations of the XP-SWMM Nodes are found on Figures 2-10.

Under Alternative 1, model results indicated a decrease in the peak WSE throughout the Lexington Drive corridor of approximately 4-inches in the 2-year storm event, 2-inches in the 10-year storm event, and 1-inch for the 100-year storm event. Greater peak WSE decreases were shown on the far western portion of Lexington Drive which is attributed to re-grading the open channel on the south side of Lexington Drive, northwest of Mt. Vernon. The proposed bypass sewer provides additional flow conveyance capacity near the Ruben Drive and Lexington Drive intersection resulting in lower peak WSE's during the modeled storm events. Storm water does not leave the Lexington Drive right of way during a 10-year storm event. However, this proposed configuration causes the peak flows discharging at the end of the watershed into Bluemound Road to increase from 385 cfs in existing conditions to 422 cfs, for the 100-year storm event. The increase in peak flow is not due to the addition of impervious area or new flows but is a result of conveyance improvements and reduced ponding within the drainage system.

Under Alternative 2, there are similar decreases in the peak WSE throughout Lexington Drive. The proposed storm sewer on the north side of Lexington Drive allows additional flow to be conveyed away from the Ruben Drive and Lexington Drive intersection which results in a lower peak WSE during the three modeled storm events, when compared to both the Existing and Alternative 1 conditions. During a 2-year storm event, the maximum water depth on any portion of the roadway in the corridor is between 6 and 12-inches for the existing condition and is less than 3-inches under Alternative 2. However, this proposed configuration causes the peak flows discharging at the end of the watershed into Bluemound Road to increase from 385 cfs in existing conditions to 413 cfs for the 100-year storm event. The increase in peak flow is not due to the addition of impervious area or new flows but is a result of conveyance improvements and reduced ponding within the drainage system.

Under Alternative 3, model results indicated a decrease in the peak WSE throughout the Lexington Drive corridor of approximately 2-inches in the 2-year storm event, 1-inch in the 10-year storm event, and 1-inch for the 100-year storm event. Similarly to Alternative 1, greater peak WSE decreases were shown on the western portion of Lexington Drive which is attributed to re-grading the ditches on both sides of Lexington Drive. The small improvements to the water surface elevation near the intersection of Ruben Drive and Lexington Drive are also attributed to the re-graded ditches which conveyed more flow away from the intersection. The modeling of Alternative 3 showed that for the 100-year storm event 385 cfs and 382 cfs for the existing condition and proposed Alternative 3 condition, respectively, discharged at the end of the watershed into Bluemound Road, indicating that Alternative 3 will not have significant impact on peak flows.

Opinion of Probable Cost

Opinions of Probable Cost (OPCs) for the three alternatives are summarized in Table 2. Detailed spreadsheets for each alternative can be found in Attachment A. The opinions of probable construction cost should be considered a Class 4 estimate as classified by the Association for the Advancement of Cost Engineering (AACE International), which is consistent with an opinion of probable construction cost prepared as part of a feasibility study.

Table 2. Opinion of Probable Cost Summary

Alternative	Cost
1	\$790,000
2	\$1,290,000
3	\$390,000

E. Recommendations

While all of the proposed alternatives are viable solutions, some factors to consider include cost, constructability, and achieving the goal of eliminating the standing water at the intersection of Ruben Drive and Lexington Drive while minimizing downstream drainage impacts. AECOM recommends that because each alternative has advantages and disadvantages, the City of Pewaukee evaluate all factors that could impact the proposed project and select an alternative that satisfies the most factors.

Attachments

- 1 – Table A.1 – Takoma Hills Peak WSE Comparison for Alternatives 1-3
- 2 – Opinions of Probable Cost for Alternatives 1-3

Figures

- 1 – Drainage Map
- 2 – Existing Conditions (2-yr Storm Event)
- 3 – Existing Conditions (10-yr Storm Event)
- 4 – Existing Conditions (100-yr Storm Event)
- 5 – Proposed Alternative 1 (2-yr Storm Event)
- 6 – Proposed Alternative 1 (10-yr Storm Event)
- 7 – Proposed Alternative 1 (100-yr Storm Event)
- 8 – Proposed Alternative 2 (2-yr Storm Event)
- 9 – Proposed Alternative 2 (10-yr Storm Event)
- 10 – Proposed Alternative 2 (100-yr Storm Event)
- 11 – Proposed Alternative 3 (2-yr Storm Event)
- 12 – Proposed Alternative 3 (10-yr Storm Event)
- 13 – Proposed Alternative 3 (100-yr Storm Event)

Attachments

Table A.1

Takoma Hills Peak WSE Comparison																							
XP- SWMM Node ⁽¹⁾	Location	Ground/ Overbank Elev.	2-year, 24-hour							10-year, 24-hour							100-year, 24-hour						
			Water Surface Elevation (WSE) (ft)							Water Surface Elevation (WSE) (ft)							Water Surface Elevation (WSE) (ft)						
			Existing	Alt. 1	Alt. 2	Alt. 3	Alt. 1 Reduction	Alt. 2 Reduction	Alt. 3 Reduction	Existing	Alt. 1	Alt. 2	Alt. 3	Alt. 1 Reduction	Alt. 2 Reduction	Alt. 3 Reduction	Existing	Alt. 1	Alt. 2	Alt. 3	Alt. 1 Reduction	Alt. 2 Reduction	Alt. 3 Reduction
25.3-143.1	Ruben and Lexington Drive (NE)	875	874.4	874.2	873.8	874.4	-0.2	-0.6	0.0	875.0	874.6	874.6	874.7	-0.4	-0.4	-0.3	875.5	875.4	875.3	875.4	-0.1	-0.2	-0.1
25.3-140	Ruben and Lexington Drive (SE)	875	874.3	874.0	873.7	874.0	-0.3	-0.5	-0.3	875.0	874.8	874.2	874.5	-0.3	-0.8	-0.5	875.5	875.4	875.4	875.4	-0.1	-0.1	-0.1
25.3-114	Takoma and Lexington Drive (NE)	872	872.5	872.2	872.0	872.4	-0.3	-0.5	-0.1	872.7	872.5	872.4	872.6	-0.2	-0.3	-0.1	873.0	872.9	872.9	872.9	-0.2	-0.2	-0.1
25.3-132	Takoma and Lexington Drive (SE)	872	872.5	872.2	872.0	872.4	-0.3	-0.5	-0.1	872.7	872.6	872.6	872.6	-0.1	-0.2	-0.1	873.0	872.9	873.0	873.0	0.0	0.0	0.0
25.3-199	Mt Vernon and Lexington Drive (SE)	870	870.2	870.0	868.2	870.3	-0.1	-1.9	0.1	870.3	870.2	870.1	870.7	-0.1	-0.2	0.3	870.7	870.7	870.6	870.9	0.0	-0.1	0.2
25.3-126	Mt Vernon and Lexington Drive (NE)	870	870.4	870.0	869.8	870.4	-0.4	-0.6	0.0	870.8	870.6	870.3	870.7	-0.2	-0.5	-0.1	871.3	871.3	871.3	871.4	0.0	-0.1	0.1
25.3-116	Lexington Drive Dead End (N)	868	868.3	867.2	866.1	868.0	-1.1	-2.2	-0.3	868.7	868.0	867.9	868.7	-0.8	-0.9	0.0	869.5	869.5	869.0	869.4	0.0	-0.5	-0.1
25.3-118	Lexington Drive Dead End (S)	868	868.3	866.3	866.6	868.1	-2.0	-1.7	-0.2	868.8	868.2	868.1	868.5	-0.6	-0.7	-0.3	869.6	868.9	868.8	868.9	-0.7	-0.7	-0.6

(1) For node locations, see Figures 2-13.

Alternative 1



1555 Rivercenter
Dr., Suite 214
Milwaukee,
Wisconsin 53212

CLIENT:	City of Pewaukee				
PROJECT:	Stormwater Management Plan Review Assistance				
CONTRACT NO:	Takoma Hills Drainage Study Tasks				
AECOM PROJECT NO.:	60339891				
SUBMITTAL:	Opinion of Probable Construction Cost				
DATE CREATED/MODIFIED:	01/24/2023	BY:	VTC		
DATE CHECKED:	01/30/2023	BY:	EJE		

Line Item	Item Code	Item Description	Unit of Measure	Quantity	Unit Price	Total Cost
1	619.1000	Mobilization, Bonds, and Insurance (~7%)	LS	1	\$39,000	\$39,000
2	SP	Clearing & Grubbing	LS	1	\$3,000.00	\$3,000
3	206.2000	Grading and Excavation for Structures Culverts (structure)	CY	1,780	\$42.00	\$74,748
4	628.1104	Erosion Log, 12-Inch	LF	240	\$12.20	\$2,928
5	628.7504	Ditch Checks	LF	450	\$17.40	\$7,830
6	628.7020	Inlet Protection (Type D)	EACH	6	\$250.00	\$1,500
7	SP	6" Topsoil Restoration, w/ Class 1, Urban, Type B Erosion Mat	SY	1,083	\$6.10	\$6,608
8	630.0140	Turfgrass Seed Mix	SY	1,083	\$2.50	\$2,708
9	SP	Removing Asphaltic Surface	SY	324	\$10.50	\$3,397
10	SP	HMA Pavement 4MT 58-28S	SY	324	\$105.00	\$33,973
11	SP	Base Aggregate Dense 3/4-inch	TON	80	\$123.00	\$9,850
12	SP	3/8" Crushed Stone Chip	CY	999	\$54.00	\$53,967
13	SP	Traffic Control/Safety Practices	LS	1	\$10,000.00	\$10,000
14	611.2005	Manholes 5-FT Diameter	EACH	3	\$4,450.00	\$13,350
15	611.2006	Manholes 6-FT Diameter	EACH	4	\$6,230.00	\$24,920
16	611.0612	Inlet Covers Type C	EACH	6	\$578.00	\$3,468
17	611.0530	Manhole Covers Type J	EACH	1	\$533.00	\$533
18	203.0100	Remove Existing Culverts and Endwalls	EACH	12	\$1,050.00	\$12,600
19	SP	Construction Staking Storm Sewer	LS	1	\$4,000.00	\$4,000
20	608.0312	Storm Sewer Pipe Reinforced Concrete Class III 12-inch	LF	50	\$92.00	\$4,600
21	608.0330	Storm Sewer Pipe Reinforced Concrete Class III 30-inch	LF	111	\$147.00	\$16,317
22	608.0336	Storm Sewer Pipe Reinforced Concrete Class III 36-inch	LF	151	\$157.00	\$23,707
23	608.0342	Storm Sewer Pipe Reinforced Concrete Class III 42-inch	LF	953	\$185.00	\$176,305
24	SP	Reinforced Concrete Box Culvert, 3' x 4'	LF	21	\$525.00	\$11,025
25	521.3717	Pipe Arch Corrugated Steel 17x13-Inch	LF	20	\$80.00	\$1,600
26	521.3118	Culvert Pipe Corrugated Steel 18-Inch	LF	42	\$69.00	\$2,898
27	521.3735	Pipe Arch Corrugated Steel 35x24-Inch	LF	44	\$130.00	\$5,720
28	521.3742	Pipe Arch Corrugated Steel 42x29-Inch	LF	82	\$126.00	\$10,332
29	521.3749	Pipe Arch Corrugated Steel 49x33-Inch	LF	185	\$158.00	\$29,230
30	SP	Apron Endwalls for Reinforced Concrete Box Culvert	EACH	2	\$1,500.00	\$3,000
31	522.1012	Apron Endwall for Culvert Pipe Reinforced Concrete 12-Inch	EACH	5	\$1,209.00	\$6,045
32	521.1018	Apron Endwall for Culvert Pipe Steel 18-inch	EACH	2	\$387.00	\$774
33	521.1217	Apron Endwall for Pipe Arch Steel 17x13-Inch	EACH	2	\$344.00	\$688
34	521.1242	Apron Endwall for Pipe Arch Steel 42x29-Inch	EACH	4	\$711.00	\$2,844
35	521.1249	Apron Endwall for Pipe Arch Steel 49x33-Inch	EACH	14	\$1,100.00	\$15,400
36	522.1042	Apron Endwall for Culvert Pipe Reinforced Concrete 42-Inch	EACH	1	\$3,476.00	\$3,476

