Stormwater Management Committee

Meeting Agenda
Wednesday, August 29, 2018
Leawood City Hall
Main Conference Room
4800 Town Center Drive
Leawood, KS 66211
7:30 AM to 9:00 AM

WELCOME AND INTRODUCTIONS

OLD BUSINESS:

1. Review/Approve Minutes from last meeting of May 30, 2018.

NEW BUSINESS:

2. Stormwater concerns at 9849 Sagamore

ADJOURN

MISSION STATEMENT
To recommend to the Governing Body how to enhance the stormwater policy; and to provide a forum for citizens, staff and Council to discuss and study stormwater concerns and issues.

~ 2018 APPOINTMENTS- STORMWATER COMMITTEE MEMBERS ~
James Azeltine, Chair, City Council Member Ward 4
Debra Filla, Vice-Chair, City Council Member Ward 1
Lisa Harrison, City Council Member Ward 3
Mary Larson, City Council Member Ward 2
Skip Johnson….John Kahl….Carole Lechevin
David Lindley….Curt Talcott….William "Bill" Ramsey

If you require any accommodation (i.e. qualified interpreter, hearing assistance, etc.) in order to attend this meeting, please notify this office at (913)339-6700, x130 no later than 48 hours prior to the scheduled commencement of the meeting.

MINUTES of the
STORMWATER MANAGEMENT COMMITTEE
Meeting of: Wednesday, May 30, 2018
Leawood City Hall, Main Conference Room

COMMITTEE MEMBERS PRESENT:
James Azeltine, CHAIR and Councilmember Ward 4
Debra Filla, Vice Chair and Councilmember Ward 1
Lisa Harrison, Councilmember Ward 3
Skip Johnson
John Kahl
Mary Larson, Councilmember Ward 2
Carole Lechevin
David Lindley
Bill Ramsey

COMMITTEE MEMBERS ABSENT:
Curt Talcott

STAFF PRESENT:
David Ley, P.E., Director of Public Works
Julie Stasi, Admin. Services Manager, Sr.

CALL TO ORDER: Chair Azeltine called the meeting to order at 7:30 A.M.

FIRST ITEM OF BUSINESS: Previous Meeting Minutes
ACTION: Mary Larson made a Motion to approve the Minutes of March 28, 2018, as written. Lisa Harrison seconded the Motion to approve. All members in attendance were in favor. Motion passed; Minutes approved.

SECOND ITEM OF BUSINESS: Review draft map of creek areas discussed at our last meeting. Private vs City Owned areas of maintenance.
David Ley-Earlier this year the Stormwater Committee asked Public Works to create a map that indicated the private and public maintained creeks throughout the City. Staff has completed the maps and wanted to bring them back for Committee input and any changes or additions that they think need to be made. Staff calculated approximately 284,000 linear feet of streams; 91,000 approximately Leawood maintains, privately maintained would be about 183,000 linear feet and 10,000 linear feet of streams are maintained by either KDOT or an adjacent city/property owner. In review there were a few suggestions:

- Lakes could be named to show which are privately or publicly maintained. (Currently they are just shown as a blue lake).
- Creek lines could be bolder.
- There are 10 sheets for each section of the City. Staff decided to name each sheet by the boundary locations and not "Sheet 1 through 10".
- Talked about having the "Creek Policy" listed on each map.
- The storm sewer system is shown on the maps as grey in color, we need to change the color a bit. It can become confusing with all the other information.
- Need addresses and street names throughout.
- Show Tributary/Watershed Names of each Creek Branch to raise awareness.

Eventually we would like the maps on the City's Web site, maybe with tips for people who live on creeks with what maintenance is required and by whom. Committee members also advised realtors would be a good group to contact to get the word out and the next Homes Owners Association meeting. Desire would be to explain to citizens who owns the creeks, who maintains them and tips on who to call etc. for assistance or what the City can or cannot help with. Suggestion also to contact the Chamber of Commerce for providing information on contractors

that are licensed or rated well with the Better Business Bureau. Once tweaked staff should present at a Staff Meeting/City Administrator before posting on the Website.

Questions:
Lisa Harrison-What causes little sections to be public while being surrounded by private areas?
David Ley-North of I-435, most of the public maintained creeks were flood improvement projects, flood control projects. Example the DB24 Project goes from Wenonga, north of 83rd Street and down approximately Lee Boulevard. The City went in and constructed flood prevention. We made a vegetation area in order to lower the 100 year elevation. Another project was a box culvert project again to lower the water surface elevations to decrease flooding. Another one started at State Line Road we installed a box culvert. Most of it was open channel prior to the project and we did improvements downstream. These are all residential.

Lisa Harrison/Mary Larson-Asks where the Pond No. 1 is that they have been hearing about.
Julie Stasi-The "Finger Lakes"? These are north of 98th Street, west of Lee Boulevard (between Meadow and Manor).
James Azeltine-Everyone once every few years someone comes around and asks the City to do something.
Lisa Harrison-Yes Every few years something would need to be done to maintain them.
David Ley-There is a box culvert that we worked on in 1988. Recently this was also part of a flood item included in our last July flood work. What we are hearing about on the ponds is the by the first lake, because all the water is draining. It drains from around 92nd, 93rd and then down through the storm sewer pipes and the first lake are where we are catching most of the stormwater.
David Ley- About five years ago, the property owner by the 4th lake down emptied the lake and cleaned it out, deepened it.
Lisa Harrison-I didn't realize how few homes actually touched some of these properties.
James Azeltine-Asked what Homes Association was in the particular area.
Julie Stasi-Leawood Estates is south of 95th. North of 95th is mostly Leawood.
David Ley-Does want to also identify the lakes on the map. Although the ponds in Leawood are mostly private. The City does have 3 along Tomahawk Creek Parkway, City Park and Gezer Park.

Carole Lechevin-Asked David Ley to explain the history about the Lee Boulevard areas and how some are private and some are public.
David Ley-In the late 1980's, the City improved Lee Boulevard. We extended the storm sewer pipes through the areas where there was a lot of flow or we had a steep roadway. So we put the water in the storm sewer pipe to prevent the erosion of the channels. Some areas we are looking at extending the storm sewer pipe. Lee Boulevard Improvements in the next couple of years/due to the erosion happening. For the most part the is a roadside ditch and in some of the ditches there is still pipe underneath those ditches that are taking most of the conveyance on the channel.
Debra Filla-We had met once with another home owner on Lee Boulevard where there was silt that had filled into his ditch and it was backing up the flow. And we had talked about what the cost efficiency was with doing the hard structures verses the open ditches. I went and spoke with him with Joe (the former Director of Public Works) and it was felt that the cost of managing an open ditch was so much more less than the cost of a storm system structure. We were at the

time talking about 10 million dollars if we wanted to take everything on Lee and turn it into hardscape. So in that particular area it was the home owners' responsibility to maintain. And for some people it is very difficult because of the pitch. To mow down there and the other things that are down there, it is not a fun thing. This resident had to back hoe it and, that was a bit much. Near 86th & Lee or further north of that.

Debra Filla- One thing I think that would be a good education and might be helpful, for example my street put in a bio-swale pilot area. The bio-swale filtration will sift out the stormwater; cleaning it before it gets to the drain. There are perennials planted there that help slow the water down and in the homeowners point of view it is filled with items they do not have to mow. They will still have to do a little weeding, but they can cut it back in the fall and they do not have to mow it. It could be an option to help people, and would be better than using a lawn mower on an angled ditch. It would also approve the appearance then having bunches of leaves collecting there.

David Ley-Once we do Lee Boulevard we can speak to many of those residents. Many are concerned with the road side ditches and another thing we hear about is the age of the roadway is breaking off and they are getting a lot of asphalt chunks in their yards. We can discuss those options to help them. The first phase of Lee Boulevard is in 2019 and it runs from 95th to 103rd streets. We will widen the roadway out about two feet in order to stripe off bike lanes. And then add stormsewer (about 500') where we are having erosion problems. On the bike lanes we are planning a concrete base and then do an asphalt top.

James Azeltine-Asked about the goal for today's meeting.
David Ley-Advised today was just about the maps. Staff created the maps under your direction and we wanted your input. We can then post them once they are complete the way you want them and for information on line for people to view. The lakes being shown, will indicate if they are privately maintained or publically maintained. The maps will assist the Committee is seeing what all the City has to take care of and what residents are required to maintain.
James Azeltine-That would be very useful.
Mary Larson-It would help to have the ponds identified public/private.
Lisa Harrison-And on the website to clearly communicate and remind people along these types of properties and clearly labeled. Examples Homes Associations or Private owners maintain these creeks and not the City, etc. Based on the concerns that have come to the Committee we need to do a better job of communicating to anyone that is looking at property in Leawood. People moving here have no idea most of the time that that pond or creek is theirs or their HOA's responsibility. Maybe it is in the deed restrictions or their realtor did not talk about it much. If it is on the web site they will appreciate it.
Carole Lechevin-Also have it say if it is a privately owned channel (with arrows pointing to those) and have a note on what is expected with the maintenance of each type. Or if you take in a back-hoe when a tree is down, can you do that? Who is responsible? How far can they go?

