State of Ohio

OHIO PUBLIC WORKS FOR YOU

Public Works Commission

Application for Financial Assistance

IMPORTANT: Please consult "Instructions for Financial Assistance for Capital Infrastructure Projects" for guidance in completion of this form.

Applicant

Applicant: City of Kettering Subdivision Code: 113-40040

District Number: 4 County: Montgomery Date: 08/30/2022

Contact: Kettering Engineer Phone: (937) 296-2436
(The individual who will be available during business hours and who can best answer or coordinate the response to questions)

Email: ketteringengineering@ketteringoh.org FAX: _____

Project

Project Name: Golf Club Estates Storm Sewer Improvements, Phase 1 Zip Code: 45429

Subdivision Type	Project Type (Select single largest component by $)	Funding Request Summary (Automatically populates from page 2)	
City	1. Road	Total Project Cost:	1,559,250 .00
	2. Bridge/Culvert	1. Grant:	190,000 .00
	3. Water Supply	2. Loan:	190,000 .00
	4. Wastewater	3. Loan Assistance/ Credit Enhancement:	0 .00
	5. Solid Waste		
	x 6. Stormwater	Funding Requested:	380,000 .00

District Recommendation (To be completed by the District Committee)

Funding Type Requested (Select one)

- ☐ State Capital Improvement Program
- ☐ Local Transportation Improvement Program
- ☐ Revolving Loan Program
- ☐ Small Government Program

District SG Priority: _____

SCIP Loan - Rate: ____ % Term: ____ Yrs Amount: _____ .00

RLP Loan - Rate: ____ % Term: ____ Yrs Amount: _____ .00

Grant: Amount: _____ .00

LTIP: Amount: _____ .00

Loan Assistance / Credit Enhancement: Amount: _____ .00

For OPWC Use Only

STATUS

Project Number: _____

_____

Release Date: _____

OPWC Approval: _____

Grant Amount: _____ .00

Loan Amount: _____ .00

Total Funding: _____ .00

Local Participation: _____ %

OPWC Participation: _____ %

Loan Type: ☐ SCIP ☐ RLP

Date Construction End: _____

Date Maturity: _____

Rate: _____ %

Term: _____ Yrs

1.0 Project Financial Information (All Costs Rounded to Nearest Dollar)

1.1 Project Estimated Costs

Engineering Services

Preliminary / Final Design: 0 .00

Construction Administration: 0 .00

Total Engineering Services:	a.)	0 .00	0 %
Right of Way:	b.)	0 .00	
Construction:	c.)	1,417,500 .00	
Permits, Advertising, Legal:	e.)	0 .00	
Construction Contingencies:	f.)	141,750 .00	
Total Estimated Costs:	g.)	1,559,250 .00	

1.2 Project Financial Resources

Local Resources

Local In-Kind or Force Account:	a.)	0 .00	
Local Revenues:	b.)	1,179,250 .00	
Other Public Revenues:			
Local / ODOT - Let:	d.)	0 .00	
ODOT PID:			
OEPA / OWDA:	e.)	0 .00	
CDBG:	f.)	.00	
Other:	g.)	0 .00	
Subtotal Local Resources:	i.)	1,179,250 .00	75.6 %

OPWC Funds (Check all requested and enter Amount)

Grant: 50 % of OPWC Funds	j.)	190,000 .00	
Loan: 50 % of OPWC Funds	k.)	190,000 .00	20 yrs
Loan Assistance / Credit Enhancement:	l.)	0 .00	
Subtotal OPWC Funds:	m.)	380,000 .00	24.4 %
Total Financial Resources:	n.)	1,559,250 .00	100 %

1.3 Availability of Local Funds

Attach a statement signed by the Chief Financial Officer listed in section 5.2 certifying all local resources required for the project will be available on or before the earliest date listed in the Project Schedule section. The OPWC Agreement will not be released until the local resources are certified. Failure to meet local share may result in termination of the project. Applicant needs to provide written confirmation for funds coming from other funding sources.

2.0 Repair / Replacement or New / Expansion

2.1 Total Portion of Project New / Expansion: 838,670 .00

3.0 Project Schedule

3.1 Engineering / Design / Right of Way	Begin Date:	07/01/2022	End Date:	11/30/2022
3.2 Bid Advertisement and Award	Begin Date:	03/23/2023	End Date:	04/27/2023
3.3 Construction	Begin Date:	07/01/2023	End Date:	05/03/2024

Construction cannot begin prior to release of executed Project Agreement and issuance of Notice to Proceed.

Failure to meet project schedule may result in termination of agreement for approved projects. Modification of dates must be requested in writing by project official of record and approved by the Commission once the Project Agreement has been executed.