Total Opinion of Probable Construction Cost \$623,000

Surveying, Design Engineering, and Const. Admin (~10%) \$63,000

Contingency (~15%) \$103,000

Total Opinion of Probable Surveying, Engineering Design, Construction, and Administration/Inspection Cost Estimate \$790,000

Alternative 2



1555 Rivercenter
Dr., Suite 214
Milwaukee,
Wisconsin 53212

CLIENT: **City of Pewaukee**
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7	SP	6" Topsoil Restoration, w/ Class 1, Urban, Type B Erosion Mat	SY	3,954	\$6.10	\$24,118
8	630.0140	Turfgrass Seed Mix	SY	3,954	\$2.50	\$9,884
9	SP	Removing Asphaltic Surface	SY	324	\$10.50	\$3,397
10	SP	HMA Pavement 4MT 58-28S	SY	324	\$105.00	\$33,973
11	SP	Base Aggregate Dense 3/4-inch	TON	80	\$123.00	\$9,850
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23	608.0342	Storm Sewer Pipe Reinforced Concrete Class III 42-inch	LF	953	\$185.00	\$176,305
24	608.0342	Storm Sewer Pipe Reinforced Concrete Class III-A 42-inch	LF	142	\$132.00	\$18,744
25	608.0348	Storm Sewer Pipe Reinforced Concrete Class III-A 48-inch	LF	1,081	\$142.00	\$153,502
26	SP	Reinforced Concrete Box Culvert, 3' x 4'	LF	21	\$525.00	\$11,025
27	521.3717	Pipe Arch Corrugated Steel 17x13-Inch	LF	20	\$80.00	\$1,600
28	521.3118	Culvert Pipe Corrugated Steel 18-Inch	LF	42	\$69.00	\$2,898
29	521.3735	Pipe Arch Corrugated Steel 35x24-Inch	LF	44	\$130.00	\$5,720
30	521.3742	Pipe Arch Corrugated Steel 42x29-Inch	LF	44	\$126.00	\$5,544
31	521.3742	Pipe Arch Corrugated Steel 49x33-Inch	LF	98	\$158.00	\$15,484
32	SP	Apron Endwalls for Reinforced Concrete Box Culvert	EACH	2	\$1,500.00	\$3,000
33	522.1012	Apron Endwall for Culvert Pipe Reinforced Concrete 12-Inch	EACH	5	\$1,209.00	\$6,045
34	521.1018	Apron Endwall for Culvert Pipe Steel 18-inch	EACH	2	\$387.00	\$774
35	521.1217	Apron Endwall for Pipe Arch Steel 17x13-Inch	EACH	2	\$344.00	\$688
36	521.1242	Apron Endwall for Pipe Arch Steel 42x29-Inch	EACH	4	\$711.00	\$2,844
37	521.1249	Apron Endwall for Pipe Arch Steel 49x33-Inch	EACH	14	\$1,100.00	\$15,400
38	522.1012	Apron Endwall for Culvert Pipe Reinforced Concrete 42-Inch	EACH	1	\$3,476.00	\$3,476
39	522.0148	Apron Endwall for Culvert Pipe Reinforced Concrete 48-Inch	EACH	1	\$4,010.00	\$4,010

Total Opinion of Probable Construction Cost **\$1,016,000**
Surveying & Design Engineering (~10%) **\$102,000**
Contingency (~15%) **\$168,000**

Total Opinion of Probable Surveying, Engineering Design, Construction, and Administration/Inspection Cost Estimate **\$1,290,000**

Alternative 3



1555 Rivercenter
Dr., Suite 214
Milwaukee,
Wisconsin 53212

CLIENT: **City of Pewaukee**
PROJECT: **Stormwater Management Plan Review Assistance**
CONTRACT NO.: **Takoma Hills Drainage Study Tasks**
AECOM PROJECT NO.: **60339891**
SUBMITTAL: **Opinion of Probable Construction Cost**
DATE CREATED/MODIFIED: **01/24/2023** BY: **VTC**
DATE CHECKED: **01/30/2023** BY: **EJE**

Line Item	Item Code	Item Description	Unit of Measure	Quantity	Unit Price	Total Cost
1	619.1000	Mobilization, Bonds, and Insurance (~7%)	LS	1	\$19,000	\$19,000
2	206.2000	Grading and Excavation for Structures Culverts (structure)	CY	2,176	\$42.00	\$91,392
3	628.1104	Erosion Log, 12-Inch	LF	240	\$12.20	\$2,928
4	628.7504	Ditch Checks	LF	450	\$17.40	\$7,830
5	SP	6" Topsoil Restoration, w/ Class 1, Urban, Type B Erosion Mat	SY	3,654	\$6.10	\$22,288
6	630.0140	Turfgrass Seed Mix	SY	3,654	\$2.50	\$9,134
7	SP	Removing Asphaltic Surface	SY	289	\$10.50	\$3,038
8	SP	HMA Pavement 4MT 58-28S	SY	289	\$105.00	\$30,380
9	SP	Base Aggregate Dense 3/4-inch	TON	72	\$123.00	\$8,808
10	SP	3/8" Crushing Stone Chip	CY	195	\$54.00	\$10,543
11	SP	Traffic Control/Safety Practices	LS	1	\$7,500.00	\$7,500
12	203.0100	Remove Existing Culverts and Endwalls	EACH	12	\$1,050.00	\$12,600
13	SP	Construction Staking Storm Sewer	LS	1	\$750.00	\$750
14	SP	Reinforced Concrete Box Culvert, 3' x 4'	LF	21	\$525.00	\$11,025
15	521.3118	Culvert Pipe Corrugated Steel 18-Inch	LF	42	\$69.00	\$2,898
16	521.3749	Pipe Arch Corrugated Steel 49x33-Inch	LF	205	\$158.00	\$32,390
17	521.3742	Pipe Arch Corrugated Steel 42x29-Inch	LF	82	\$126.00	\$10,332
18	SP	Apron Endwalls for Reinforced Concrete Box Culvert	EACH	2	\$1,500.00	\$3,000
19	521.1018	Apron Endwall for Culvert Pipe Steel 18-inch	EACH	2	\$387.00	\$774
20	521.1217	Apron Endwall for Pipe Arch Steel 17x13-Inch	EACH	2	\$344.00	\$688
21	521.1242	Apron Endwall for Pipe Arch Steel 42x29-Inch	EACH	4	\$711.00	\$2,844
22	521.1249	Apron Endwall for Pipe Arch Steel 49x33-Inch	EACH	14	\$1,100.00	\$15,400

Total Opinion of Probable Construction Cost **\$306,000**
Surveying & Design Engineering (~10%) **\$31,000**
Contingency (~15%) **\$51,000**

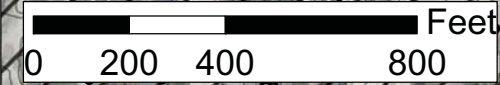
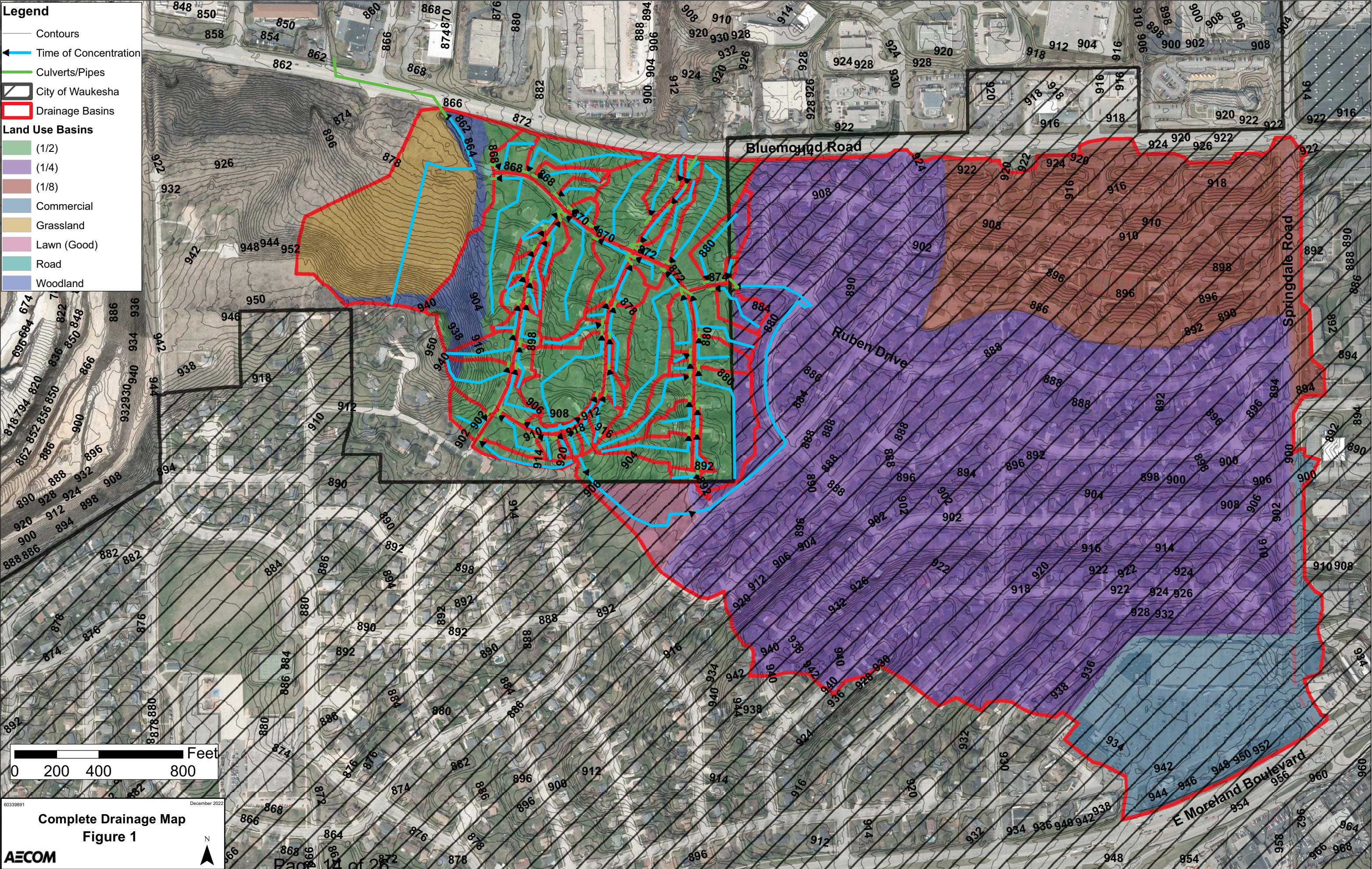
Total Opinion of Probable Surveying, Engineering Design, Construction, and Administration/Inspection Cost Estimate **\$390,000**