Chair Azeltine-And maybe as an accompaniment to the map on the website, point out some general rules on how these thing work, before they call the City.

David Lindley-asked about Building Permits and if there was anything in those that could be more authoritative to advised people about stormwater and their responsibilities.
Debra Filla-advised that she has run into this in her neighborhood with people adding on large garages. And has helped with explaining the % of the areas that they are adding to in runoff and asked David Ley to explain that.

David Ley-Over 400 square feet of impervious you are required to provide a map to the City. It goes through the building process and then it is fed over to Public Works and we review those plans for if it is over the allowed impervious areas and if so, they have to do some type of detention. Mostly rock and infiltration ditches. It is a pretty simple stormwater study for those. On tear down rebuilds they actually have to provide a stormwater study and have a professional engineer look at the existing site, show the flow patterns and then the volumes coming off the site and which direction if is going. On their proposed improvements they have to do the same and account for how they are going to address the stormwater issues. We have maximum heights so you cannot raise it more than 1 foot without existing the first floor elevation unless there is a stormwater issue to where you needed to get more drainage or get more water out to the street and then we would permit a little bit higher first floor. And with the deeper foundations they tend to find a spring that we didn't know about.

Carole Lechevin-asked if we could point out detention areas as opposed to water features.
David Ley-Gave an example of the Price Chopper at 133rd & Mission. The blue lines on the map are actually underground tanks, storm sewer pipes and are 6 to 7 feet in diameter. Maybe we can make those yellow or something so you are not thinking those are cool square ponds. Also something between the public and private storm, maybe a different hatch mark so it is obvious. Gezer Park pond at 133rd & Mission is a water feature/City owned pond.

Carole Lechevin-Had a question and mentioned the "finger lakes" on the North end probably takes a lot of debris and silts up pretty quickly. Those two or three homeowners on each side are responsible for constantly maintaining that?
Staff-Yes. And they have come to us before asking for help and we had to advise that was private property unless they wanted to make it public.
Carole Lechevin-That is huge if you look around from that area those are typically very messy. One of your notes said that you guys (Public Works) provide pick up service, what all does that entail?

David Ley-If there is debris in a creek. Where somebody cut out trees or if there is any other debris they can bring any of that up to the curb and the City would come by and pick it up if they were to call us.
Lisa Harrison-Several of the homeowners that we have heard from in the last three months that have creeks in their back yards have talked about the massive amounts of trees, root balls that ended up in their back yard creeks and they have no way to get rid of it. Well we wanted to let them know actually we do if you can get it to the curb and cut it up, drag it up, the City will come and get it.

Carole Lechevin-I've mentioned this before but in my creek, it was a concrete basin at one point and pieces have floated downstream, but there is no way I could have gotten that out without heavy equipment. And that is mine because it is in my back yard? It came from upstream.

Bill Ramsey-Part of the issue here is there really isn't any public access to get in to these areas. And the legal folks go ballistic on you if you enter without an easement or some right to be on the property with damage and other issues. That is why this is such an issue. Some of the ones I have reviewed in the Ward are so restrictive and creeks are so narrow, it can be basically a ditch.
Carole Lechevin-Vertical walls.
James Azeltine-and once we go in there we own it right?
David Ley-Well from that point on we hear that the City came in and did something to clean it up.
Bill Ramsey-At that point, you might as well make the whole system public because for all intensive purposes you are going to own it.

Debra Filla-To that point is there someway that we can help? Many people are confused on what they can do. Who can they call? Would there be suggestions as to the type of contractor that we can suggest to them? Tree Landscape people? Are there people certified that we could have maybe through the City for them to call upon? Someone approved to go in and work in these areas? But have it where they are working for them? What type of contractor does this work? Other cities have certified tree workers working in their Cities is there someone or some type we can recommend to people who ask? All working with a permit and licensed with the State etc.

Bill Ramsey-We talked about this when I worked at Olathe and the City Council did not want to approach this within a country mile regarding licensing. But there is nothing wrong with providing a list of contractors who have been vetted by the Chamber of Commerce or by the Better Business Bureau or someone like that. I think there is some benefit to what you are talking about in terms of at least providing a starting point for people to go to.

James Azeltine-In an example of Mission Hills, the City and one home owners association can get together and that gives them more flexibility than what Leawood would have. To start a new permitting process may be a bit much.
Debra Filla-You have to prove you have your Johnson County Contractors License, and you have to prove you have Insurance.
James Azeltine-To me that is what I do when I hire someone.
Debra Filla-And we could put those as suggestions. Look for a contractor that has a license, and insurance and a business license to do work in the City of Leawood.
Carole Lechevin-If they are doing business in our City they are supposed to be licensed anyway, right?
Staff-Right.

Mary Larson-If we are trying to help our home owners with providing them a list of people to turn to for help. There is a big difference in that with requiring permits; two different categories here.
James Azeltine-No matter how you go about getting them on the list, some people will look at that as an endorsement by the City. That is why you could get involved with the Chamber and ask them how to que this up as a link on our web site, before you make a list.
John Kahl-There is a huge difference in the costs of tree removals between one company to another. It can be 300 to 400% difference. We have a guy we've used for the past several years and I'm not sure if he is licensed or not.

James Azeltine-Comments on the maps? Good. More labels, addresses. Maybe identify the watershed on the map.
Carole Lechevin-It is different between Kansas and Missouri with the laws in working in the creek.

David Ley-You need to get an Army Corp of Engineers Permit if you are getting down into the channel. We do permit any work on the banks, for clearing.
Carole Lechevin-What if I want to build a retaining wall in my creek.
David Ley-You have to get a flood plain permit if you are doing creek work like that the City wants to see the work you are doing. Especially if you are moving more than 400 square feet. So that way we can verify that you are not necking the creek down or creating flooding issues.
Carole Lechevin-I think that needs to be clearly defined for most lay people.
Lisa Harrison-All these people that have come in saying they worked on their creek, they all got a permit to do that?
David Ley-Not all of them but some with the walls have.
James Azeltine-If you dig down you need one.
David Ley-You are supposed to come to the City. So a lot of the times if people go out and just do it and it's in their back yard, many times we wouldn't know. Unless the neighbor calls and we have had that happen.

James Azeltine-My guess is if there is not anything in our Stormwater Ordinance that talks about this there should be. Either a small paragraph or a few points ought to accompany the map to explain why it's there, and what the City's responsibility is verses what is not the City's responsibility.

Debra Filla-On our Web site I really encourage us to call out stormwater separate from Public Works. It is hard to find, it is buried under Public Works. Maybe we could link it to the HOA Map.
James Azeltine-Does I.S. Department keep a suggestion of things like this?
Julie Stasi-We have a Help Desk where we can ask for items to be published to the web site. Although everyone wants to be on the front page. Maybe the terms we use would be easier too, say we call it Creek information, instead of Stormwater. Staff can work on brochures for this too (like we did for the BMP) and with the map put tips on what they should know about living by a creek.

Carole Lechevin-There is a gray area in some of the creek areas as to when it becomes public and when it is private.
David Ley-The City's policy is if our structure is becoming undermined then the City would go out and stabilize that area to protect our end section and our storm sewer pipe.
James Azeltine-A lot of what we need is education, to get the word out. A lot of people do not know they are not supposed to pour things into the stormsewer.
John Kahl-We have such a broad cross section of people and residents that you will find living along the creek. Some have money to do extra things with their yards and some of the mind set not to touch them.
Debra Filla-Stormwater is the Rodney Dangerfield of utilities. The only people that think about flooding are the engineers or the people that have flooded.

Chair Azeltine-Whenever Johnson County gets their SMAC Program revamped it might be a good idea to us to revisit these maps and look at our watershed and information.

Bill Ramsey-Asked about if we have a new development coming in the south part of Leawood, do we have our Ordinance all up to date so we do not have some of the issues we are finding in older areas that were built years ago?
David Ley-advised in the new developments if there is a 100 year flood plain or if there is a

stream running through the property, the developer is required to plat that area in a tract that is dedicated to the HOA so it is no longer individually maintained and owned. So as for open channels there are practices for treating stormwater which is required now for all new developments. For example the Hills of Mission which is at 151st & Mission on the Northeast corner. They have a lot of underground detention areas just to hold the first flood and then they have an open retention pond and they are also doing a drop pond for detention, so there are two levels; Best Management Practices which is treating the first rainfall and then we have the detention that is required for the heavier storm events. That is required and started back about 2009 in the City for all developments.