4.0 Project Information

If the project is multi-jurisdictional, information must be consolidated in this section.

4.1 Useful Life / Cost Estimate / Age of Infrastructure

Project Useful Life: 30 Years Age: 1956 (Year built or year of last major improvement)

Attach Registered Professional Engineer's statement, with seal or stamp and signature confirming the project's useful life indicated above and detailed cost estimate.

4.2 User Information

Road or Bridge: Current ADT _____ Year _____

Water / Wastewater: Based on monthly usage of 4,500 gallons per household; attach current ordinances.

Residential Water Rate	Current $	0	Number of households served: _____
Residential Wastewater Rate	Current $	0	Number of households served: _____
Stormwater:			Number of households served: 3,500

4.3 Project Description

A: SPECIFIC LOCATION (Supply a written location description that includes the project termini; a map does not replace this requirement.) 2000 character limit.

The approximate construction limits that will include in the improvements are the streets south of Ridgeview Avenue, west of Southern Boulevard, north of Big Hill Road and east of Regent Street The exact street are shown on the vicinity map.

B: IDENTIFY THE PROBLEM (Describe the issue to be addressed) 2000 character limit.

The neighborhood directly north of the Kettering Medical Center has been experiencing increased flooding due to large rain events over the past several years. A detailed drainage study was performed and determined several of the large storm sewer main lines were severally undersized.

C: PROJECT SCOPE (Describe the work to be completed) 2000 character limit.

The City is proposing to replace the undersized pipes within the system along with replacing deteriorated curbs, sidewalks and drive approaches in the neighborhood. After the completion of this work, the streets will be repaved.

5.0 Project Officials

Changes in Project Officials must be submitted in writing from an officer of record.

5.1 Chief Executive Officer

(Person authorized in legislation to sign project agreements)

Name: Mark Schwieterman

Title: City Manager

Address: 3600 Schroyer Road

City: Kettering State: OH Zip: 45429

Phone: 937-296-2412

FAX:

E-Mail: mark.schwieterman@ketteringoh.org

5.2 Chief Financial Officer

(Can not also serve as CEO)

Name: Nancy Gregory

Title: Finance Director

Address: 3600 Shroyer Road

City: Kettering State: OH Zip: 45429

Phone: 937-296-2400

FAX:

E-Mail: nancy.gregory@ketteringoh.org

5.3 Project Manager

Name: Chad Ingle

Title:

Address: 3600 Shroyer Road

City: Kettering State: OH Zip: 45429

Phone: 937-296-2436

FAX:

E-Mail: chad.ingle@ketteringoh.org

6.0 Attachments / Completeness review

Confirm in the boxes below that each item listed is attached (Check each box)

x A certified copy of the legislation by the governing body of the applicant authorizing a designated official to sign and submit this application and execute contracts. This individual should sign under 7.0, Applicant Certification, below.

x A certification signed by the applicant's chief financial officer stating the amount of all local share funds required for the project will be available on or before the dates listed in the Project Schedule section. If the application involves a request for loan (RLP or SCIP), a certification signed by the CFO which identifies a specific revenue source for repaying the loan also must be attached. Both certifications can be accomplished in the same letter.

x A registered professional engineer's detailed cost estimate and useful life statement, as required in 164-1-13, 164-1-14, and 164-1-16 of the Ohio Administrative Code. Estimates shall contain an engineer's seal or stamp and signature.

A cooperative agreement (if the project involves more than one subdivision or district) which identifies the fiscal and administrative responsibilities of each participant.

Farmland Preservation Review - The Governor's Executive Order 98-IIV, "Ohio Farmland Protection Policy" requires the Commission to establish guidelines on how it will take protection of productive agricultural and grazing land into account in its funding decision making process. Please include a Farm Land Preservation statement for projects that have an impact on farmland.

Capital Improvements Report. CIR Required by O.R.C. Chapter 164.06 on standard form.

x Supporting Documentation: Materials such as additional project description, photographs, economic impact (temporary and/or full time jobs likely to be created as a result of the project), accident reports, impact on school zones, and other information to assist your district committee in ranking your project. Be sure to include supplements which may be required by your local District Public Works Integrating Committee.

7.0 Applicant Certification

The undersigned certifies: (1) he/she is legally authorized to request and accept financial assistance from the Ohio Public Works Commission as identified in the attached legislation; (2) to the best of his/her knowledge and belief, all representations that are part of this application are true and correct; (3) all official documents and commitments of the applicant that are part of this application have been duly authorized by the governing body of the applicant; and, (4) should the requested financial assistance be provided, that in the execution of this project, the applicant will comply with all assurances required by Ohio Law, including those involving Buy Ohio and prevailing wages.