Legend

- Contours
- Time of Concentration
- Culverts/Pipes
- City of Waukesha
- Drainage Basins

Land Use Basins

- (1/2)
- (1/4)
- (1/8)
- Commercial
- Grassland
- Lawn (Good)
- Road
- Woodland



Legend

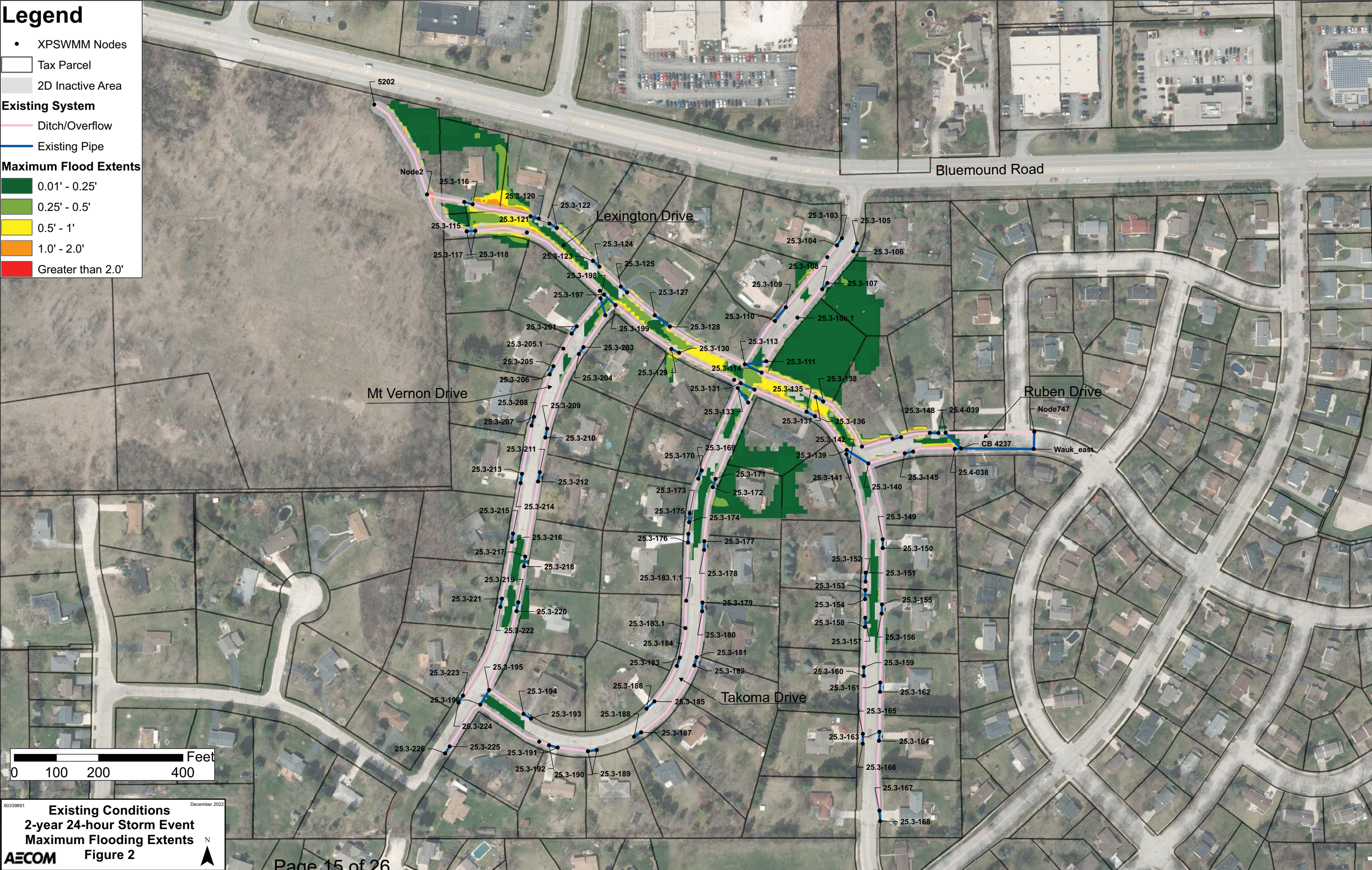
- XPSWMM Nodes
- Tax Parcel
- 2D Inactive Area

Existing System

- Ditch/Overflow
- Existing Pipe

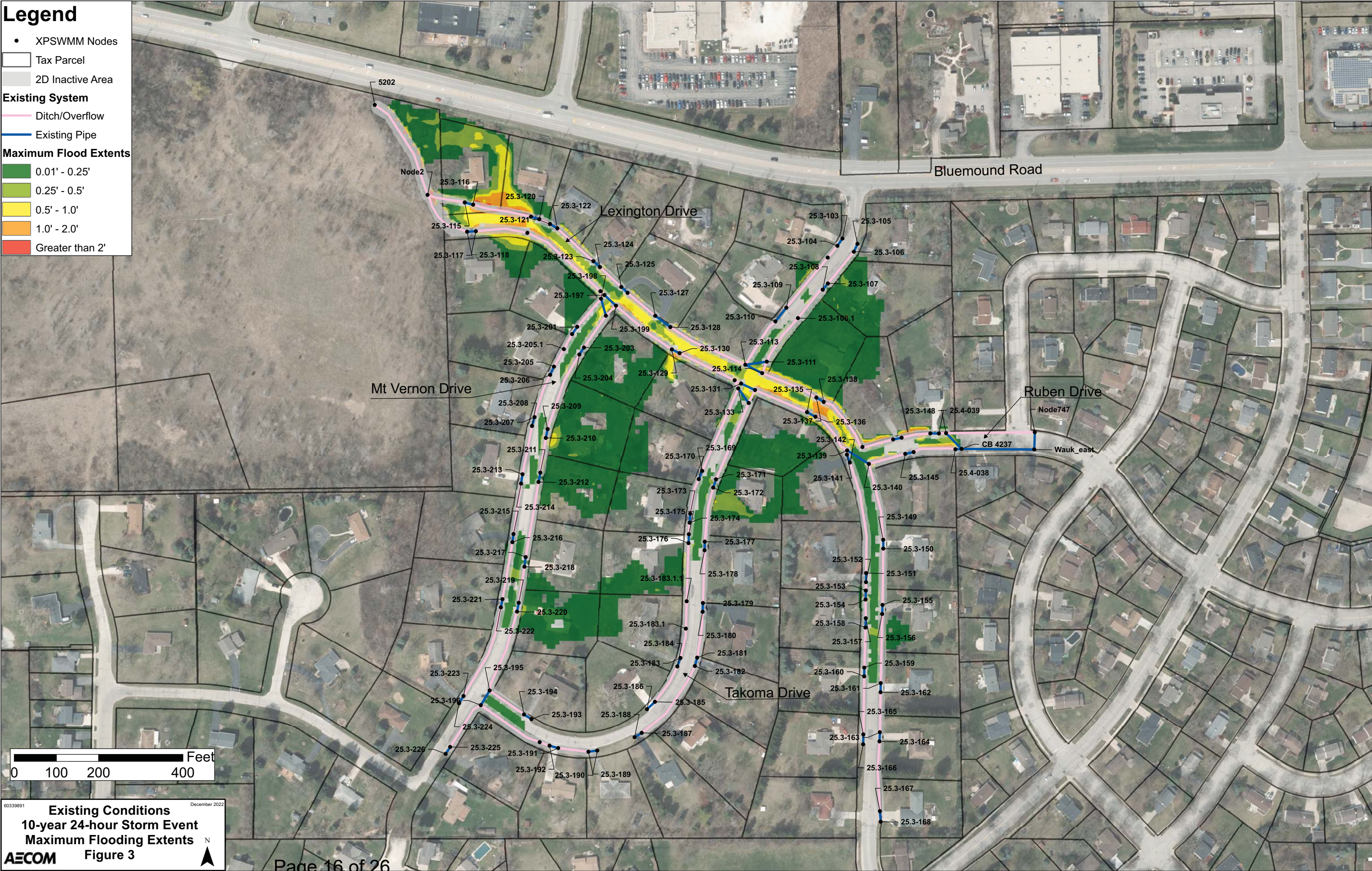
Maximum Flood Extents

- 0.01' - 0.25'
- 0.25' - 0.5'
- 0.5' - 1'
- 1.0' - 2.0'
- Greater than 2.0'



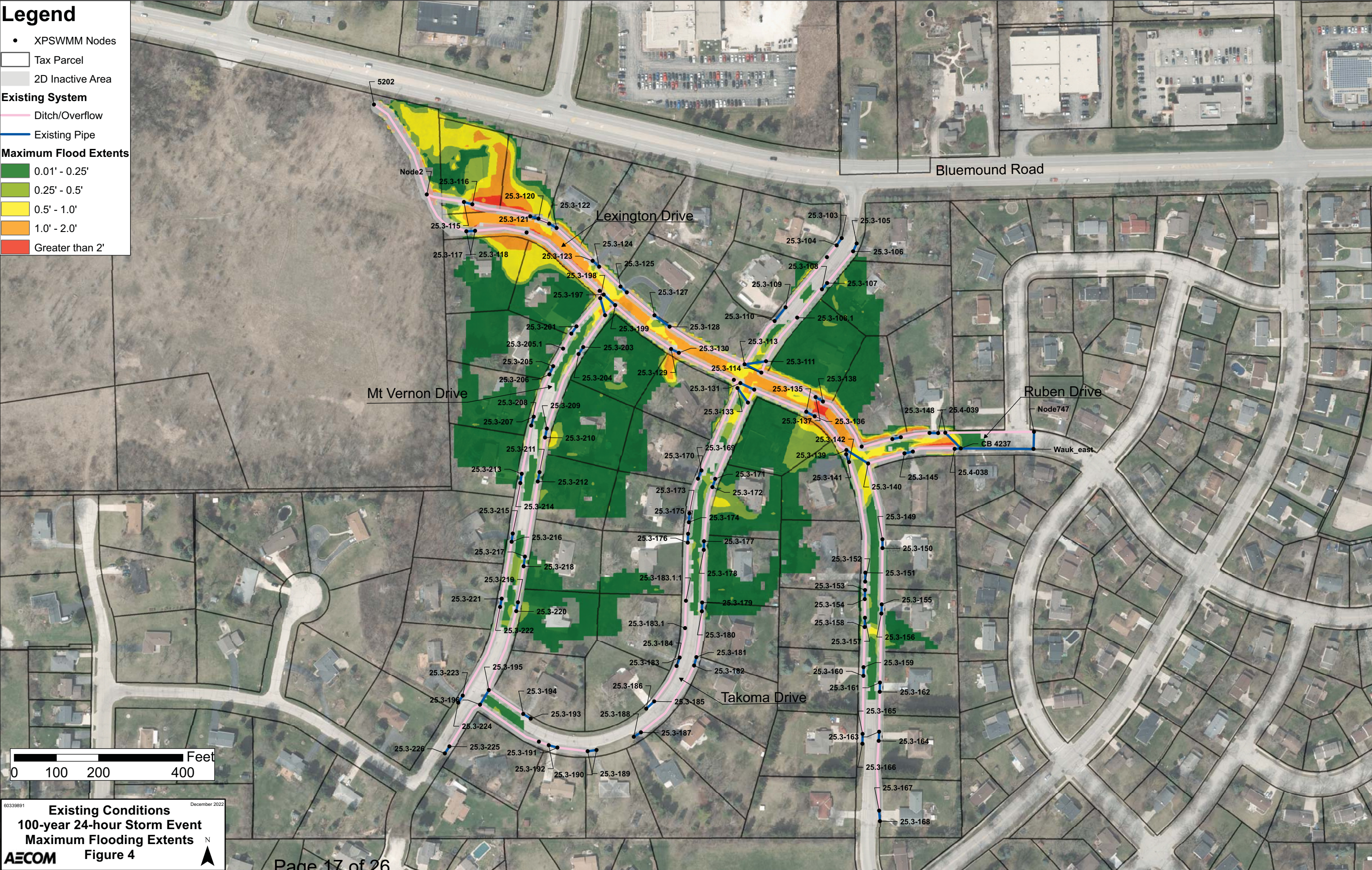
Legend

- XPSWMM Nodes
- Tax Parcel
- 2D Inactive Area
- Existing System**
 - Ditch/Overflow
 - Existing Pipe
- Maximum Flood Extents**
 - 0.01' - 0.25'
 - 0.25' - 0.5'
 - 0.5' - 1.0'
 - 1.0' - 2.0'
 - Greater than 2'