Discussion
Properties go all the way back to the creek and the creek is a part of the lot.
Can you make the area along the creek a common area, but how do you offer that without taking portions out of everybody's lot?
Carole Lechevin-recalled when there were pocket parks behind several lots near 92, 91st, but they went away because they were unable to maintain them.
John Kahl-If you go to the Corps of Engineers for a 404 Permit with a New Development and you show a line like that where the lots go all the way to the back; the corp will say if you bring the lots all the way to the back we are going to assume that you are going to take that channel out. And you have to mitigate for it. They understand that if the lot goes all the way to the back they are not going to enforce an individual homeowner if and when they decide they want to do something to that creek. It cost them more money to develop that way because they then have to pay mitigation or provide mitigation for the impact of that channel. Even if they are not going to touch it. That does not make the channel any different other than the fact that it encourages the developer not to do lots like that. If they put it in a common tract and said we are not going to touch it, then the Corp says that is fine and you do not have to mitigate. It's largely the same reasons why the City Engineer is doing, just from a different direction. If you run a subdivision and you basically make the lot lines line up with the creek along the back. That is all private property. Basically the Corp does not want to have to enforce on individuals if the homeowner goes in and lines their creek. That should require a 404 permit. Most homeowners will not do that. There is not really an enforcement mechanism for it.

James Azeltine and that is why all the new developments have the HOA's with the area along the creek.
Lisa Harrison-We have mentioned realtors a couple of times. The realtors meet their teams once a week for meetings and they disseminate important information and they want guest speakers. They are always looking for information updates and there might be an opportunity here to reach many Leawood people with some of this information on creek maintenance. Anything that we can put out there in meetings, on our web site. Maintenance of creeks, ponds, etc. Information on these great resources and helpful tips on where they can go to understand what is required as a homeowner along a creek.
Deb Filla-And as a reminder for our HOA Meeting we could have something for our next annual meeting on Creek Maintenance.

Chair Azeltine-Group advised staff to make sure the City Administrator sees what we are posting, although the map will be an ongoing update once we have it created.
Chair Azeltine adjourned the meeting at 8:30 AM.

CITY OF LEAWOOD

INFORMATION FOR THE
STORMWATER MANAGEMENT COMMITTEE
August 29, 2018

TO: **James Azeltine, CHAIR**
Committee Members

FROM: **David Ley, P.E.**
Director of Public Works

SUBJECT: **See attached agenda**

OLD BUSINESS

Approval of Minutes of May 30, 2018

NEW BUSINESS

City Council referred storm drainage/flooding concerns at 9849 Sagamore in the Leawood Estates subdivision. Pam Nolan is one of the property owners and plans to be in attendance. This area was developed in the mid-1950s; the storm sewer design standards have changed significantly since that time. In residential developments the City now requires area inlets and swales to convey flows when the drainage area is 2 acres or greater.

The included Overview of Upstream Watershed map shows the total area of land that drains toward 9849 Sagamore. There are 4.8 acres that drain to Pembroke Lane and 2.8 acres that sheet flow directly to the rear of the house. On Pembroke Lane the drainage area is captured with three curb inlets. Staff reviewed the storm sewer system along Pembroke Lane and determined the pipe and inlets have the capacity to convey the 1% storm event. However if a curb inlet on Pembroke Lane becomes clogged the water would overtop the cul-de-sac and flow towards 9849 Sagamore. The Overland Flow to 9849 Sagamore map shows 2.8 acres immediately upstream that sheet flows to the back of the house as there are no swales or berms to direct the flow around the house.

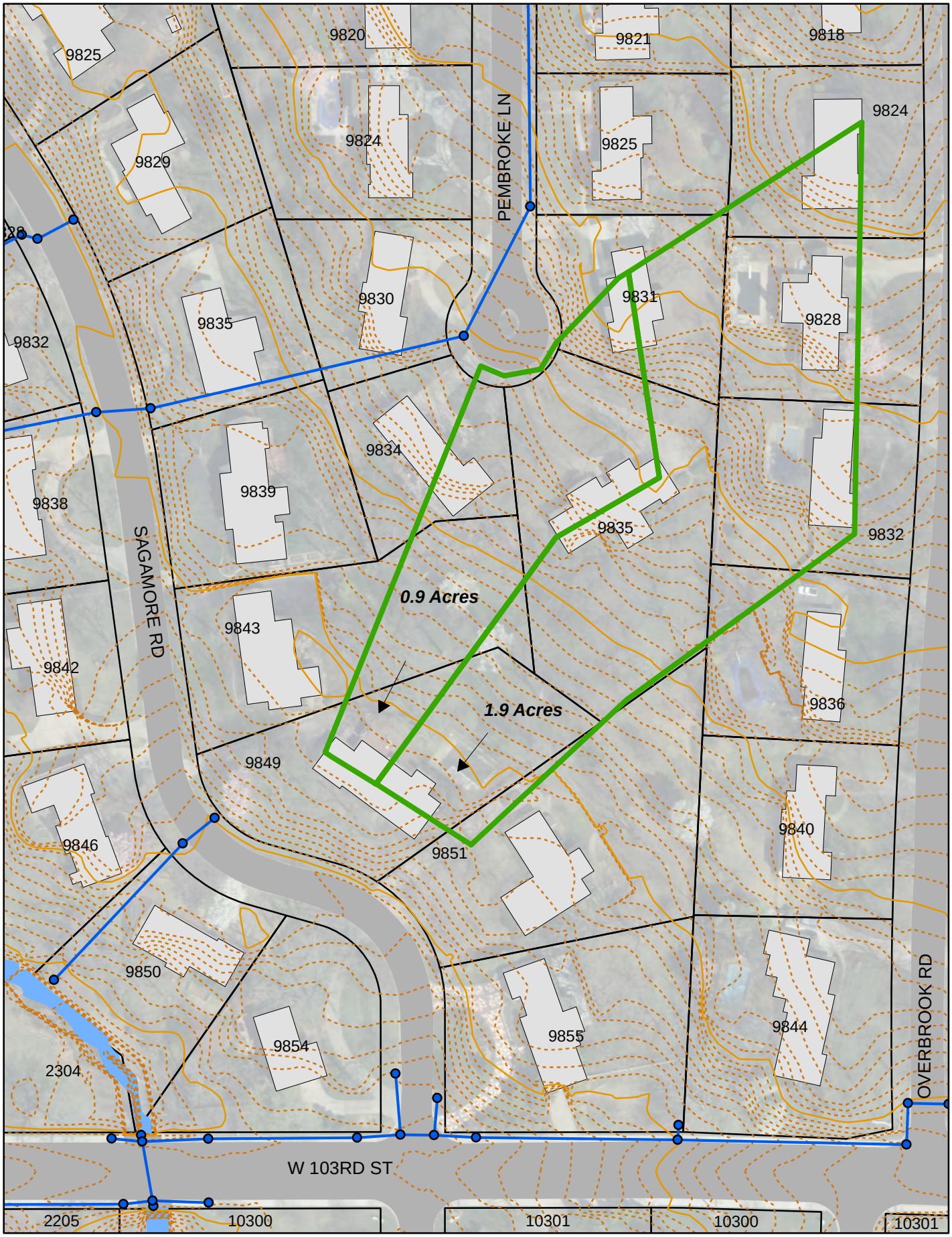
One solution we reviewed was to install berms to direct the flow around 9849 Sagamore. This could cause flooding of the garages at 9849 Sagamore and 9851 Sagamore and also damage the retaining wall around the driveway at 9851 Sagamore. Another solution we reviewed was to install swales/berms along the rear of properties at 9849 – 9855 Sagamore but the slope of the swale would be steep causing erosion and the grades from the rear of the property to the house are steep making it difficult to grade a swale big enough to convey the flow and tie back in to the existing ground.

The Proposed Storm Sewer map shows one solution to collect 2.7 acres that is sheet flowing to 9849 – 9855 Sagamore. The proposed storm sewer would begin at 103rd Street and be installed along the rear property lines of 9849 – 9855 Sagamore with three area inlets and swales/berms to direct the flow in to the area inlets. This option would reduce the area of water sheet flowing to 9849 Sagamore by 2.0 acres. The remaining local area draining to the rear of the house would need to be addressed by the property owner with swales/berms near the rear of the structure. With this option the metal pipe along 103rd Street would need to be upsized. This section of pipe could be replaced and upsized with the Metal Pipe Replacement Program. The approximate cost for this option is $310,000 which does not include replacing the metal pipe along 103rd Street as that is already a future project.