Applicant certifies that physical construction on the project as defined in the application has NOT begun, and will not begin until a Project Agreement for this project has been executed with the Ohio Public Works Commission. Action to the contrary will result in termination of the agreement and withdrawal of Ohio Public Works Commission funding from the project.

Certifying Representative (Printed form, Type or Print Name and Title)

Original Signature / Date Signed

CITY OF KETTERING, OHIO

A RESOLUTION

By: MR. DUKE AND MRS. FISHER No. 10779-22

AUTHORIZING THE CITY MANAGER TO APPLY FOR FUNDING FROM THE OHIO PUBLIC WORKS COMMISSION FOR THE EAST DAVID ROAD IMPROVEMENTS PROJECT AND THE GOLF CLUB ESTATES PROJECT

WHEREAS, the Ohio Public Works Commission's ("OPWC") State Capital Improvement Program and Local Transportation Improvement Program both provide financial assistance to political subdivisions for capital improvements to public infrastructure; and

WHEREAS, the City of Kettering is currently planning to make capital improvements with the following project(s):

1. East David Road Improvements – Far Hills to Ackerman (Project No. 02-116R);

2. Golf Club Estates – Phase 1 (Project No. 03-607B); and

WHEREAS, the infrastructure improvements described above are considered to be a priority need for the community and are qualified projects under the OPWC programs;

NOW, THEREFORE, Be It Resolved by the Council of the City of Kettering, State of Ohio, that:

Section 1. The City Manager is hereby authorized to make application on behalf of the City of Kettering to the OPWC for funds for the capital improvement(s) described in the recital paragraphs above.

Section 2. The City Manager is further authorized to take all necessary and proper action to accept the funds awarded and execute any related contracts or instruments. The City Manager is further authorized to sign any amendments or extensions thereto that the City Manager deems appropriate.

Section 3. As provided in Section 4-8 of the City Charter, this Resolution takes effect immediately upon its adoption.

Passed by Council this 9 day of AUGUST 2022.

Peggy Lehner
PEGGY LEHNER, Mayor

ATTEST:

LASHAUNAH D. KACZYNSKI,
Clerk of Council

CERTIFICATE OF APPROVAL

THEODORE A. HAMER III,
Law Director

(Requested by: Engineering Department)

CITY OF KETTERING
FINANCE DEPARTMENT

CHIEF FINANCIAL OFFICER'S CERTIFICATION OF LOCAL FUNDS

August 25, 2022

I, Nancy Gregory, Finance Director of the City of Kettering, Ohio, hereby certify that the City of Kettering has the amount of **$ 1,179,250.00** in the Capital Improvement Fund and that this amount will be used to pay the local share for the Golf Club Estates Phase 1 Project, when it is required.

I, Nancy Gregory, Finance Director of the City of Kettering, hereby certify that the City of Kettering has the amount of **$190,000.00** in the Capital Improvement Fund and that this amount will be used to repay the Ohio Public Works Commission SCIP or RLP loan requested for the Golf Club Estates Phase 1 Project over a 20 year term.