Legend

- XPSWMM Nodes
- Tax Parcel
- 2D Inactive Area
- Existing System**
 - Ditch/Overflow
 - Existing Pipe
- Maximum Flood Extents**
 - 0.01' - 0.25'
 - 0.25' - 0.5'
 - 0.5' - 1.0'
 - 1.0' - 2.0'
 - Greater than 2'



0 100 200 400 Feet

Legend

- XPSWMM Nodes

☐ Tax Parcel

2D Inactive Area

Alternative 1 System

— Alternative 1 Pipe

— Ditch/Overflow

— Existing Pipe

— Regrade Ditch

— Replace Pipe in Kind

Upsize Pipe

Maximum Flood Extents

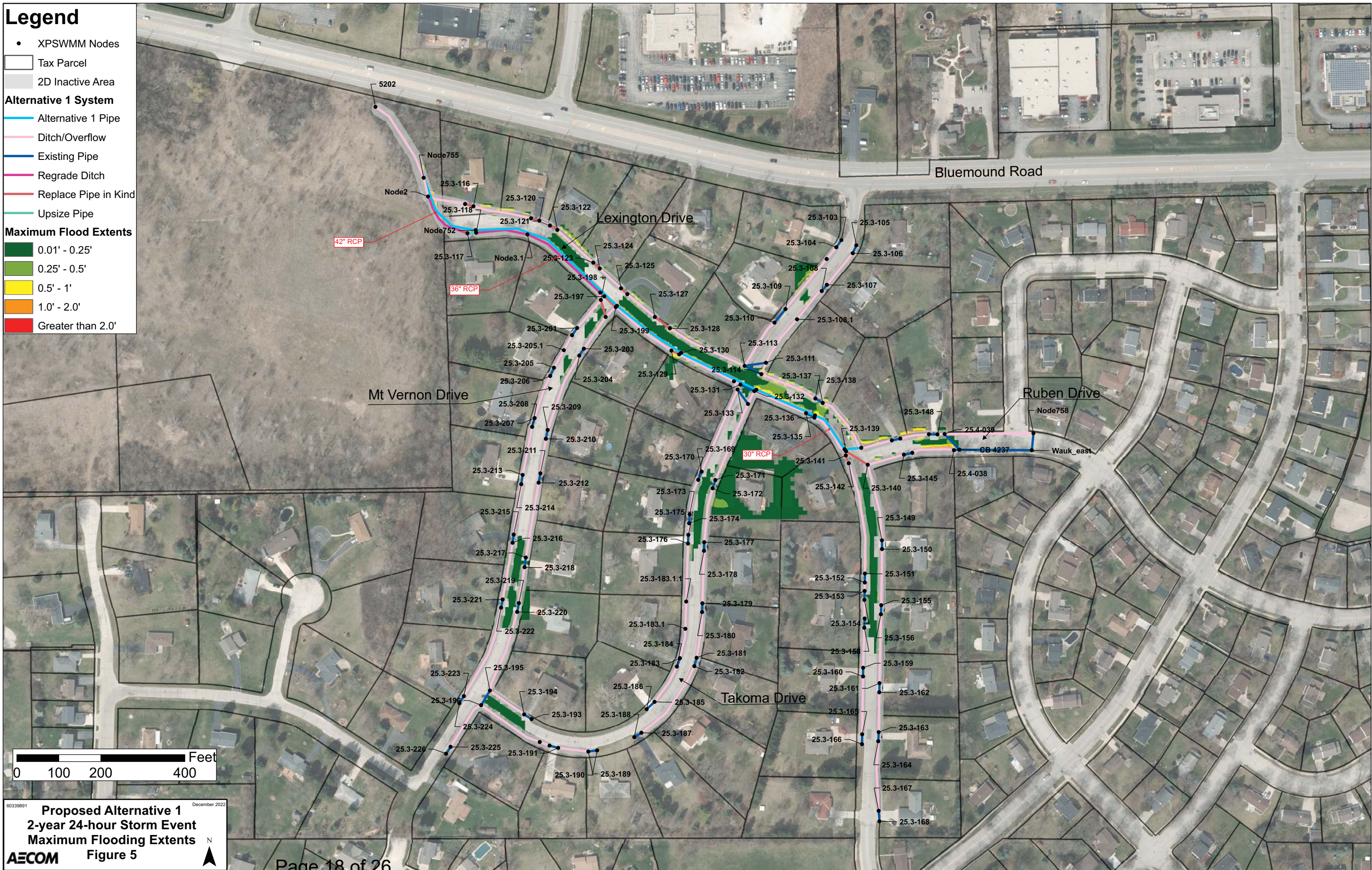
0.01' - 0.25'

0.25' - 0.5'

0.5' - 1'

1.0' - 2.0'

Greater than 2.0'



80339891 **Proposed Alternative 1** December 2022
2-year 24-hour Storm Event
Maximum Flooding Extents
Figure 5



Legend

- XPSWMM Nodes

☐ Tax Parcel

2D Inactive Area

Alternative 1 System

— Alternative 1 Pipe

— Ditch/Overflow

— Existing Pipe

— Regrade Ditch

— Replace Pipe in Kind

— Upsize Pipe

Maximum Flood Extents

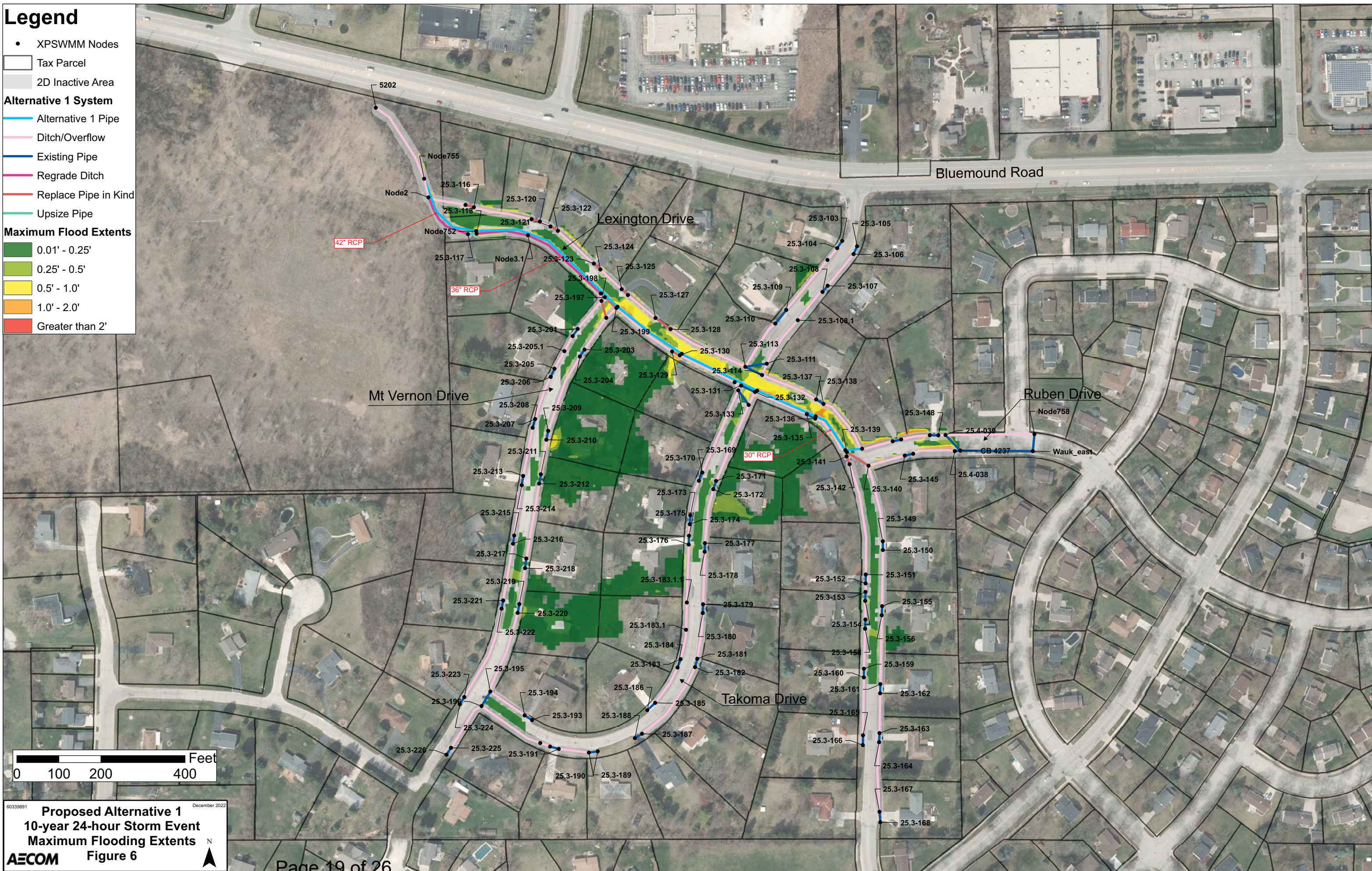
0.01' - 0.25'

0.25' - 0.5'

0.5' - 1.0'

1.0' - 2.0'

Greater than 2'