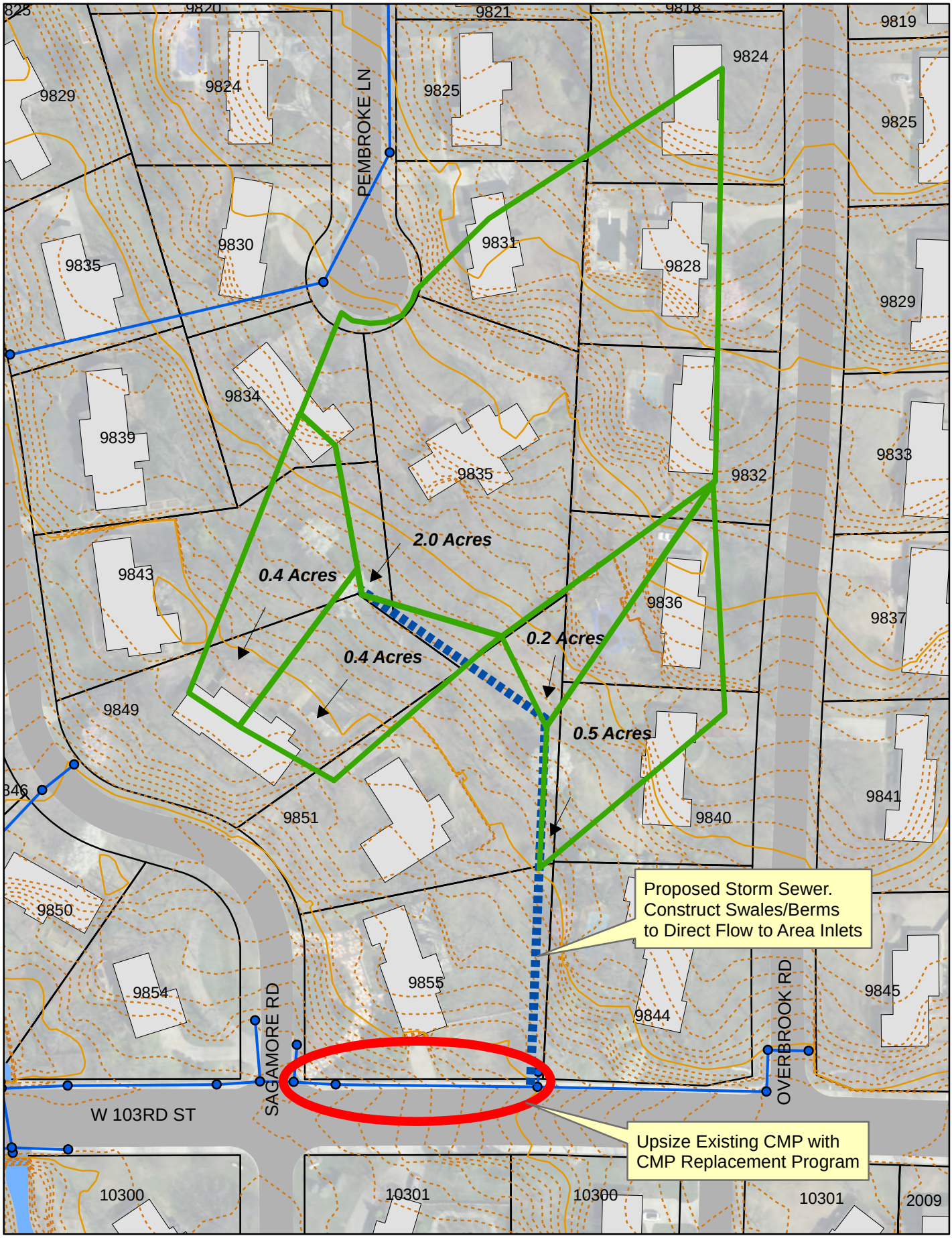
There is an existing storm sewer line in front of 9849 Sagamore that was designed to convey a small portion of this flow and direct it west to the unimproved creek. The size of the pipe going to the creek is 12" in diameter and is not be big enough to convey the added flow from the rear of 9849 Sagamore. Staffs concern with this option is that we would be directing approximately 2.0 acres of additional drainage area to the unimproved creek which could cause erosion of the streambanks. This unimproved creek is maintained by the adjacent property owners. There would also be significant roadway and driveway removal and replacement costs. Cost estimates for this alignment would be $390,000. Staff did not provide a map for this option.

For this project to qualify for SMAC funding staff would need documentation from the property owners that their habitable buildings have flooded three or more times in the past ten years. As part of that documentation the County requires pictures of the flood damage.