Nancy Gregory, Finance Director
City of Kettering, Ohio

3600 SHROYER ROAD • KETTERING, OHIO 45429-2799
937-296-2401 • FAX 937-296-3390
www.ketteringoh.org

ENGINEER'S ESTIMATE

CITY PROJECT NUMBER: 03-607A

PROJECT NAME: GOLF CLUB ESTATES - PHASE 1

July 7, 2022

SPEC. NO.	DESCRIPTION	EST'D QUANT.	UNIT	UNIT PRICE	ESTIMATED COST
	ROADWAY				
201-1000	CLEARING AND GRUBBING INCLUDING TREE/STUMP REMOVAL (<12")	1	LUMP	$10,000.00	$10,000.00
202-2100	CONCRETE CURB AND GUTTER REMOVED	1,762	FOOT	$11.00	$19,382.00
202-3000	CONCRETE FLATWORK REMOVED (6" & UNDER)	2,625	SF	$3.50	$9,187.50
202-3500	ASPHALT DRIVE REMOVED	700	SF	$4.00	$2,800.00
203A-1101	EXCAVATION AND EMBANKMENT, INCLUDING ASPHALT CONCRETE AND PIPE < 8"	1,430	CY	$30.00	$42,900.00
204-1000	SUBGRADE COMPACTION	3,321	SY	$2.00	$6,642.00
254	PAVEMENT PLANING	6,181	SY	$3.00	$18,544.33
301-1000	ASPHALT CONCRETE BASE	968	TON	$80.00	$77,440.00
304-1000	AGGREGATE BASE	1,476	TON	$45.00	$66,420.00
407-2000	NON-TRACKING TACK COAT	618	GAL	$3.00	$1,854.43
441-1100	ASPHALT CONCRETE SURFACE COURSE, TYPE 1 (448), PG64-22 (1.5")	567	TON	$105.00	$59,496.40
608A-2061	6" CONCRETE DRIVE APPROACH	2,625	SF	$11.00	$28,875.00
608B-1400	ASPHALT DRIVEWAY (449)	700	SF	$20.00	$14,000.00
609-1100	KETTERING TYPE B CONCRETE CURB AND GUTTER	2,362	FOOT	$46.00	$108,652.00
611	STORM MANHOLE ADJUSTED TO GRADE, TYPE 2B	3	EA	$1,000.00	$3,000.00
614-1001	MAINTAINING TRAFFIC, AS PER PLAN	1	LUMP	$74,999.72	$74,999.72
653-0300	TOPSOIL FURNISHED AND PLACED, 4" DEPTH	108	TON	$40.00	$4,320.00
659-0100	SEEDING AND MULCHING	972	SY	$3.00	$2,916.00
832-0200	SEDIMENT AND EROSION CONTROL, PER ODOT SS 832	5,000	EACH	$1.00	$5,000.00
901-6310	WATER LINE VALVE BOX ADJUSTED TO GRADE, PER MCES SPECIFICATIONS	16	EACH	$500.00	$8,000.00
902-2010	SANITARY MANHOLE ADJUSTED TO GRADE	12	EACH	$1,200.00	$14,400.00
				TOTAL ROADWAY	**$578,829.39**
	STORM SEWER UPSIZING				
202-1010	PIPE REMOVED (>8")	1,193	FOOT	$50.00	$59,650.00
202-1200	MANHOLE REMOVED	6	EACH	$1,500.00	$9,000.00
611	MANHOLE, ODOT NO 3 (9' DIA)	6	EACH	$9,000.00	$54,000.00
611	30" CONDUIT, ADS N-12 OR APPROVED EQUAL	213	FOOT	$230.00	$48,990.00
611	48" CONDUIT, ADS N-12 OR APPROVED EQUAL	290	FOOT	$285.00	$82,650.00
611	54" CONDUIT, ADS N-12 OR APPROVED EQUAL	504	FOOT	$353.00	$177,912.00
611	53" x 83" CONDUIT, TYPE B	476	FOOT	$810.00	$385,560.00

614-1001	MAINTAINING TRAFFIC, AS PER PLAN	1	LUMP	$74,999.72	$20,908.61
				TOTAL STORM SEWERS	$838,670.61
				SUBTOTAL:	$1,417,500.00
				10% CONTINGENCY:	$141,750.00
8/16/22 Chad Ingle					
DATE	Signed: Chad Ingle, PE, PS			TOTAL CONSTRUCTION COST:	$1,559,250.00

A weighted useful life statement stamped/sealed and signed by a licensed professional engineer must be included with the project application.

This spreadsheet has formulas to make a weighted useful life calculation and is populated with an example for illustrative purposes. Items can be added to column a.

Weighted Useful Life & Design Service Capacity Calculations

Major Component	Cost ($1,000)	Portion Repair / Replacement (%)	Repair / Replace Product	Useful Life (Years)	Useful Life Product
Full-depth road construction w/ drainage		100		25	
Full-depth road construction w/o drainage				25	
Partial-depth road construction w/ drainage		100		30	
Partial-depth road construction w/o drainage	$578.83	100	57883	15	8682.45
Storm Sewers	$838.67	10	8386.7	40	33546.8
Sanitary Sewers		100		40	
Water Lines				40	
Bridge				75	
Pumps, Lift Stations				15	
Sidewalks		100		25	
Bike Facility		100		7	
Traffic Signal		100		25	
Totals	1417.5		66269.7		42229.25

Weighted Useful Life: 29.8 Years

Design Service Capacity (Project Application, Section 2.0):

Portion Repair / Replace	47 %
Portion New / Expansion	53 %

Chad Ingle 8/16/22

OHIO PUBLIC WORKS COMMISSION
DISTRICT 4
Round 2022-2023 Supplemental Questionnaire

Applicant: City of Kettering

Project Title: Golf Club Estate Storm Sewer Improvements, Phase 1

Application Summary:

Briefly describe the project:

The City of Kettering has experienced significant flooding in the roadways and basements in the residential neighborhood north of the Kettering Medical Center along Southern Boulevard. The City hired LJB Inc. to perform a flood study in this area and recommend possible improvements to reduce the flooding. The study determined that the two main storm drainage systems going through the neighborhood are undersized and recommend replacing the storm pipes with larger diameter pipe.