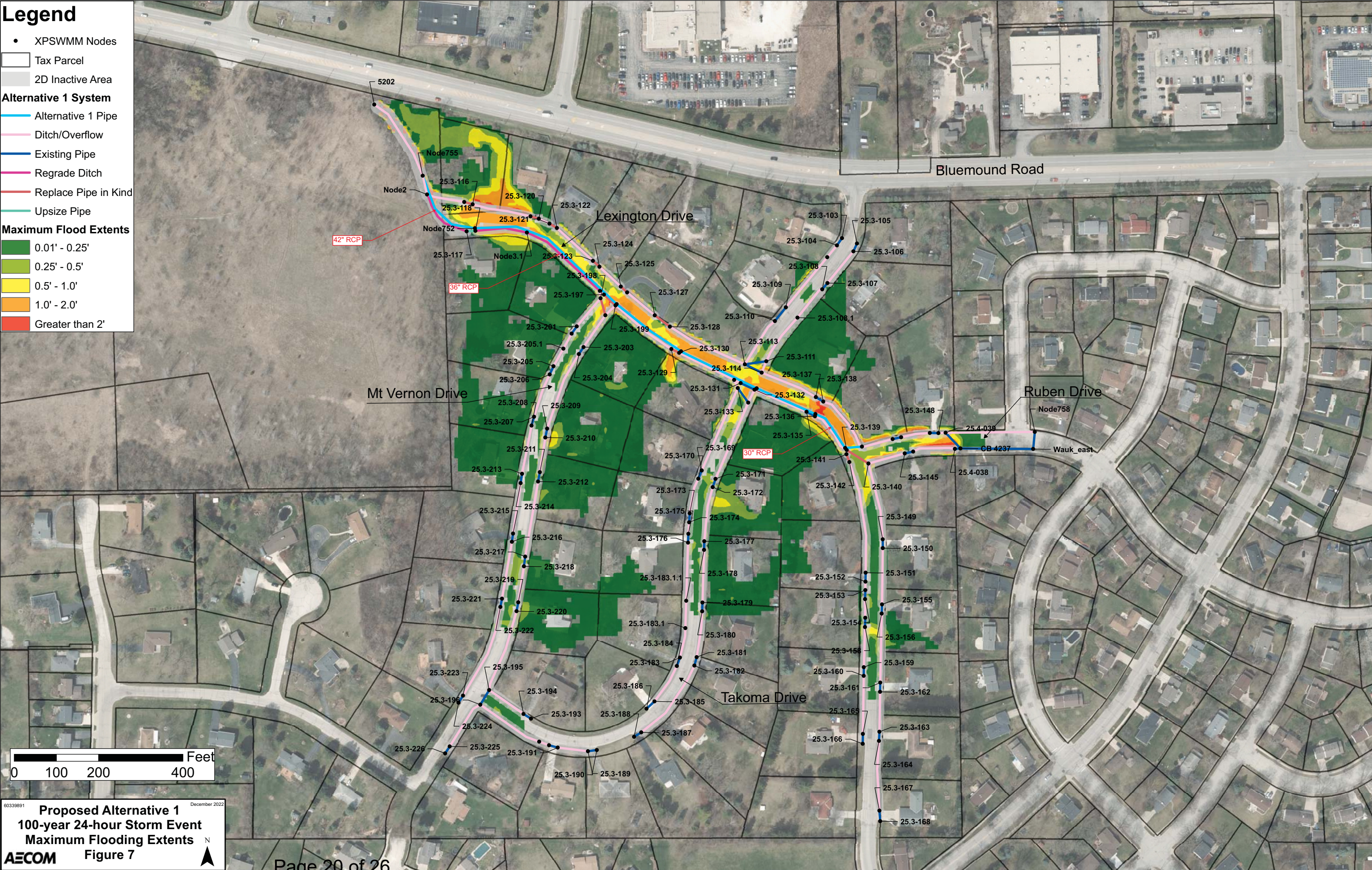


A scale bar labeled "Feet" with markings at 0, 100, 200, and 400. A white rectangular segment is highlighted between the 100 and 200 marks.

60339891 **Proposed Alternative 1** December 2022
10-year 24-hour Storm Event
Maximum Flooding Extents
Figure 6

Legend

- XPSWMM Nodes
- Tax Parcel
- 2D Inactive Area
- Alternative 1 System**
 - Alternative 1 Pipe
 - Ditch/Overflow
 - Existing Pipe
 - Regrade Ditch
 - Replace Pipe in Kind
 - Upsize Pipe
- Maximum Flood Extents**
 - 0.01' - 0.25'
 - 0.25' - 0.5'
 - 0.5' - 1.0'
 - 1.0' - 2.0'
 - Greater than 2'



Legend

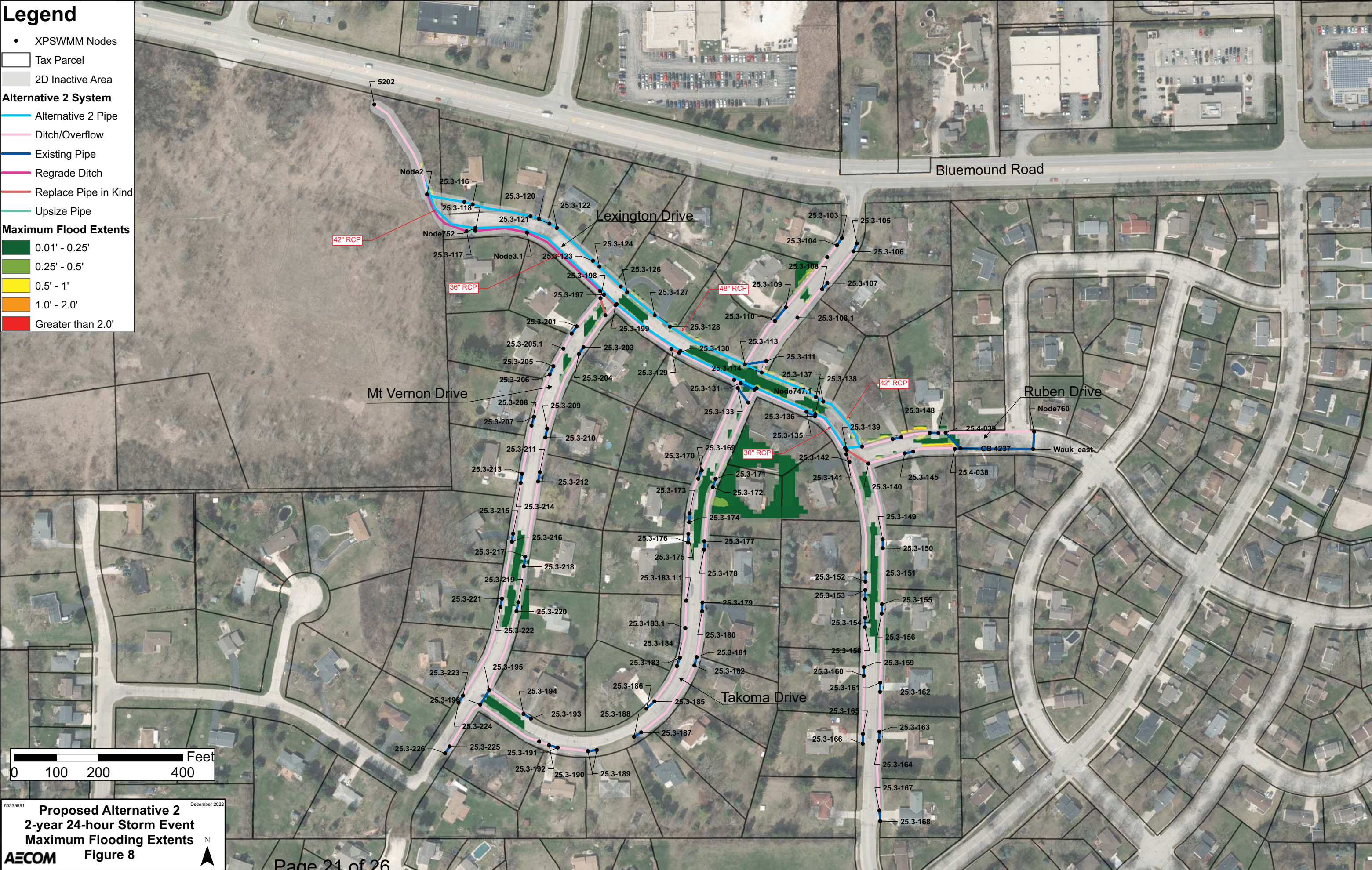
- XPSWMM Nodes
- Tax Parcel
- 2D Inactive Area

Alternative 2 System

- Alternative 2 Pipe
- Ditch/Overflow
- Existing Pipe
- Regrade Ditch
- Replace Pipe in Kind
- Upsize Pipe

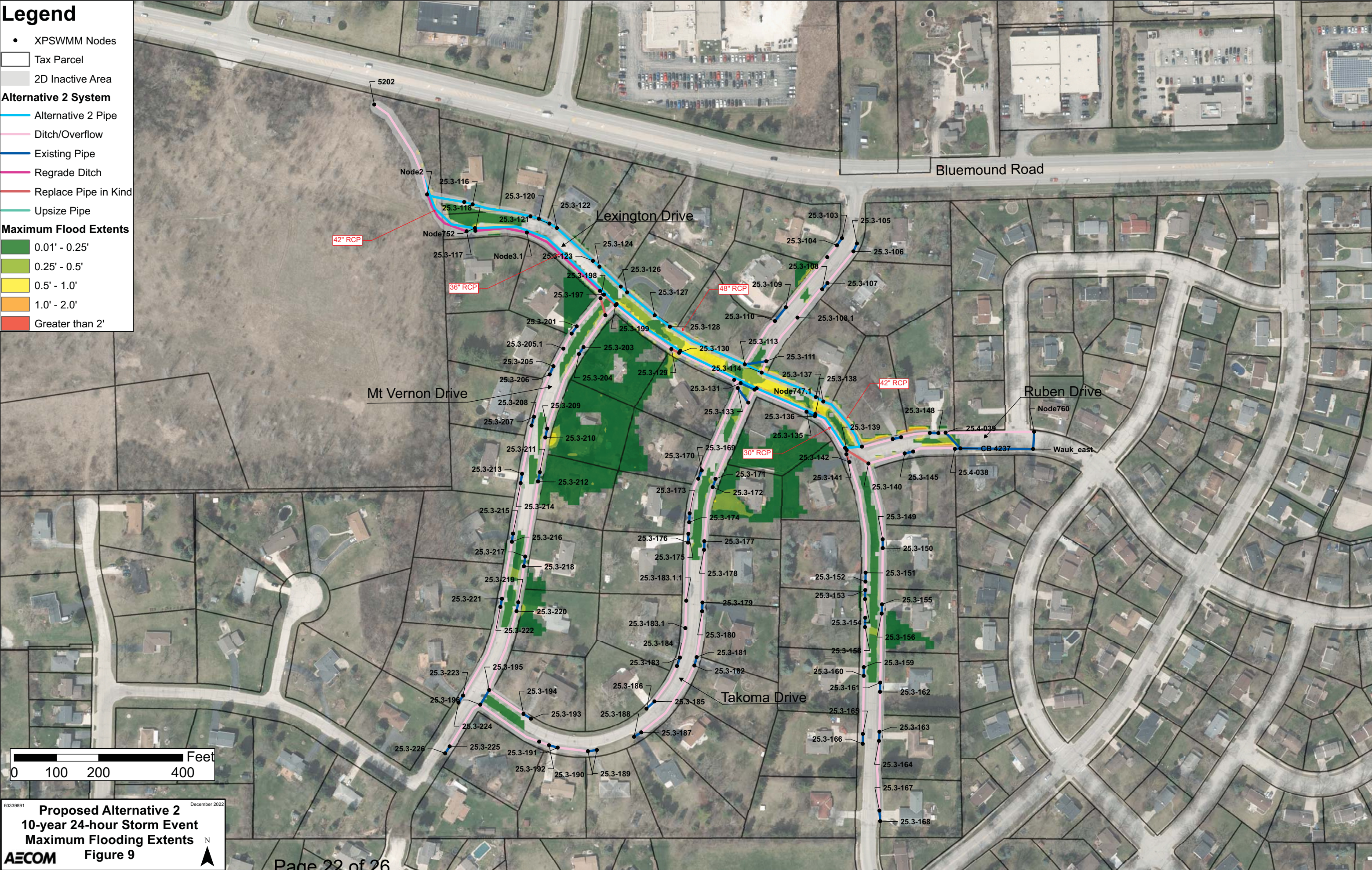
Maximum Flood Extents

- 0.01' - 0.25'
- 0.25' - 0.5'
- 0.5' - 1'
- 1.0' - 2.0'
- Greater than 2.0'