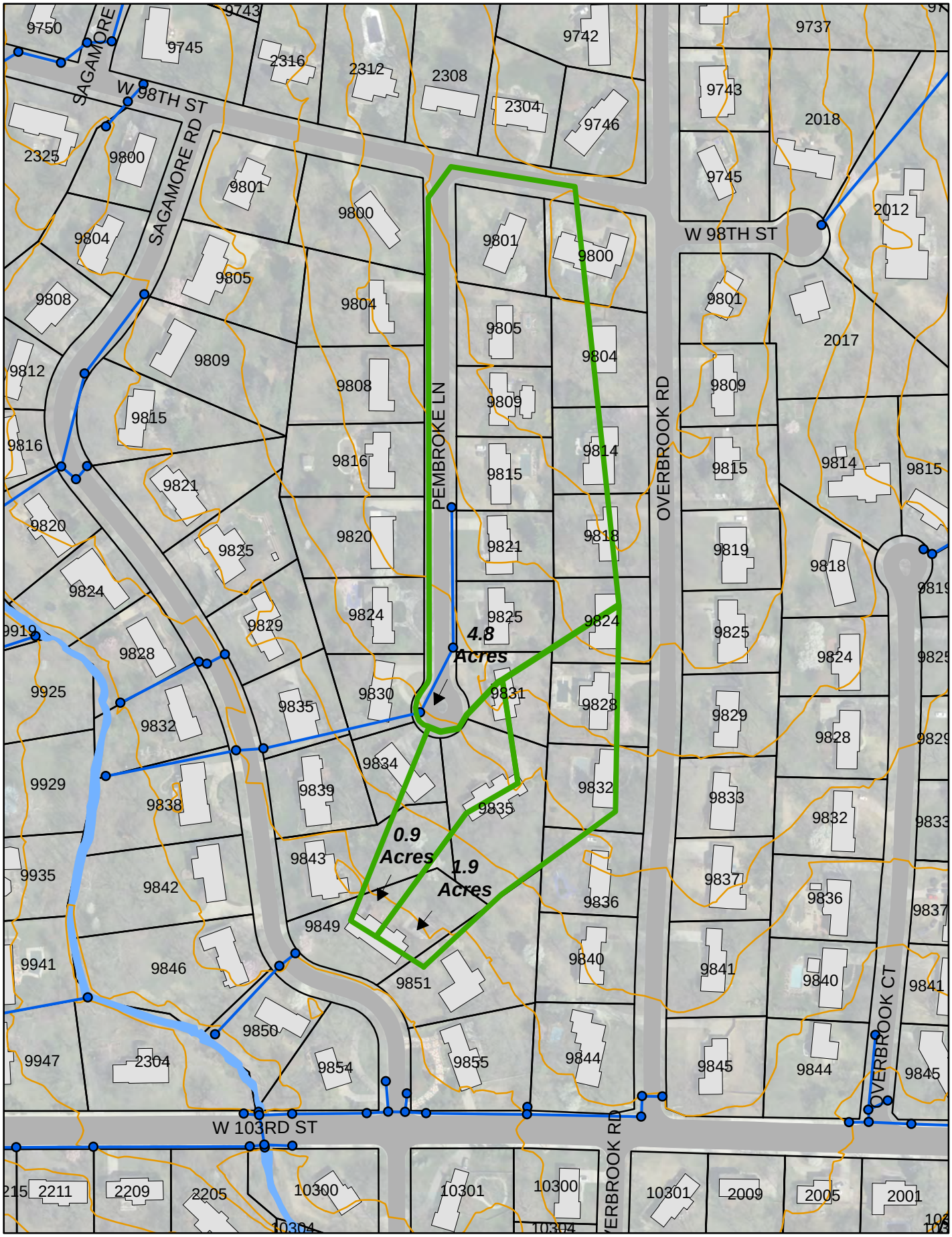
Overland Flow to 9849 Sagamore



9849 Sagamore
Proposed Storm Sewer



9849 Sagamore
Overview of Upstream Watershed



City of Leawood

MEMO

Public Works Department

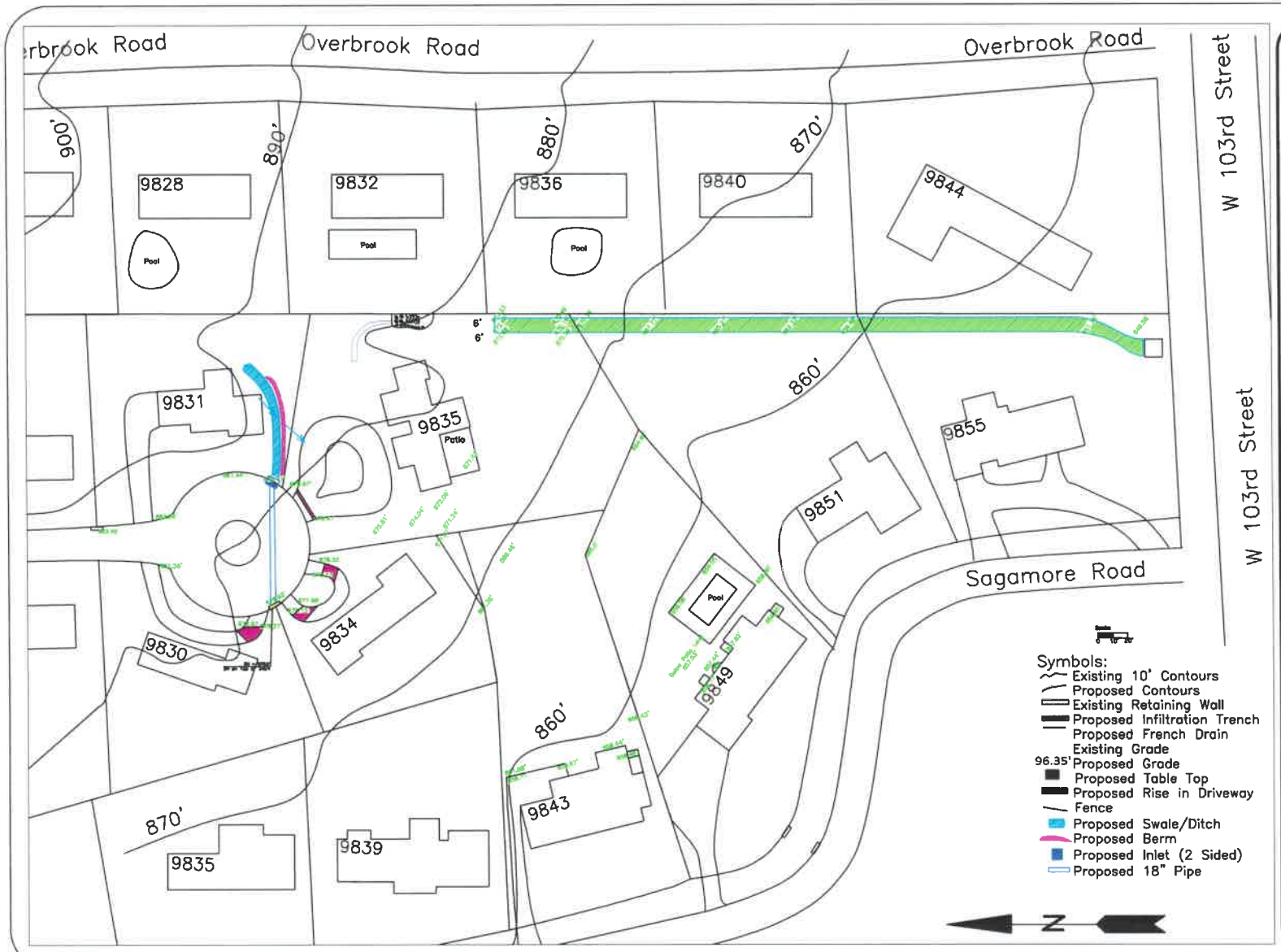
To: Public Works Committee

From: Julie Stasi, PW Administration Services

Date: August 24, 2018

Re: Information for 9849 Sagamore

The property owner of 9849 Sagamore, Pam Nolan, contracted with Kahn Engineering LLC to perform a drainage analysis. A copy of the report from Kahn Engineering along with a map are attached for your review.



General Notes

No.	Revision/Issue	Date

Author
KAHN ENGINEERING LLC
609 SW GENTRY LANE
LEE'S SUMMIT, MO 64081
(816) 872-0862
dan.kahn@KahnEngineeringLLC.com
www.KahnEngineeringLLC.com

Project Name and Address
Pam Nolan & Teresa
9849 Sagamore Road
Leawood, KS

Project: Overview
Date: 3-29-18
Scale: As Shown
Sheet: 02

9849 Sagamore Proposed.dwg
3/29/2018

KAHN
ENGINEERING LLC

Preliminary Drainage Analysis

For

Sagamore/ Pembroke/ Overbrook Area

Leawood, Kansas

Kahn Engineering LLC
609 SW Gentry Lane
Lee's Summit, MO 64081

dan.kahn@kahnengineeringllc.com
816.872.0862

KAHN
ENGINEERING LLC

May 9, 2018

Kahn Engineering LLC
609 SW Gentry Ln
Lee's Summit, MO 64081

City of Leawood
4800 Town center Drive
Leawood, KS 66211

RE: Preliminary Drainage Analysis
In the Sagamore, Pembroke and Overbrook area

To Whom It May Concern:

Being a Drainage Engineer for over 20 years and seeing a wide variety of drainage concerns from individual property owners to large scale roadway project drainage issues, I would like to bring the following watershed issues to your attention.

Being a Public servant myself for over 17 years, I somewhat understand the pulls and pushes that you must feel being in the position of Father of the community.

In the end, all we can do is bring this concern before your desk and say, please help us with the issues that some in your community are experiencing in a negative way.

I believe that with some small changes to the watershed, it can function in a way that is better able to handle the larger precipitation events that we have been experiencing as of late.

Sincerely,

Dan Kahn, PE, CFM
Kahn Engineering LLC

DANIEL J KAHN
LICENSED
22868
5-9-2018
KANSAS
PROFESSIONAL ENGINEER

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IV. Exhibits .....Pg. 16+

I. Background

A) Scope of the Project

1. To investigate the water issue realized on the Sagamore/Pembroke/Overbrook area and understand the impact to neighboring property owners
2. To conduct a preliminary drainage analysis of the Sagamore/Pembroke/Overbrook watershed

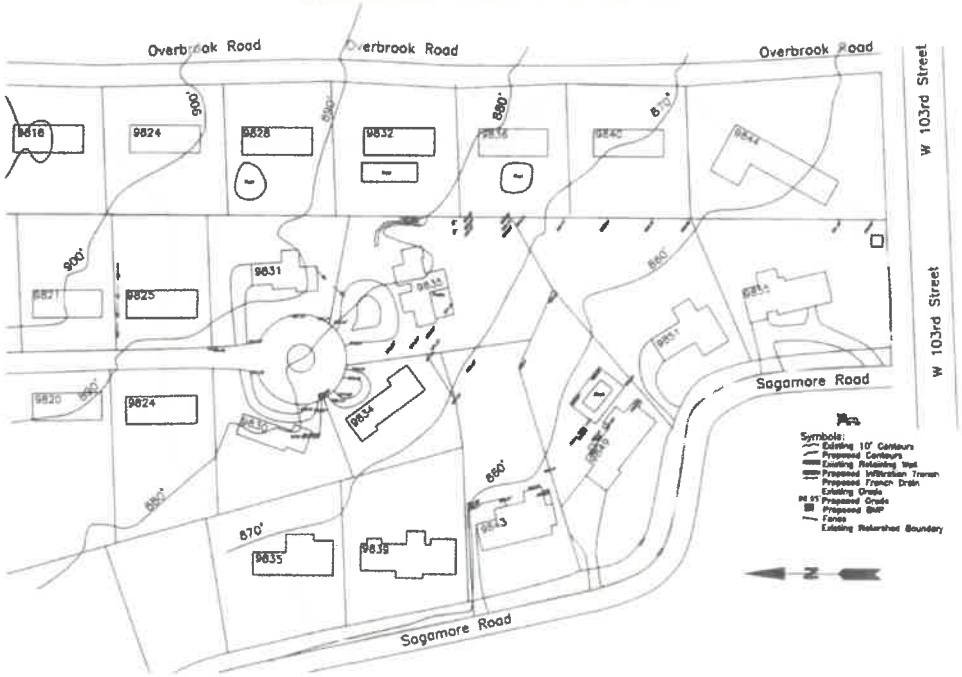
B) Reason for the Report

The owner of 9849 Sagamore Road (Pam Nolan) and many of her neighbors in Leawood, Kansas would like to bring attention to the growing stormwater issue in the Sagamore, Pembroke and Overbrook area. She has observed flooding in rain events approximately 10 times since 2010. Of those 10 times, approximately 2-3 times the water forced open the window to the basement. As the Engineer and advocate for your residents, I would like to shed light on the extent of this issue. The intent of this report is to describe the stormwater issue and the engineering analysis used to quantify the extent of it.