Based on these recommendations, the City has developed a plan to up-size the storm sewer system along with improvements to the neighborhood.

The project will include:
-Replacing the undersized pipes within the system.
-Remove and replace deteriorated curb, sidewalk and drive approaches in the project limits.
-Mill and pave the streets after the improvements have been made.

Priority:

Is this application your priority project? (Circle One)	
Yes ○	No ●

Generation of Revenue:

Will new user fees or assessments be assessed as part of this project? (Circle One)	
Yes ●	No ○
What will the new user fees or assessments be used for?	
The property owner's will be assessed for the removal and replacement of deteriorated curb, sidewalk and drive approach.	

Additional Funding:

Will OPWC match, in part, a committed grant or loan? (Circle One)	
Yes ○	No ●
If no, was the project submitted to an appropriate agency for funding, but denied due to lack of funding? (Circle One)	
Yes – Appropriate Documentation Attached ○	No ●

Readiness of Project:

Will this project be substantially underway on or before June 1, 2024? (Circle One)	
Yes ●	No ○

Health & Safety:

Describe the specific health or safety issue being addressed by this project. What deficiency or condition is causing the health or safety issue?
The Golf Course Estates Neighborhood was developed in the 1950's prior to the development of the surrounding area, including the hospital. At the western edge of the neighborhood is where the storm sewer system outlets into an open channel and continues to the west. This is the main outlet for large drainage area of 418 acres serving approximately 683 Kettering Residences. The neighborhood is experiencing both roadway flooding and water in basements on the larger rain events. These rain events are consistently happening more frequently causing the concern for the health and safety of the neighborhood.

Addresses District Infrastructure Needs:

Is this project located in more than one community? (Circle One)		
Yes ○	No ◉	
What percentage of the community will be served by this project? (Circle One)		
Less than 25% ◉	25% to 40% ○	More than 40% ○

Economic Development

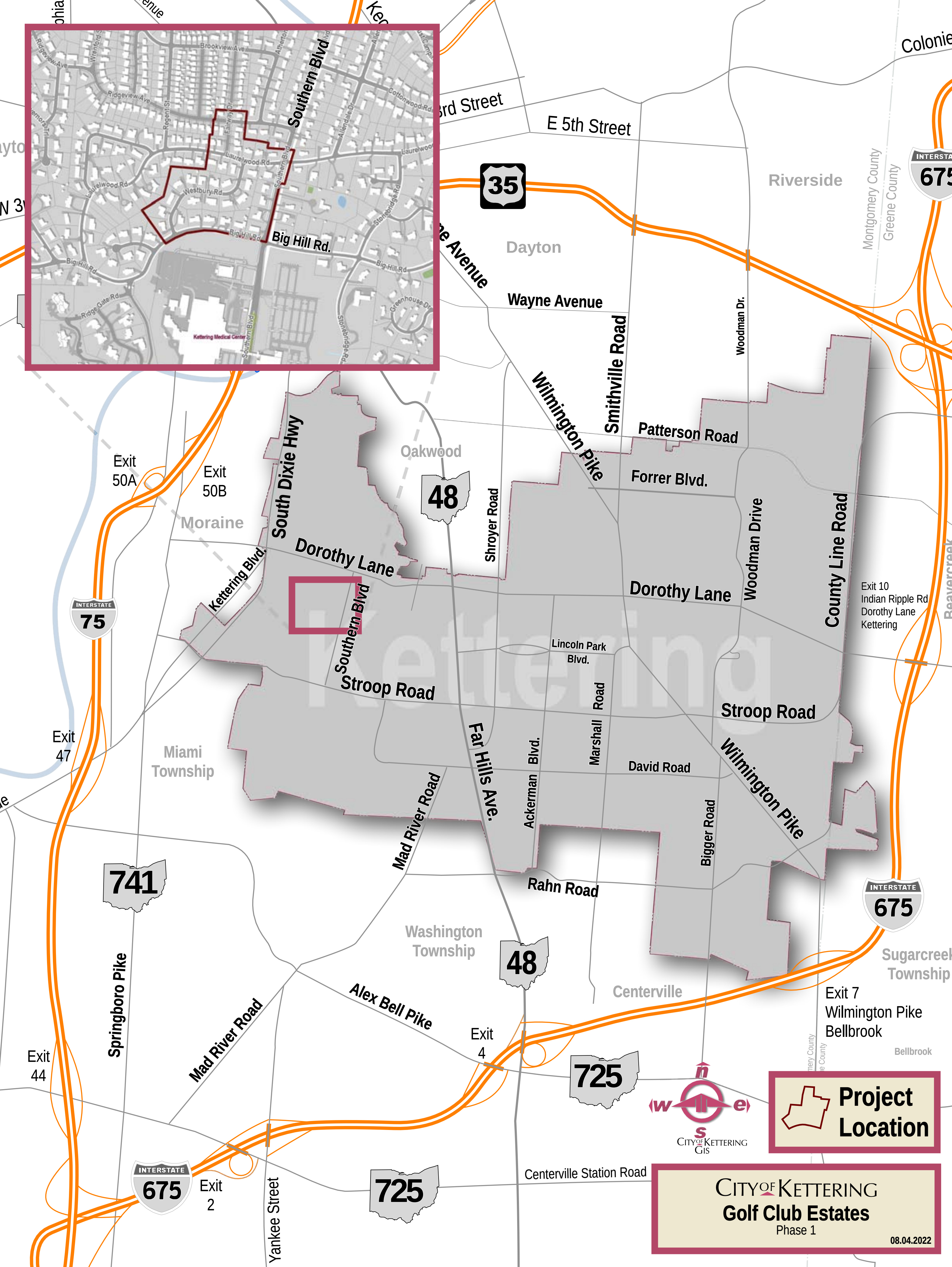
How many jobs are being created as a result of this project?	NA
How many jobs will be retained as a result of this project?	NA
Why is it necessary to fund this improvement to secure this development?	
NA	
What type of industry is proposed in this development?	
NA	