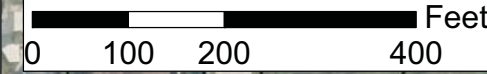
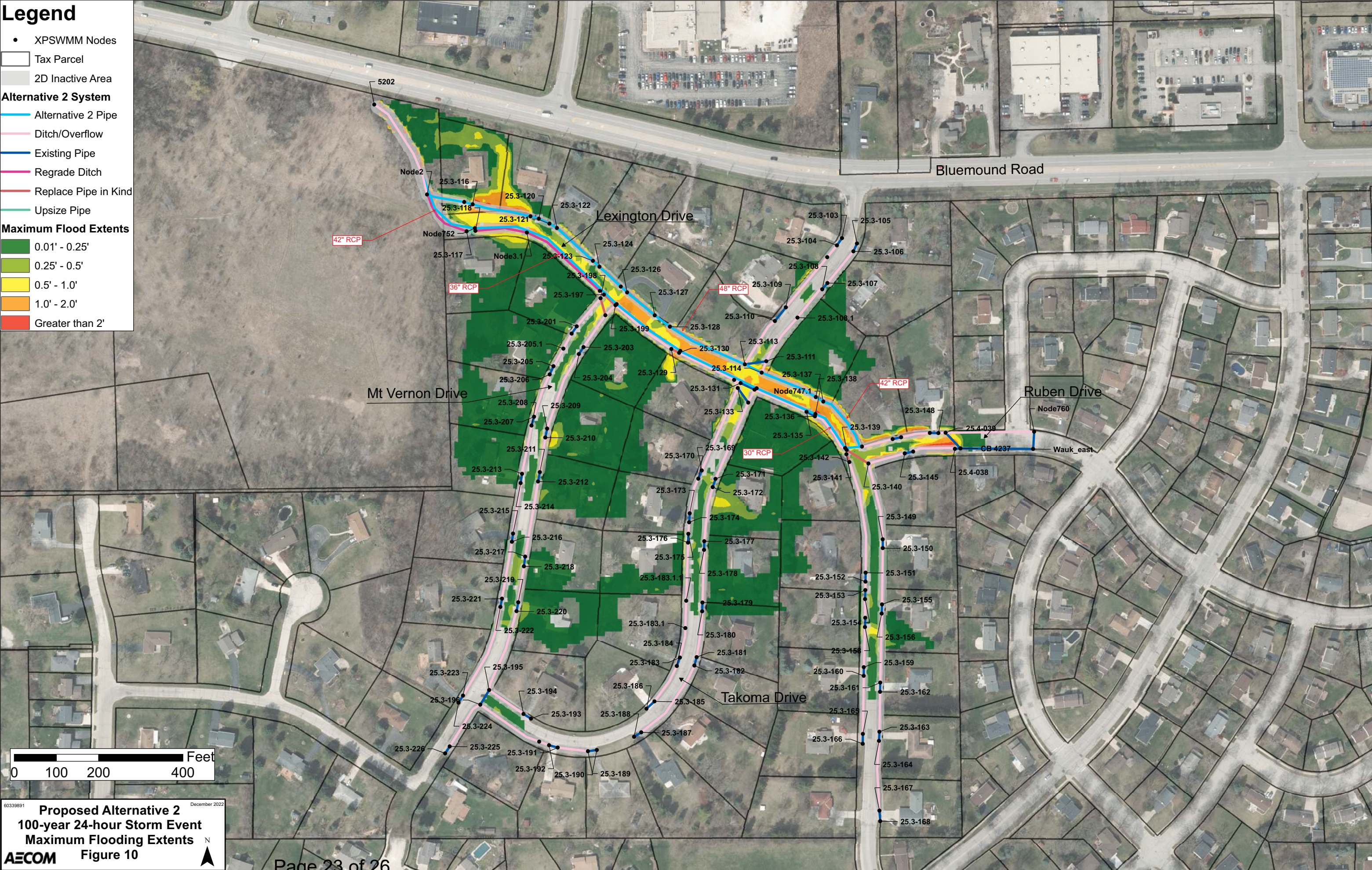
Legend

- XPSWMM Nodes
- Tax Parcel
- 2D Inactive Area
- Alternative 2 System**
 - Alternative 2 Pipe
 - Ditch/Overflow
 - Existing Pipe
 - Regrade Ditch
 - Replace Pipe in Kind
 - Upsize Pipe
- Maximum Flood Extents**
 - 0.01' - 0.25'
 - 0.25' - 0.5'
 - 0.5' - 1.0'
 - 1.0' - 2.0'
 - Greater than 2'



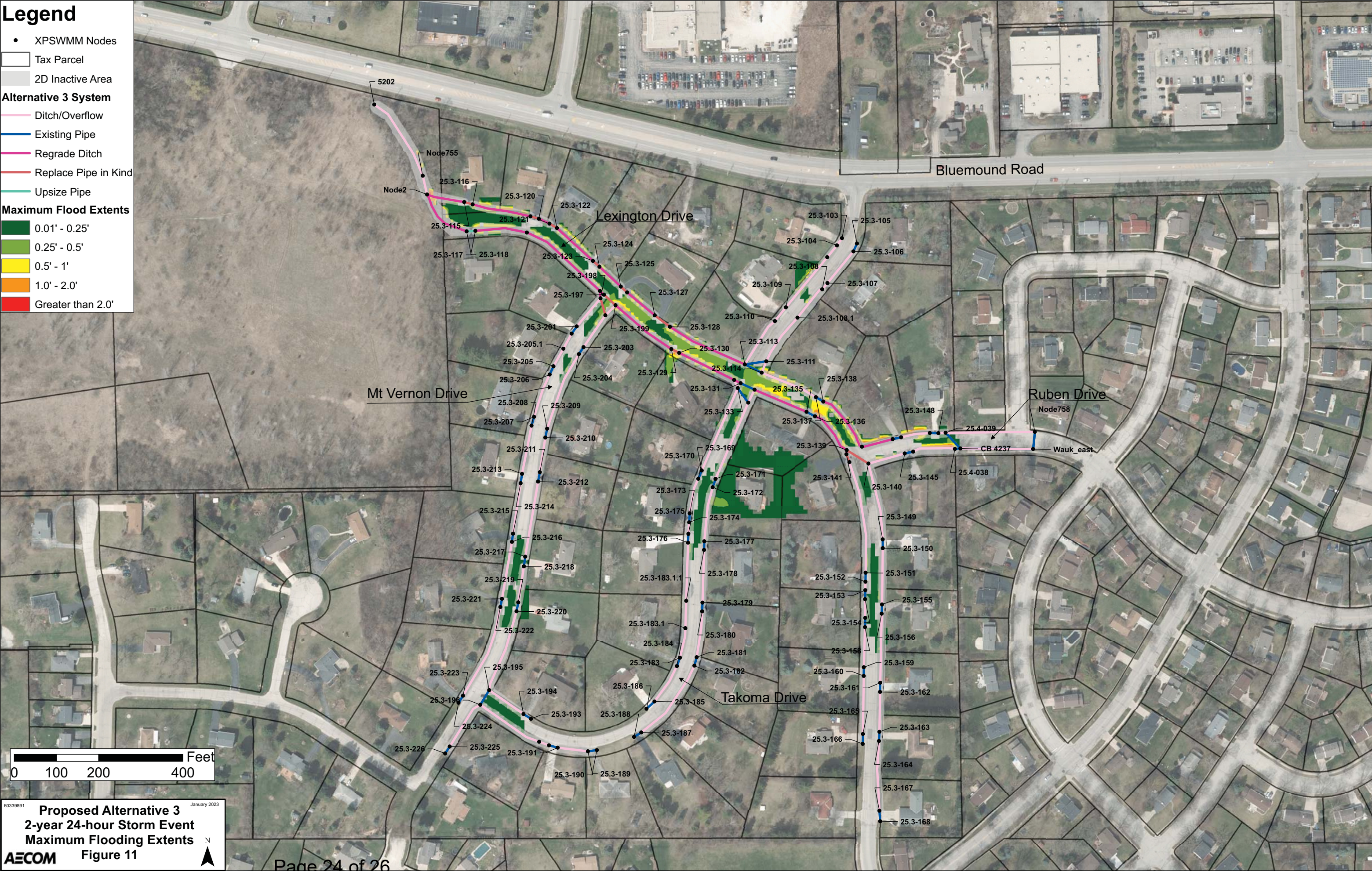
Legend

- XPSWMM Nodes
- Tax Parcel
- 2D Inactive Area
- Alternative 2 System**
 - Alternative 2 Pipe
 - Ditch/Overflow
 - Existing Pipe
 - Regrade Ditch
 - Replace Pipe in Kind
 - Upsize Pipe
- Maximum Flood Extents**
 - 0.01' - 0.25'
 - 0.25' - 0.5'
 - 0.5' - 1.0'
 - 1.0' - 2.0'
 - Greater than 2'



Legend

- XPSWMM Nodes
- Tax Parcel
- 2D Inactive Area
- Alternative 3 System**
 - Ditch/Overflow
 - Existing Pipe
 - Regrade Ditch
 - Replace Pipe in Kind
 - Upsize Pipe
- Maximum Flood Extents**
 - 0.01' - 0.25'
 - 0.25' - 0.5'
 - 0.5' - 1'
 - 1.0' - 2.0'
 - Greater than 2.0'



Legend

- XPSWMM Nodes

☐ Tax Parcel

 2D Inactive Area

Alternative 3 System

— Ditch/Overflow

— Existing Pipe

— Regrade Ditch

— Replace Pipe in Kind

— Upsize Pipe

Maximum Flood Extents

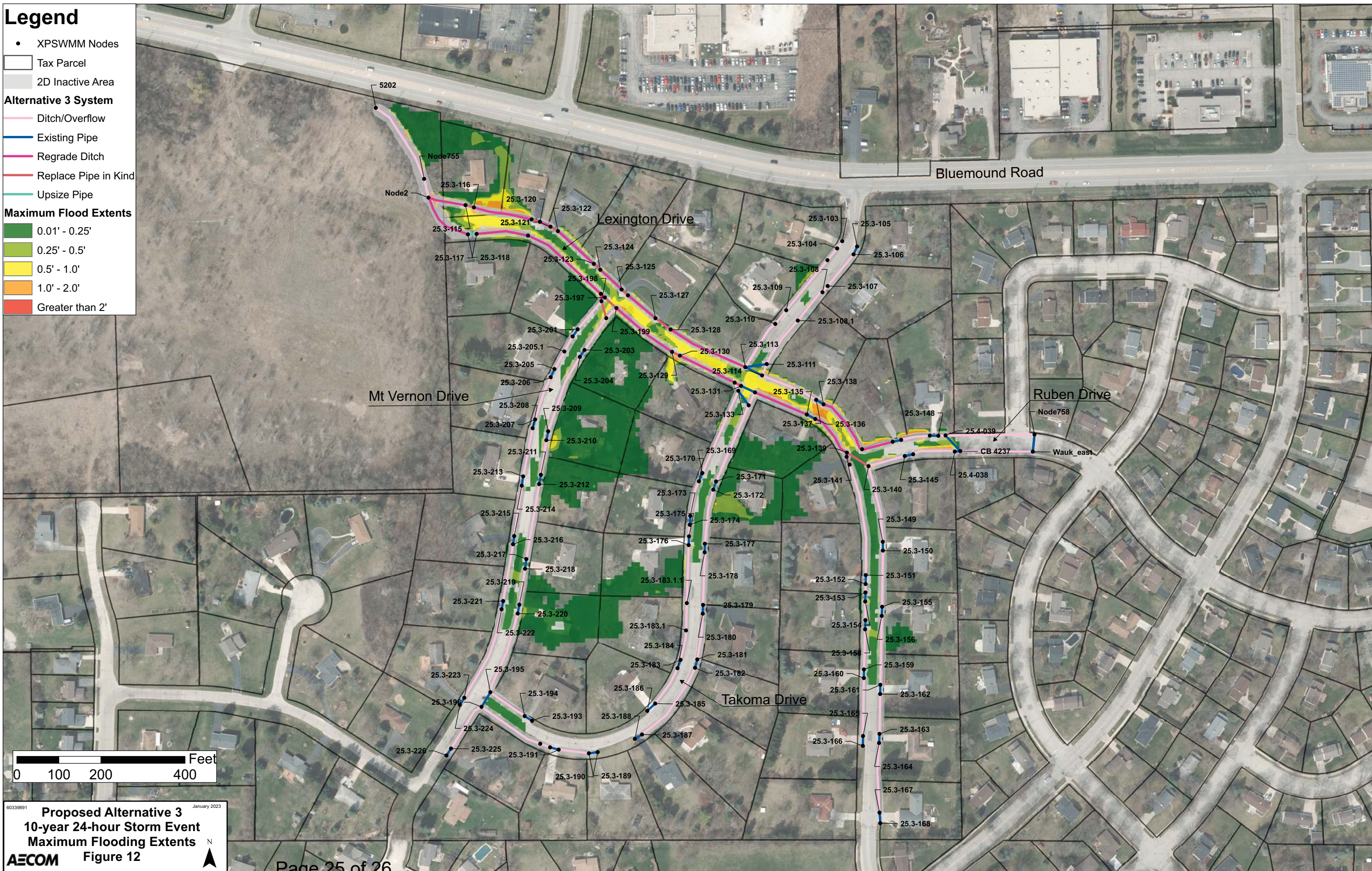
0.01' - 0.25'