We are also in the position to see what some relatively minor corrections to the watershed could do for the community.

C) Watershed

Sagamore/Pembroke/Overbrook Watershed



You can see by the area on the watershed diagram that there are approximately 18 homes that are in this particular watershed. The area of the watershed is approximately 8.74 acres.

Simple terms are used in the explanation of stormwater effects, so as to explain in the easiest way possible. Please keep an open mind during this report and see if you agree with us about the extent of the issue.

D) On-Site Soils

The soils on site are composed of Sharpsburg-Urban Land Complex with about 7% slopes in the upper reaches of the watershed. These soils are composed of poorly draining clay. In the middle area of the watershed, the on-site soils are composed of Chillicothe Silt Loam and in the lower reaches of the watershed, the on-site soils are composed of Martin Silty Clay Loam. All of these soils fall in hydrologic group D (Within the Rational Method of Hydrologic Peak Flow Calculations) or poorly draining soils.

E) Sagamore/Pembroke/Overbrook Improvement Specifics

Some of the improvements in the neighborhood consist of swimming pools, retaining walls, gardens, and patios. There is still much more of the land that is considered to be pervious to rainwater. I am estimating that 28% of the land is impervious as a conservative estimate.

F) Sagamore/Pembroke/Overbrook Subdivision Specifics

Residents in Watershed

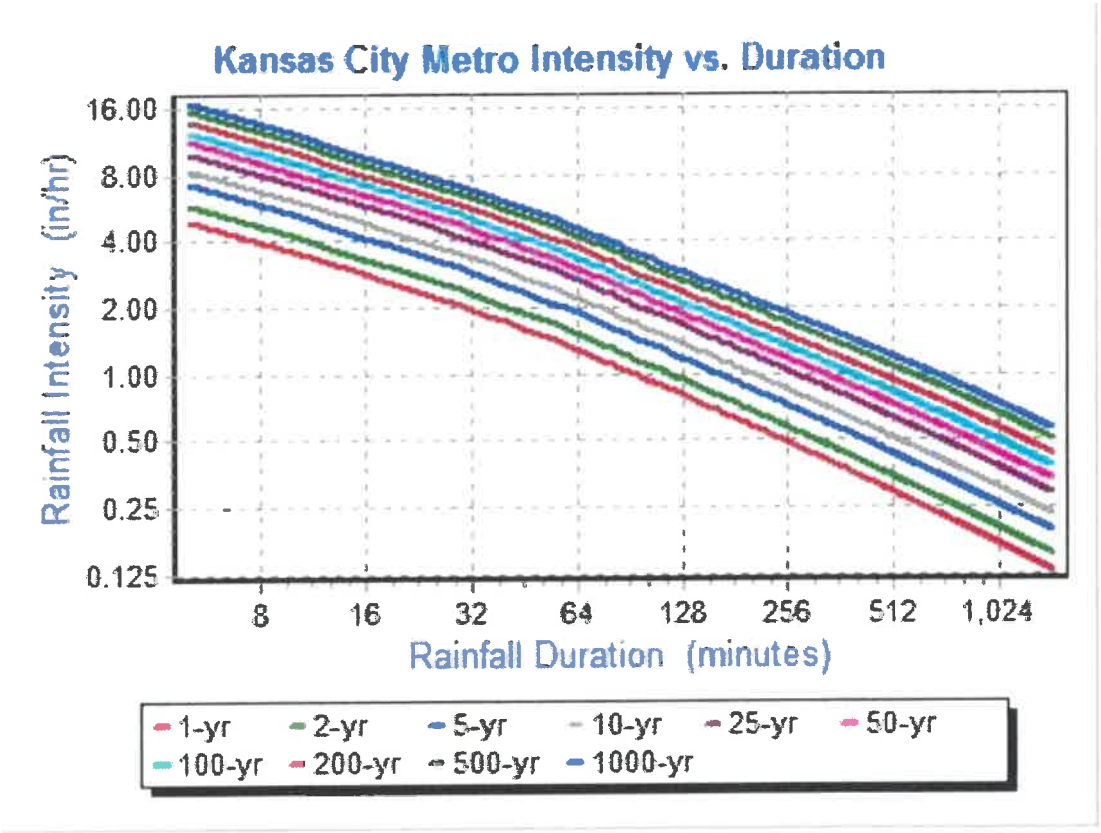
Overbrook	Owner	Total Acres	Estimated Impervious Acres	Watershed Acreage	Flooding Yes or No
9824	Simmermon	0.46	0.1288	0.4	*
9828	McQuaid	0.46	0.1288	0.4	*
9832	Volkens	0.48	0.1344	0.4	*
9836	Zachenberger	0.47	0.1316	0.4	*
9840	Mulford	0.48	0.1344	0.48	*
9844	Siskey/Peckham	0.62	0.1736	0.52	*
Pembroke					
9824	Mahon	0.46	0.1288	0.3	?
9825	Griffin	0.38	0.1064	0.31	Yes
9830	Mattes	0.34	0.0952	0.34	?
9831	Matther/Ibarra	0.4	0.112	0.4	Yes
9834	Antin	0.39	0.1092	0.39	No
9835	Conner	0.84	0.2352	0.84	Soil Issues
Sagamore					
9835	Scott	0.41	0.1148	0.35	?
9839	Ames/Lockard	0.46	0.1288	0.46	Tree Fell
9843	Jeffcote	0.65	0.182	0.65	Yes
9849	Nolan/Brown	0.7	0.196	0.7	Yes
9851	Rice	0.76	0.2128	0.76	Yes
9855	Petersonmoon	0.64	0.1792	0.64	Yes
Totals		9.4	2.632	8.74	

* These homes are at a higher elevation in the watershed and therefore The probability of these homes flooding are considerably less.

II) Hydrology and Current Positions of Stakeholders

A) Drainage Analysis Discussion

Stormwater Analyses are based on empirical formulas and require the engineer to gather data and make judgements based on engineering principals to obtain the flows as shown in this letter. Some of the data gathering is as follows: investigate the how much land contributes to the surface water flow, conducting land surveying to gather elevation data, gathering existing plats, surveys, and other mapping, gathering soils characteristics, using precipitation intensity charts (see chart above), and making an judgement on the surface roughness coefficient, which affects how quickly the water flows.



B) Precipitation History

We have had many large-scale precipitation events over the years. The two instances below are when major flooding occurred in the Kansas City area. These are not the only events to cause flooding in the Sagamore/Pembroke/Overbrook watershed, but are included as reference.

Leawood Reported Precipitation (Weather.com)

Thursday July 27, 2017 – 2.57 in.

Saturday August 5, 2017 – 1.74 in.

These two dates had reports of unusually high precipitation in the Kansas City area. On Thursday July 27, 2017 into Friday July 28, 2017 it was reported as high as 8.0 inches of rain fell over a 6-hour period. According to the chart above that would equate to at least a 200-year storm if not a 500-year storm. Then to have another large event a little more than a week later with the ground already saturated, we had another 5.0-inch rain in about 4 hours. According to the chart above that would equal a 100-year or 200-year depending on how you interpolate the chart.

Pleasant Hill Reported Precipitation (Weather.com)

May 27, 2013 – 2.01 in.

May 28, 2013 – 0.13 in.

May 29, 2013 – 0.62 in.

May 30, 2013 – 3.19 in.

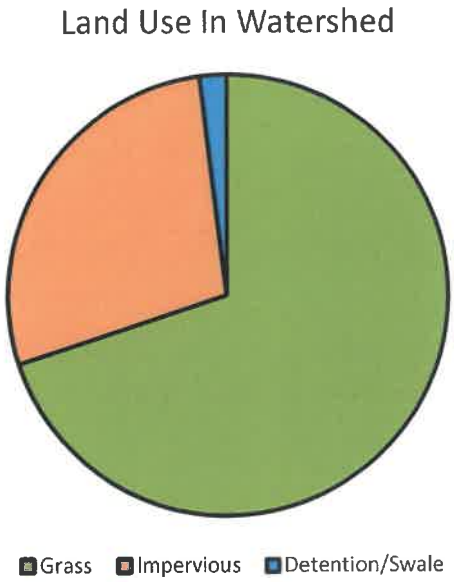
May 31, 2013 – 1.60 in.