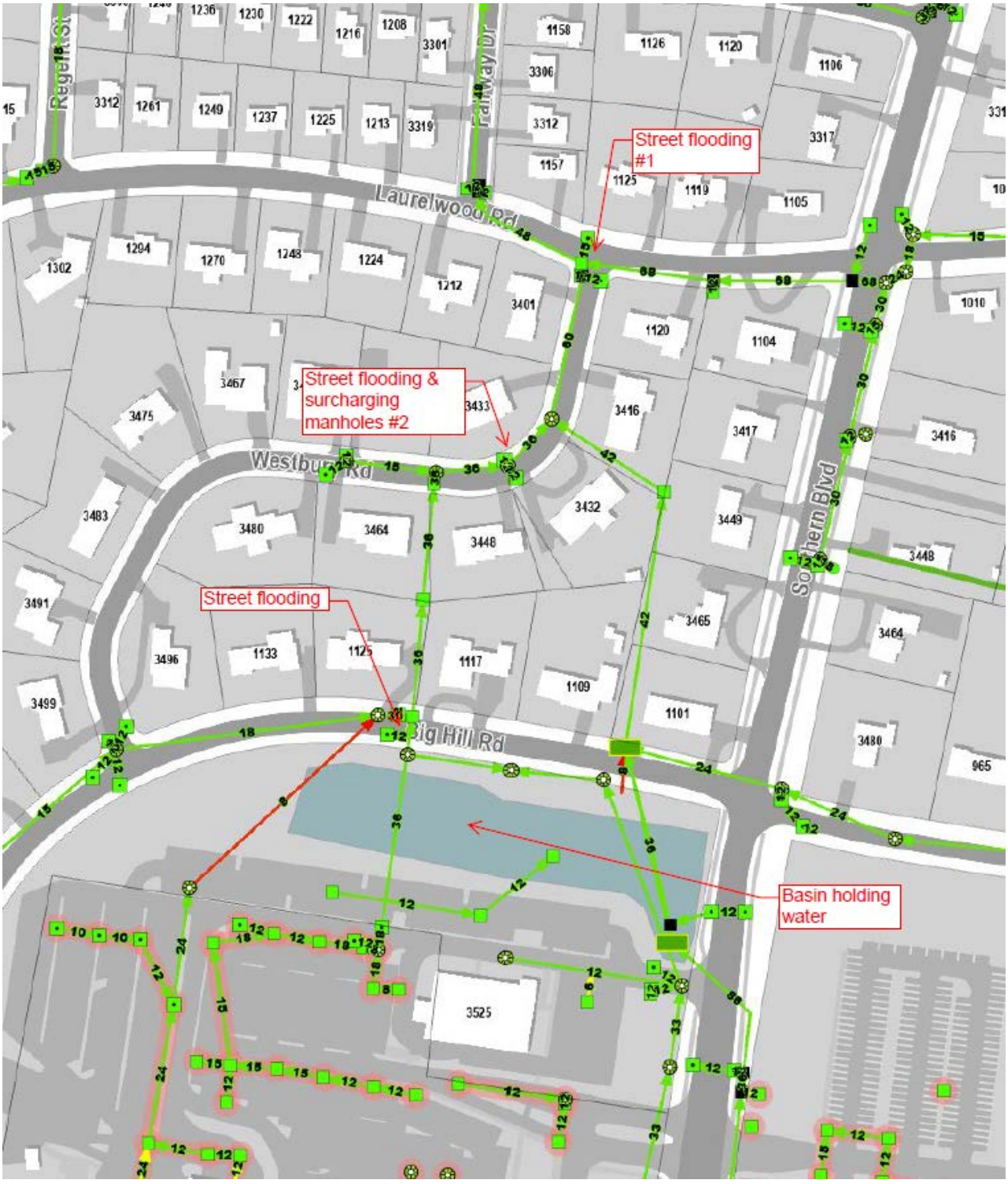
Relieve Existing Traffic Congestion:

What is the level of service?	NA

Other Factors

What other factors exist that make this project more important than other like projects?
The City of Kettering will the design the improvements in-house and has already started the topographical survey of the area. The City will be ready to go out for bid and award the project when the funds are available. The City is also coordinating with Montgomery County Environmental Services and CenterPoint Energy to replace the aging water and gas utilities in the neighborhood prior to paving the project. The project will be a large investment into the aging infrastructure that will greatly improve the health and safety for the residents in the neighborhood.


Southern Blvd
Big Hill Rd.
Brookview Ave
Ridgeview Ave
Laurelwood Rd
Westbury Rd
Big Hill Rd
Kettering Medical Center
3rd Street
E 5th Street
35
Riverside
Montgomery County
Greene County
675
INTERSTATE
Colonie
Dayton
Wayne Avenue
Smithville Road
Woodman Dr.
Wilmington Pike
Patterson Road
Forrer Blvd.
Oakwood
48
Shroyer Road
South Dixie Hwy
Exit 50A
Exit 50B
Moraine
Dorothy Lane
Kettering Blvd.
75
Woodman Drive
County Line Road
Exit 10
Indian Ripple Rd
Dorothy Lane
Kettering
Kettering
Southern Blvd
Lincoln Park Blvd.
Stroop Road
Stroop Road
Marshall Road
Exit 47
Miami Township
David Road
Ackerman Blvd.
Far Hills Ave.
Mad River Road
Bigger Road
Wilmington Pike
741
Rahn Road
675
Washington Township
48
Centerville
Sugarcreek Township
Springboro Pike
Alex Bell Pike
Exit 7
Wilmington Pike
Bellbrook
Bellbrook
Exit 44
Mad River Road
Exit 4
725
n
w
e
s
City of Kettering GIS
Project Location
675
Exit 2
Yankee Street
725
Centerville Station Road
City of Kettering
Golf Club Estates
Phase 1
08.04.2022



Map indicated locations that have experienced significant flooding during large rain events.

Street Flooding and manhole surcharging at location #1

Street Flooding and manhole surcharging at location #1

Street Flooding and multiple drainage structures surcharging at location #1

Street Flooding and multiple drainage structures surcharging at location #2

Street Flooding and manhole surcharging at location #2

SOUTHERN BOULEVARD AREA DRAINAGE STUDY

February 21, 2022

PREPARED FOR:

City of Kettering

3600 Shroyer Road
Kettering, OH 45429-2799

PREPARED BY:

LJB Inc.

2500 Newmark Drive
Miamisburg, OH 45342
(937) 259-5000

Joe Espelage, PE
jespelage@LJBinc.com

DISCUSSION

BACKGROUND

LJB Inc. has been tasked with investigating flooding issues in the residential neighborhood north of the Kettering Hospital main campus along Southern Boulevard. The study area includes a low-lying area, bound by hillsides east of Southern Boulevard and west of Ridgegate Road. The primary focus area includes three areas, as seen on the attached plan sheets, that observed ponding water on the roadways and lawn areas during two storm events in the 2021 calendar year. This study analyzes the existing storm system and provides two alternatives, along with estimated construction cost.

There are two main storm sewer drainage systems between the hospital to the south and W. Dorothy Lane to the north, in addition to an existing detention area that lies between Big Hill Road and the hospital's northern parking lot. The two systems run adjacent to each other along Ridgeview Avenue and Brookview Avenue. A 'knockout' between adjacent systems has been added near the intersection of Ridgeview Avenue and Fairway Drive that connects these systems. Based on field observations, it appears that the southern system utilizes the northern system as an overflow. For the purposes of this study, we have analyzed the systems independently, focusing on the southern system, where the primary flooding issues have occurred.