 0.25' - 0.5'

0.5' - 1.0'

1.0' - 2.0'

Greater than 2'



A horizontal number line with a black bar above it. The number line has tick marks at 0, 100, 200, and 400. The word "Feet" is written at the right end. The black bar starts at 0 and ends at 200.

60339891 **Proposed Alternative 3** January 2022
10-year 24-hour Storm Event
Maximum Flooding Extents N
AECOM **Figure 12**

Legend

- XPSWMM Nodes

☐ Tax Parcel

2D Inactive Area

Alternative 3 System

— Ditch/Overflow

— Existing Pipe

— Regrade Ditch

— Replace Pipe in Kind

— Upsize Pipe

Maximum Flood Extents

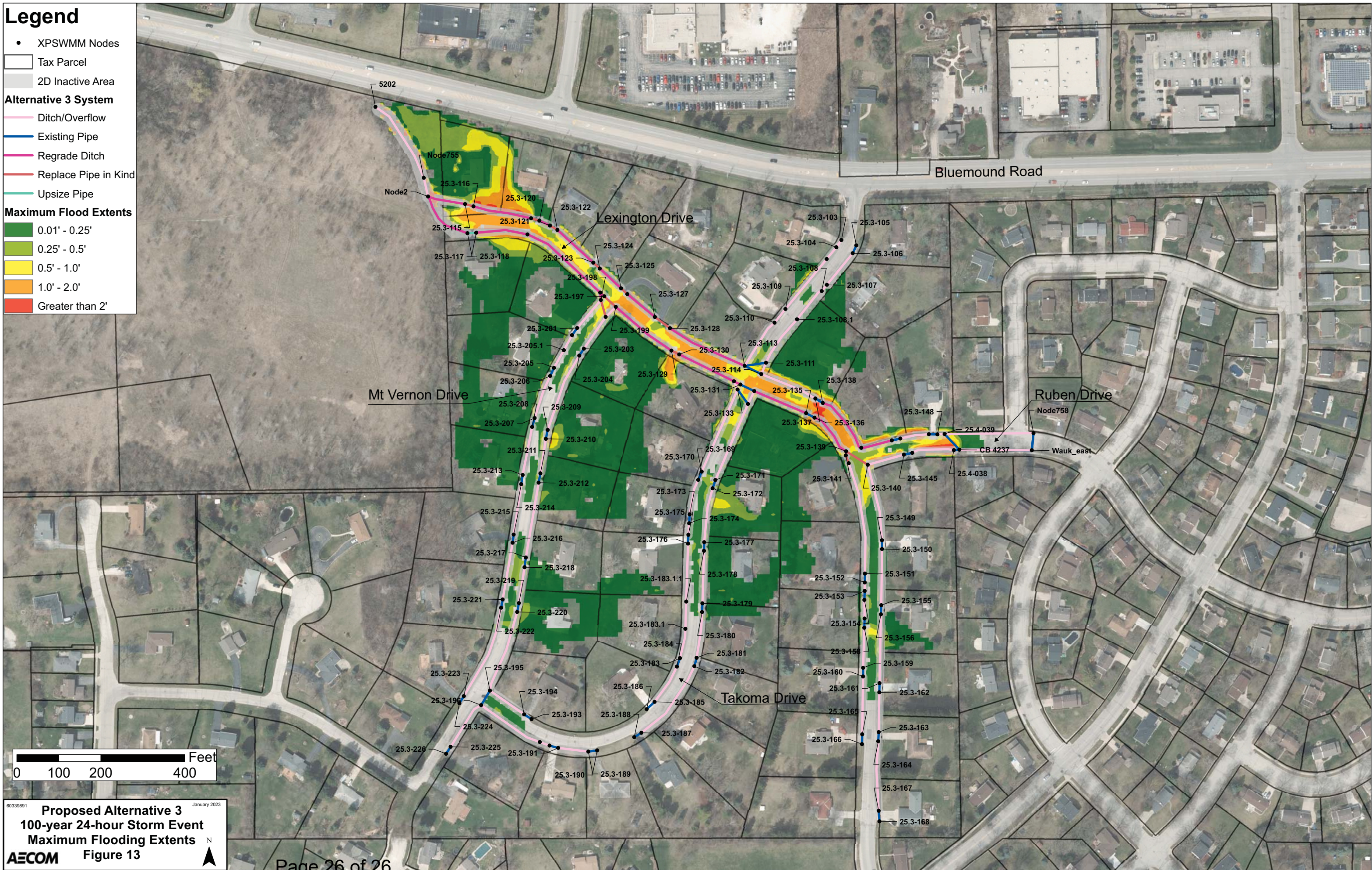
0.01' - 0.25'

0.25' - 0.5'

0.5' - 1.0'

1.0' - 2.0'

Greater than 2'



0339891

January 2020

Proposed Alternative 3
100-year 24-hour Storm Event
Maximum Flooding Extents

AECOM **Figure 13**



CITY OF PEWAUKEE
PUBLIC WORKS COMMITTEE AGENDA ITEM 5.1.

DATE: March 9, 2023

DEPARTMENT: PW - Water/Sewer

PROVIDED BY:

SUBJECT:

Gun Club Lift Station Design

BACKGROUND:

The Gun Club lift station located on Watertown Road across from the Waukesha Gun Club was constructed about 1987. The lift station is considered a “can” station as it is a buried steel structure approximately 35 feet underground. This wet well/dry well station has three flooded suction pumps that are accessed via a service elevator. The pumps pump the sewage from the wet well to the force mains located down the center of Watertown Road.

In 1997, the pumps were upgraded from the original design when the sewer flows increased with the significant development that was taking place at the time. In 2007, the lift station went through another upgrade. Enclosing the original access tube with a prefabricated building that contains the emergency generator, the Motor Control Center (MCC) was moved to ground level rather than at the bottom of the pump chamber. In 2020, the rotating assemblies on two of the pumps were replaced due to wear.

The Gun Club lift station has served us well in the early years, however the life of the steel structure is starting to show its age despite the use of cathodic protection. The MCC and controls are becoming and/or are already obsolete. The pumps and motors are wearing out and the wet well lacks adequate accessibility for cleaning and maintenance of the wet well and level controls.

The Sewer Utility has budgeted \$3.5 million over the next two years to design and build a new structure that will fit the needs of the sewer service area for years to come. The Utility has retained Strand Associates to prepare the designs for a replacement lift station on the existing site. This will allow the Utility to continue operating the existing lift station while the construction takes place on the new lift station, providing more reliable service during construction.

We have asked the consultant to provide a design that will include submersible pumps instead of the flooded suction pumps, a dual chamber wet well (likely four pumps), valve piping not a confined space entry for valve maintenance, enclosed generator and MCC.

We will keep the Committee updated on the design as the process moves forward.

FINANCIAL IMPACT:

RECOMMENDED MOTION:

CITY OF PEWAUKEE
PUBLIC WORKS COMMITTEE AGENDA ITEM 5.2.

DATE: March 9, 2023

DEPARTMENT: PW - Water/Sewer

PROVIDED BY: Jane Mueller

SUBJECT:

Well #1 Motor Failure Feb. 2023

BACKGROUND:

Another motor failure occurred at Well #1 in the early morning hours of February 14, 2023. We experienced failures previously in September 2022, August 2021 (warranty replacement) and March 2021.

Once again, the Utility was unable to determine the cause of the motor failures. The motor control components (variable frequency drive) which would normally be damaged in the event of a surge on the power supply side have not been damaged in any of these events.

Last fall the Utility hired an electrical consultant to review the electrical and control systems in the well house to help us identify the problem and determine how to protect the motors and components moving forward. Unfortunately, we are experiencing some delays in completing the final report. Based on conversations with the consultant, there does not appear to be any obvious deficiency in the controls at the well house. As he considered the entire site, however, there may be some external influence with the towers constructed near the well house. There may be some concerns about the grounding of the towers. We will need to provide additional information for him to review.

Currently the well contractor is onsite working to pull the pump and motor. We hope to have more information once an inspection of the motor can occur.

FINANCIAL IMPACT:

We will not have a definitive cost available until the motor has been pulled from the well. Previous costs ranged from \$44,000-\$56,000, depending on the components that need replacement or repair.

RECOMMENDED MOTION:

Informational Report

CITY OF PEWAUKEE
PUBLIC WORKS COMMITTEE AGENDA ITEM 5.3.

DATE: March 9, 2023

DEPARTMENT: PW - Water/Sewer

PROVIDED BY: Magdelene Wagner/Jane Mueller

SUBJECT:

Discussion and possible action regarding the Water Utility debt repayment to the Sewer Utility.

BACKGROUND:

Prior to 2014, the Water Utility and the Sewer Utility shared financial accounts. During a water rate case in 2014, the Public Service Commission required all water funds since the utilities inception be split from the shared account. In order to complete this, a full audit of the shared account since the inception of the Utilities (late 1970's) was completed to split all revenues, debt, and savings between the Water Utility and the Sewer Utility. When this audit was completed, it was determined that the Water Utility owes the Sewer Utility \$5,312,576.93. At the end of 2022, the Water debt to the Sewer has grown to \$7,404,608.61.

After several years of deciding how to proceed with correcting this issue and the finances of the Utilities, it was determined to complete a Comprehensive Financial Plan, which Baker Tilly recently completed and was presented at the last Public Works Committee meeting. The Financial Plan for the Water Utility created a debt repayment schedule for the full debt over a 20-year period. This equates to approximately \$370,230 annually, in addition to the Water Utility's previous debts, including the latest 2022 debt issuance. With this debt repayment, as well as current and planned future borrowing, the Water Utility is looking to require a water rate increase of 147%, which would likely be implemented over three phases, to become financially stable.

The Financial Plan indicated the Sewer Utility is in very good financial condition now and into the future. The plan did not recommend any future increases for the Sewer Utility at this time, even with some upcoming large projects.