Total for 5 Days = 7.55 in.

On these dates in 2013, Missouri say some major flooding. In Pleasant Hill, the monthly average was 5.51 inches for the entire month. That year, Pleasant Hill saw over 10 inches for the whole month. This month doubled the amount of monthly water that fell. Just a note that the NOAA uses the Pleasant Hill observatory as the gauge for the Kansas City Metro area.

It just goes to show that there have been some large events in the Kansas City area in the past few years. Again, Pam Nolan reported that at approximately 10 precipitation events have caused flooding to occur in her home since 2010.

C) Land Use Pie Charts



D) Preliminary Drainage Analysis

Using the data briefly described earlier in the report we are able to get peak flows or the amount of water that leaves the area in question. The rational method as outlined in the APWA Section 5600 was used for this analysis. The flows for the existing condition are as follows:

Q1year= 11.87 cfs,
Q2Year= 15.90 cfs,
Q5year= 19.67 cfs,
Q10year= 21.14 cfs,
Q25year= 28.48 cfs,
Q50year = 34.47 cfs,
Q100year= 39.80 cfs,
Q200year = 43.53 cfs
Q500year= 50.99 cfs.

So, a Q1year is the amount of water leaving the property at its highest flow volume that typically happens statistically every year. This is the most common storm. A Q100year is the amount of water leaving the property at its highest flow volume that statistically would occur once every 100 years. At the 100-year flow, the 39.80 cfs could all be handled in a 21" pipe at a 5% slope.

E) Currently Understood Positions of the Neighborhood

Preliminary discussions have been held with all the residents affected by the improvements suggested on the following sheets.

F) Current Understood Positions of the City

On May 12, 2018 we met with David Roberts with the City of Leawood Engineering division to express our concerns with respect to drainage with him. Following this meeting, Pam Nolan contacted the city council members representing Ward 2 who directed us to David Ley, Director of Public Works and liaison for the Stormwater Committee. A meeting with David Ley is to be scheduled in the near future.

III) Conclusions

There are several pieces of data that point to the fact that there is an issue with the drainage in the current watershed area. These are:

1) Flooding occurred in the homes at least 7 of the 12 residents in the lower elevation area in the watershed;

2) Steep slopes of over 7% throughout the area;

3) Current swale is at least 81% under capacity to hold all of the water for the 500-year storm;

4) It is estimated that the current inlet in the cul-du-sac on Pembroke only catches water up to the 40-year storm (higher volume storms jump the curb) even though the 24-Inch pipe that is in the inlet could carry all the water of the 500-year storm;

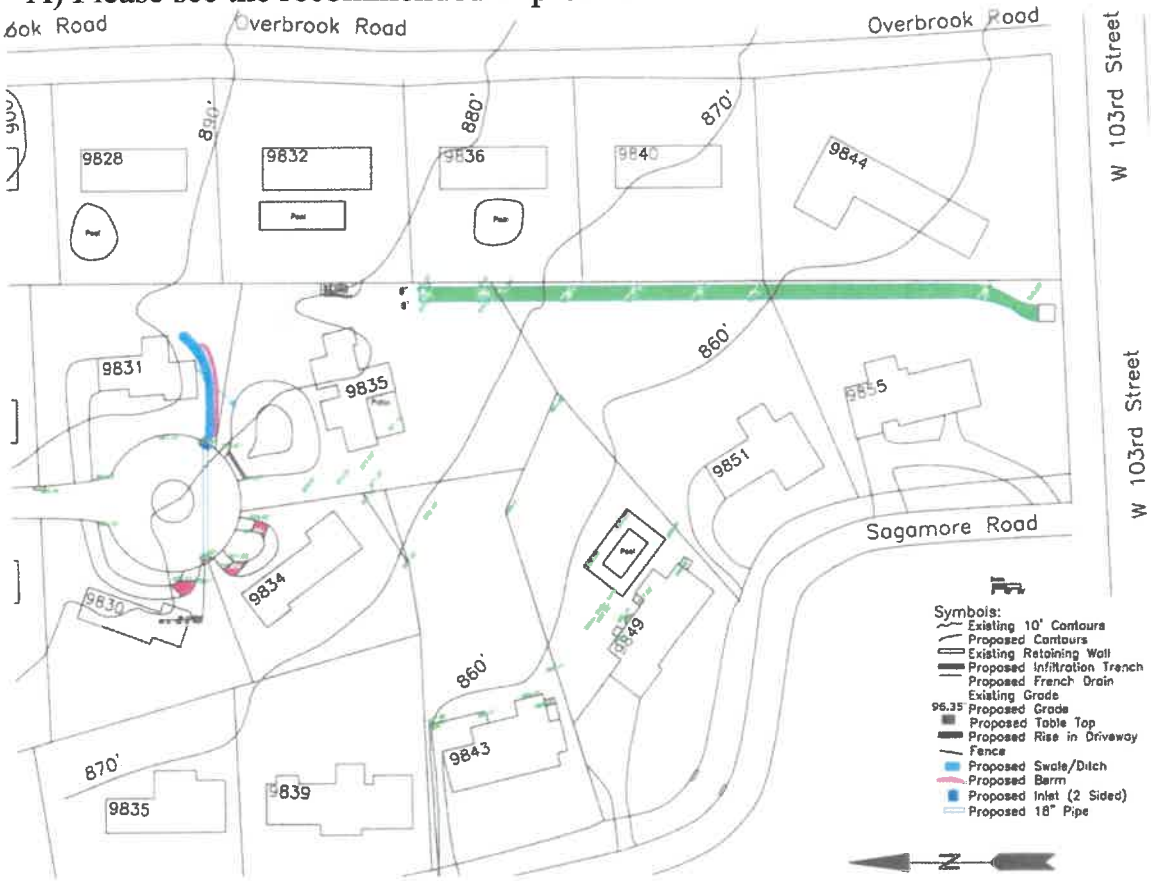
5) the soils of the area contribute to higher overland flow volumes than if more could infiltrate.

6) Three of the homes on Overbrook, which are on the higher parts of the watershed, have swimming pools. The swimming pools with the pool decks create am increased impervious area, which leads to more runoff downstream.

It is the opinion of this Engineer that if we improved several aspects of the watershed, drainage could be improved for all of the residents.

A branch of Indian Creek is approximately 200' from the watershed in question. Our hopes of improving the watershed, should not carry any more water to the creek than what already gets there.

A) Please see the recommended improvements below.



Briefly, the improvements consist of cutting the existing swale deeper to be able to handle the water that we would like to send its way (Shown in the Green Above).

Ditching to a proposed inlet that would tap into the inlet at the bottom of the Pembroke cul-du-sac. We would also place a berm along the property line to encourage the water coming off the back side of 9831 Pembroke into the proposed inlet (Shown in the Blue and Pink above).

Increasing the height of the driveway aprons to more of a tabletop like apron (Shown in the Magenta above).

Please see the next sheet for the engineer's estimate of cost associated with the improvements.

Please see the estimated costs of the improvements below.

Sagamore - Pembroke - Overbrook Watershed Improvement Costs

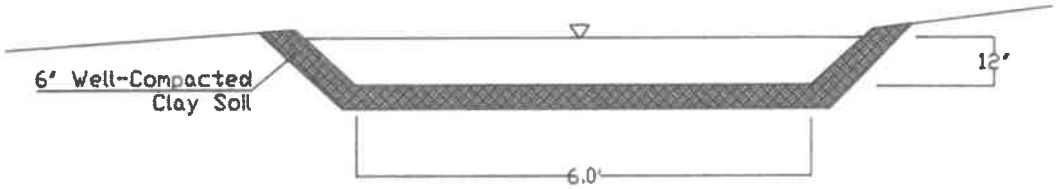
Engineer's Estimate

Item	Description	Units	Unit Cost	Qty	Price
Long Ditch Along Fence					
Ditching and Shaping		Cubic Yards	$5.00	4000	$20,000.00
Fence		Lineal Feet	$20.00	30	$600.00
Seed and Mulch		Square Yards	$1.00	560	$560.00
Adding Two-Sided Inlet					
Ditching and Shaping		Cubic Yards	$5.00	800	$4,000.00
Berm		Cubic Yards	$5.00	25	$125.00
18" Storm Sewer	Del. & Inst.	Lineal Feet	$50.00	100	$5,000.00
Two-Sided Inlet	Del & Inst.	Each	$5,000.00	1	$5,000.00
Asphalt Pavement		Ton	$140.00	34	$4,760.00
Improve Aprons					
Table Top Concrete DW		Square Yards	$35.00	50	$1,750.00
Aggregate for Table Top		Cubic Yards	$50.00	9	$450.00
Fill Dirt		Cubic Yards	$25.00	75	$1,875.00
Seed and Mulch		Square Yards	$1.00	230	$230.00
Total =					$44,350.00

The plan view and the spreadsheet are color coded for ease of understanding. The total at the bottom of the spreadsheet would be the cost for doing all of the recommended improvements.

B) Proposed Swale Cross Section

Typical Channel Detail
Cross Section



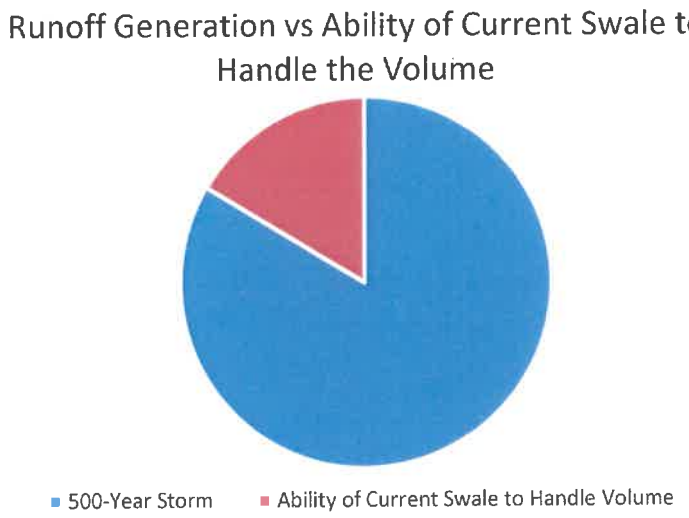
Width = 72 Inches
Height = 12 Inches
Side Angle = 45 Degrees
Slope = 7.2%
Coefficient = 0.035
Discharge = 68.3 cfs

Q 500 Year = 50.99 cfs

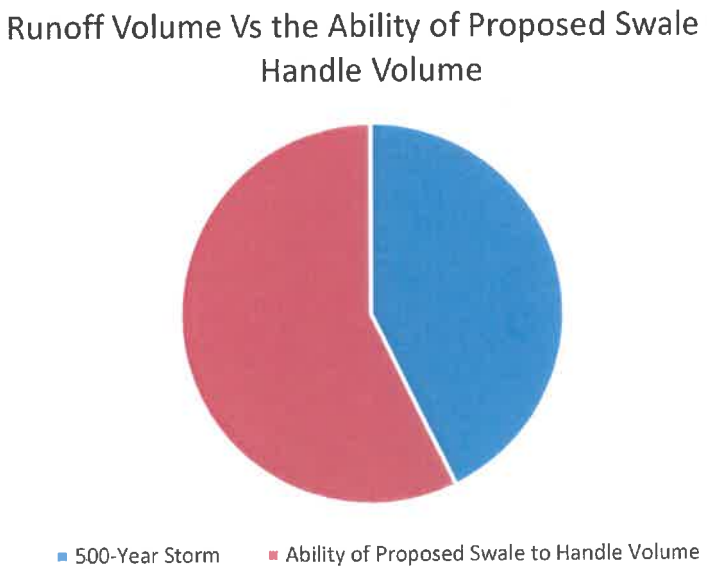
V = Q / A

V = 50.99/ 7.0 = 7.28 Ft/Sec

C) Stormwater Runoff Generation & Ability Current Swale to Handle Volume Comparison



D) Stormwater Runoff Generation Vs the Ability of Proposed to Handle Volume Comparison



The chart on this page shows that the proposed swale (shown on the next page) can accept all of the water for the watershed generated by the 500-Year Storm.

E) Recommendations

We recommend that a qualified inspector be contracted to inspect the installation of the drainage appurtenances. Kahn Engineering LLC would be happy to supply this type of service.

We strongly encourage that the contractor, inspector, property owner and City representatives to call Kahn Engineering with any questions that they have regarding the grading of the property or any other question regarding stormwater on the subject property.

If more detail is required for the watershed, we would recommend a full drainage analysis be completed. Kahn Engineering LLC would be pleased to help with this service.

F) Limitations and Exclusions

Stormwater Analyses are based on empirical formulas and require a fair amount of engineering judgement to obtain the flows as shown in this letter. Visual observations, rough soils data, ground surface evaluations as well as areas all contribute to the inputs for the formulas. When making visual observations for this letter, it is required that certain assumptions be made regarding the existing conditions, which is required in an analysis of this nature. The recipient of this letter agrees to hold Kahn Engineering LLC and its employees harmless, indemnified and defended from and against any and all claims; loss, liability or expense, including legal fees, arising out of the findings reported this letter.

Sincerely,

Dan Kahn, PE
Principal and Owner of:
Kahn Engineering LLC

DANIEL J KAHN
LICENSED
22868
5-9-2018
KANSAS
PROFESSIONAL ENGINEER

djk

Attachments

Exhibits

Rational Method by APWA

Sagamore - Pembroke - Overbrook Watershed

Q= k* C*i*A

	1 year	2 year	5 year	10 year	25 year	50 year	100 year	200 year
k=	1	1	1	1	1.1	1.2	1.25	1.25

Inputs

C=	0.5
D=	750
S=	7.2
A=	8.74

	5<Tc>15		15<Tc>60
I 1 yr=	2.591134		2.716045
I 2yr=	3.670774		3.639501
I 5yr=	4.500524		4.502918
I 10yr=	5.114232		4.839632
I 25yr=	5.932509		5.925157
I 50yr=	6.615891		6.575113
i100yr=	7.268962		7.287822
I 200 yr=	7.950427		7.970367
I 500 yr=	9.228174		9.335457

Tc= 1.8*(1.1-C)*((D^0.5)/(S^0.33))

Tc = 15.41824

	5<Tc>15		15<Tc>60
Q 1yr=	11.32326		11.86912
Q 2yr=	16.04128		15.90462
Q 5yr=	19.66729		19.67775
Q 10yr=	22.34919		21.14919
Q 25yr=	28.51757		28.48223
Q 50yr=	34.69373		34.47989
Q 100yr=	39.7067		39.80973
Q 200yr=	43.42921		43.53813
Q 500yr=	50.4089		50.99494

DANIEL J KAHN
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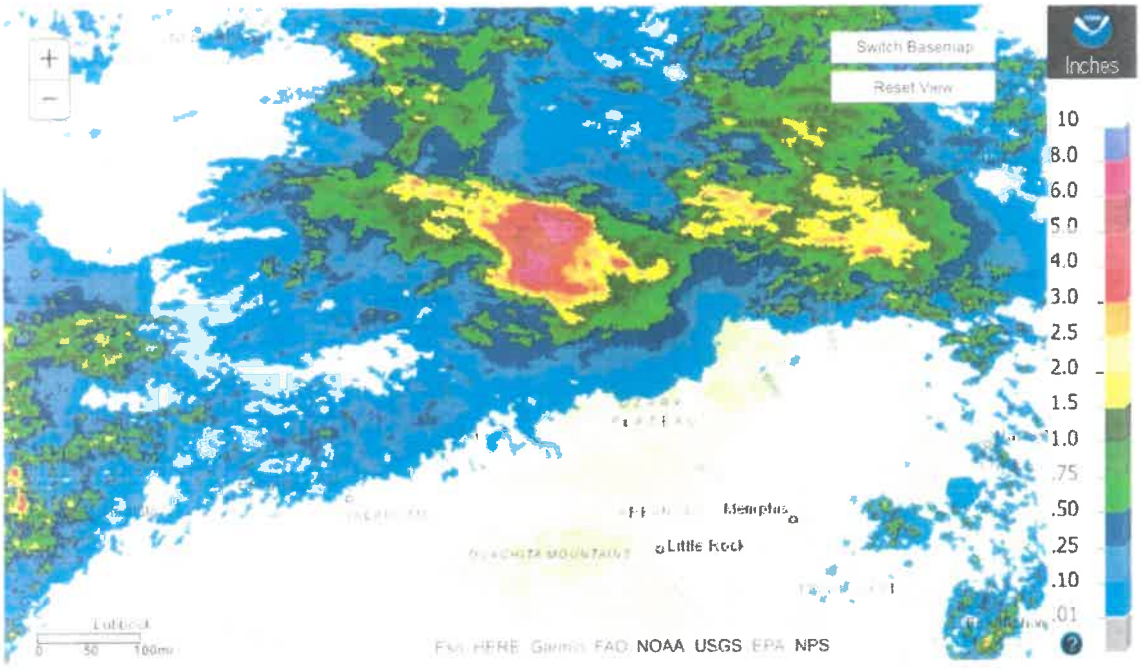
PROFESSIONAL ENGINEER

Observed Precipitation