The Water Utility has some very large projects coming up in the next few years related to a well abandonment, water extension for DNR compliance, well relief, and water extension to contaminated ground water areas. These projects are necessary and cannot be delayed, and will add to the current debt of the Water Utility.

With this information, we are reviewing the debt owed to the Sewer Utility and its impacts to the stability of the Water Utility. Staff is looking at four alternatives for your consideration.

1. Pay 100% of the debt back over 20 years, as proposed in the Financial Plan. Annual payment of \$370,230.00
2. Pay 100% of the debt back, but over a much longer period of time (40 to 50 years) to lessen the impact. Annual payment of \$185,115.22 or \$148,092.17, respectively.
3. Forgive 100% of the debt owed to the Sewer Utility. Annual payment of \$0.00.
4. Forgive all debt prior to 2014, when this issue was not known. This would forgive \$5,312,576.93, leaving \$2,092,031.68 to be repaid to the Sewer Utility. Annual payment of \$104,601.58 (20 years), \$69,734.39 (30 years), or

\$52,300.79 (40 years).

FINANCIAL IMPACT:

RECOMMENDED MOTION:

ATTACHMENTS:

Description

Debt Accounting

Alternate 1 Debt Payment Schedule

Alternate 2 and 4 Debt Payment Schedule

01/18/2023

GL ACTIVITY REPORT FOR PEWAUKEE
FROM 650-00145-15000 TO 650-00145-15000
TRANSACTIONS FROM 01/01/2013 TO 01/01/2023

Date	JNL	Typ	Description	Referenc	Debits	Credits	Balance
Fund 650 SEWER UTILITY							
01/01/2013			650-00145-15000 DUE FROM WATER UTILITY	BEG. BALANCE			0.00
01/01/2014			2014 Fiscal Year Begin				0.00
01/01/2015			2015 Fiscal Year Begin				0.00
01/01/2016			2016 Fiscal Year Begin				0.00
05/31/2016	GJ		113-CASH AT 5-31-16		5,312,576.93		5,312,576.93
01/01/2017			2017 Fiscal Year Begin				5,312,576.93
12/31/2017	GJ		AUDIT 19- RECLASS DEBT PMTS		950,593.69		6,263,170.62
01/01/2018			2018 Fiscal Year Begin				6,263,170.62
06/30/2018	GJ		RESERVE FROM RADIUM REMOVAL		59,840.00		6,323,010.62
12/31/2018	GJ		44-ADJ DUE TO SEWER		529,283.78		6,852,294.40
01/01/2019			2019 Fiscal Year Begin				6,852,294.40
12/31/2019	GJ		55-ADJ DUE TO SEWER		636,095.21		7,488,389.61
12/31/2019	GJ		A14-PSC INTEREST REALLOCATION			720,113.00	6,768,276.61
01/01/2020			2020 Fiscal Year Begin				6,768,276.61
12/31/2020	JE	JE	A07-ADJ SEWER ADV FOR 2020 WATER DEBT PY	2015	636,332.00		7,404,608.61
01/01/2021			2021 Fiscal Year Begin				7,404,608.61
01/01/2022			2022 Fiscal Year Begin				7,404,608.61
01/01/2023			2023 Fiscal Year Begin				7,404,608.61
01/01/2023			650-00145-15000	END BAL	8,124,721.61	720,113.00	7,404,608.61
							2,812,144.68
Total Debt (2016&217) - PSC adjusment (2019)					6,263,170.62		720,113.00

CITY OF PEWAUKEE (WISCONSIN) UTILITIES

SCHEDULE OF COMBINED OUTSTANDING BOND AMORTIZATION - WATER UTILITY

Bond Year	2012 Bonds	2013 Bonds	2016 Bonds	2018 Bonds	2022 Bonds	Interfund Sewer Loan (1)	Totals
2022	\$90,019.92	\$286,133.76	\$155,680.00	\$104,150.00	\$ -	\$ -	\$635,983.68
2023	89,589.82	286,733.76	153,380.00	101,750.00	374,975.00	370,230.00	1,376,658.58
2024	87,869.42	287,233.76	151,080.00	99,350.00	376,475.00	370,230.00	1,372,238.18
2025	-	287,633.76	153,780.00	102,550.00	372,600.00	370,230.00	1,286,793.76
2026	-	287,933.76	156,380.00	100,600.00	368,475.00	370,230.00	1,283,618.76
2027	-	287,893.76	153,880.00	98,650.00	364,100.00	370,230.00	1,274,753.76
2028	-	287,075.00	156,380.00	101,700.00	364,350.00	370,230.00	1,279,735.00
2029	-	285,825.00	153,780.00	104,600.00	359,225.00	370,230.00	1,273,660.00
2030	-	289,450.00	156,180.00	97,350.00	353,850.00	370,230.00	1,267,060.00
2031	-	286,500.00	153,480.00	100,075.00	348,225.00	370,230.00	1,258,510.00
2032	-	288,435.94	155,780.00	97,637.50	347,225.00	370,230.00	1,259,308.44
2033	-	-	152,840.00	100,200.00	345,725.00	370,230.00	968,995.00
2034	-	-	154,900.00	102,000.00	343,725.00	370,230.00	970,855.00
2035	-	-	151,637.50	98,600.00	342,500.00	370,230.00	962,967.50
2036	-	-	153,375.00	100,200.00	342,100.00	370,230.00	965,905.00
2037	-	-	-	96,600.00	341,300.00	370,230.00	808,130.00
2038	-	-	-	78,000.00	345,000.00	370,230.00	793,230.00
2039	-	-	-	-	343,200.00	370,230.00	713,430.00
2040	-	-	-	-	345,900.00	370,230.00	716,130.00
2041	-	-	-	-	348,000.00	370,230.00	718,230.00
2042	-	-	-	-	290,700.00	370,239.00	660,939.00
Totals	<u>\$267,479.16</u>	<u>\$3,160,848.50</u>	<u>\$2,312,532.50</u>	<u>\$1,684,012.50</u>	<u>\$7,017,650.00</u>	<u>\$7,404,609.00</u>	<u>\$21,847,131.66</u>

(1) Assumes the loan from the sewage works is repaid over 20 years with the 1st payment being made in 2022. This loan is assumed to be principal only.

(See Accountants' Forecast and Compilation Report and the accompanying
summary of accounting policies.)

Water Utility repayment schedule

Alt 2	Total due	\$7,404,608.61
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40 year repayment		50 year repayment	
2023	\$185,115.22	2023	\$148,092.17
2024	\$185,115.22	2024	\$148,092.17
2025	\$185,115.22	2025	\$148,092.17
2026	\$185,115.22	2026	\$148,092.17
2027	\$185,115.22	2027	\$148,092.17
2028	\$185,115.22	2028	\$148,092.17
2029	\$185,115.22	2029	\$148,092.17
2030	\$185,115.22	2030	\$148,092.17
2031	\$185,115.22	2031	\$148,092.17
2032	\$185,115.22	2032	\$148,092.17
2033	\$185,115.22	2033	\$148,092.17
2034	\$185,115.22	2034	\$148,092.17
2035	\$185,115.22	2035	\$148,092.17
2036	\$185,115.22	2036	\$148,092.17
2037	\$185,115.22	2037	\$148,092.17
2038	\$185,115.22	2038	\$148,092.17
2039	\$185,115.22	2039	\$148,092.17
2040	\$185,115.22	2040	\$148,092.17
2041	\$185,115.22	2041	\$148,092.17
2042	\$185,115.22	2042	\$148,092.17
2043	\$185,115.22	2043	\$148,092.17
2044	\$185,115.22	2044	\$148,092.17
2045	\$185,115.22	2045	\$148,092.17
2046	\$185,115.22	2046	\$148,092.17
2047	\$185,115.22	2047	\$148,092.17
2048	\$185,115.22	2048	\$148,092.17
2049	\$185,115.22	2049	\$148,092.17
2050	\$185,115.22	2050	\$148,092.17
2051	\$185,115.22	2051	\$148,092.17
2052	\$185,115.22	2052	\$148,092.17
2053	\$185,115.22	2053	\$148,092.17
2054	\$185,115.22	2054	\$148,092.17
2055	\$185,115.22	2055	\$148,092.17
2056	\$185,115.22	2056	\$148,092.17
2057	\$185,115.22	2057	\$148,092.17
2058	\$185,115.22	2058	\$148,092.17
2059	\$185,115.22	2059	\$148,092.17
2060	\$185,115.22	2060	\$148,092.17
2061	\$185,115.22	2061	\$148,092.17
2062	\$185,115.22	2062	\$148,092.17
	\$7,404,608.61	2063	\$148,092.17
		2064	\$148,092.17
		2065	\$148,092.17
		2066	\$148,092.17
		2067	\$148,092.17
		2068	\$148,092.17
		2069	\$148,092.17
		2070	\$148,092.17
		2071	\$148,092.17
		2072	\$148,092.17
			\$7,404,608.61

Alt 3	Total due	\$2,092,031.68
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20 year repayment		30 year repayment		40 year repayment	
2023	\$104,601.58	2023	\$69,734.39	2023	\$52,300.79
2024	\$104,601.58	2024	\$69,734.39	2024	\$52,300.79
2025	\$104,601.58	2025	\$69,734.39	2025	\$52,300.79
2026	\$104,601.58	2026	\$69,734.39	2026	\$52,300.79
2027	\$104,601.58	2027	\$69,734.39	2027	\$52,300.79
2028	\$104,601.58	2028	\$69,734.39	2028	\$52,300.79
2029	\$104,601.58	2029	\$69,734.39	2029	\$52,300.79
2030	\$104,601.58	2030	\$69,734.39	2030	\$52,300.79
2031	\$104,601.58	2031	\$69,734.39	2031	\$52,300.79
2032	\$104,601.58	2032	\$69,734.39	2032	\$52,300.79
2033	\$104,601.58	2033	\$69,734.39	2033	\$52,300.79
2034	\$104,601.58	2034	\$69,734.39	2034	\$52,300.79
2035	\$104,601.58	2035	\$69,734.39	2035	\$52,300.79
2036	\$104,601.58	2036	\$69,734.39	2036	\$52,300.79
2037	\$104,601.58	2037	\$69,734.39	2037	\$52,300.79
2038	\$104,601.58	2038	\$69,734.39	2038	\$52,300.79
2039	\$104,601.58	2039	\$69,734.39	2039	\$52,300.79
2040	\$104,601.58	2040	\$69,734.39	2040	\$52,300.79
2041	\$104,601.58	2041	\$69,734.39	2041	\$52,300.79
2042	\$104,601.58	2042	\$69,734.39	2042	\$52,300.79
	\$2,092,031.68	2043	\$69,734.39	2043	\$52,300.79
		2044	\$69,734.39	2044	\$52,300.79
		2045	\$69,734.39	2045	\$52,300.79
		2046	\$69,734.39	2046	\$52,300.79
		2047	\$69,734.39	2047	\$52,300.79
		2048	\$69,734.39	2048	\$52,300.79
		2049	\$69,734.39	2049	\$52,300.79
		2050	\$69,734.39	2050	\$52,300.79
		2051	\$69,734.39	2051	\$52,300.79
		2052	\$69,734.39	2052	\$52,300.79
			\$2,092,031.68	2053	\$52,300.79
				2054	\$52,300.79
				2055	\$52,300.79
				2056	\$52,300.79
				2057	\$52,300.79
				2058	\$52,300.79
				2059	\$52,300.79
				2060	\$52,300.79
				2061	\$52,300.79
				2062	\$52,300.79
					\$2,092,031.68