STORM SYSTEM ANALYSIS

The City of Kettering provided LJB Inc. with existing GIS/aerial mapping, field measurements for the existing drainage system, drainage areas, inspection reports, a previous drainage study for the hospital area east of Southern Boulevard, and photos documenting the flooding locations. Using this information, the existing storm sewer networks were modeled, as a baseline. There was no existing data on the existing detention basin north of the hospital and field observations did not find features of a detention basin, i.e., a control structure. To account for the unknown detention/retention factor, a lower runoff coefficient was used for the hospital site. Flow from the eastern hospital area was taken from the previous study and introduced into the system at point 115. Storm analysis was done utilizing a 10 year design storm with a 25 year hydraulic grade line check.

Three alternatives were analyzed to resolve the flooding issues. Alternative 1 focuses on identifying and replacing undersized pipes within the system. Alternative 2 recommends a combination of undersize pipe replacement and upgrades to the detention area north of Kettering Hospital. Alternative 3 is similar to Alternative 1, with the difference being that flow from the west side of Southern Boulevard (115) is diverted west to 112F, bypassing 114.

FINDINGS

Using ODOT CDSS software, analysis of the existing storm system reveals many undersized pipes, with much of the system surcharging out of structures. One key sections of the system is the pipes connecting Structures 110,109 and 107. Structure 110, an area where flooding has occurred, has two large conduits flowing into it, a 68" diameter conduit to the east and a 60" diameter conduit to the south. The conduit leaving Structure 110 is a significantly smaller, 48" diameter pipe, that runs west along Laurelwood Road and north up Fairway Drive, connecting into Structure 107, which is then upsized to a 66" diameter conduit. Analysis shows the 48" conduit connecting these structures is undersized.

Another section of concern are the pipes connecting Structures 112F through 112. Per CDSS analysis, this section of 36" diameter pipe is undersized. Structure 112, another area where flooding conditions were observed, includes 36" and 42" diameter pipes entering and a 60" pip exiting the structure. The 60" pipe connects directly to the previously mentioned Structure 110.

The third noteworthy section is a 24" diameter conduit that connects Structure 116 to 114, running east to west across Southern Boulevard. This section is the main outlet of a nearly 38 acre drainage area, which analysis shows to be heavily undersized.

CONCLUSIONS

Analysis of the existing storm sewer system and the location of undersized pipes supports the overserved flooding locations. Flooding in the Laurelwood and Westbury Road intersection likely stems from the undersized 48" pipe leaving Structure 110 in that intersection. With the other two flooding locations occurring upstream of Structure 110, the 48" conduit is likely the main cause of the flooding locations. The undersized 36" pipe stemming from Big Hill Road, through yards, to the Westbury Road curve, likely adds to the flooding caused by the downstream 48" conduit.

For Alternative 2, the flow was detained at junction 114. This reduction eliminated the need to upsize the two lengths of existing 42" (114-113-112), but still requires the existing 48" and 36" conduits to be increased. To determine if detention of the entire hospital site was an option to eliminate the need to upsize downstream pipes, we retained 100% of the flow at junction 114. There was still a need to upsize the previously mentioned 48"and 36" conduits. Alternative 3 reduces the number of parcels impacted by the project. No work will be done from junctions 114-112. An additional length of pipe will be added along Big Hill Rd. and the existing 36" (112F to 112) will require upsizing to 54".

The proposed schematic detention basin was modeled upstream of junction 114. The model used the proposed 25.34 acres draining from the existing hospital site. The proposed basin would provide detention for the 25.34 acres draining from the hospital site but would not further detain the existing controlled runoff stemming from southeast of Junction 115. An approximately 3.50 acre-foot dry detention pond would be needed to reduce the flow entering Junction 114 from roughly 163 cubic feet per second (cfs) to 90 cfs. The pond would reduce flow for a 10 year storm and 25 year storm event entering Junction 114 to approximately 85 cfs and 120 cfs respectively. For estimating purposes, an assumed depth of 2' was used for the existing basin and a 5' depth used for the proposed basin.

All alternatives could be implemented in phases, with initial focus area being the upsizing of the 48" conduit between Structures 110 and 107 to a 66" diameter conduit. Upsizing the 36" conduit, between Structures 112 and 112F, to a 42" conduit, would be a secondary phase. Estimated costs for each alternative can be seen below:

Alternative 1, Upsize all undersized pipes (no detention)
This alternative would replace approximately 1700' of existing sewer as summarized in the conduit summary table with an estimated construction cost of $1,198,872.

Alternative 2, Upsize problem pipe sections (with detention)
This alternative would replace approximately 1100' of existing sewer as summarized in the conduit summary table, with an estimated construction cost of $1,099,692.

City is going with Alt. # 3

Alternative 3, Upsize problem pipe sections (no detention)
This alternative would replace approximately 1500' of existing sewer and add 290' as summarized in the conduit summary table, with an estimated construction cost of $1,120,404.

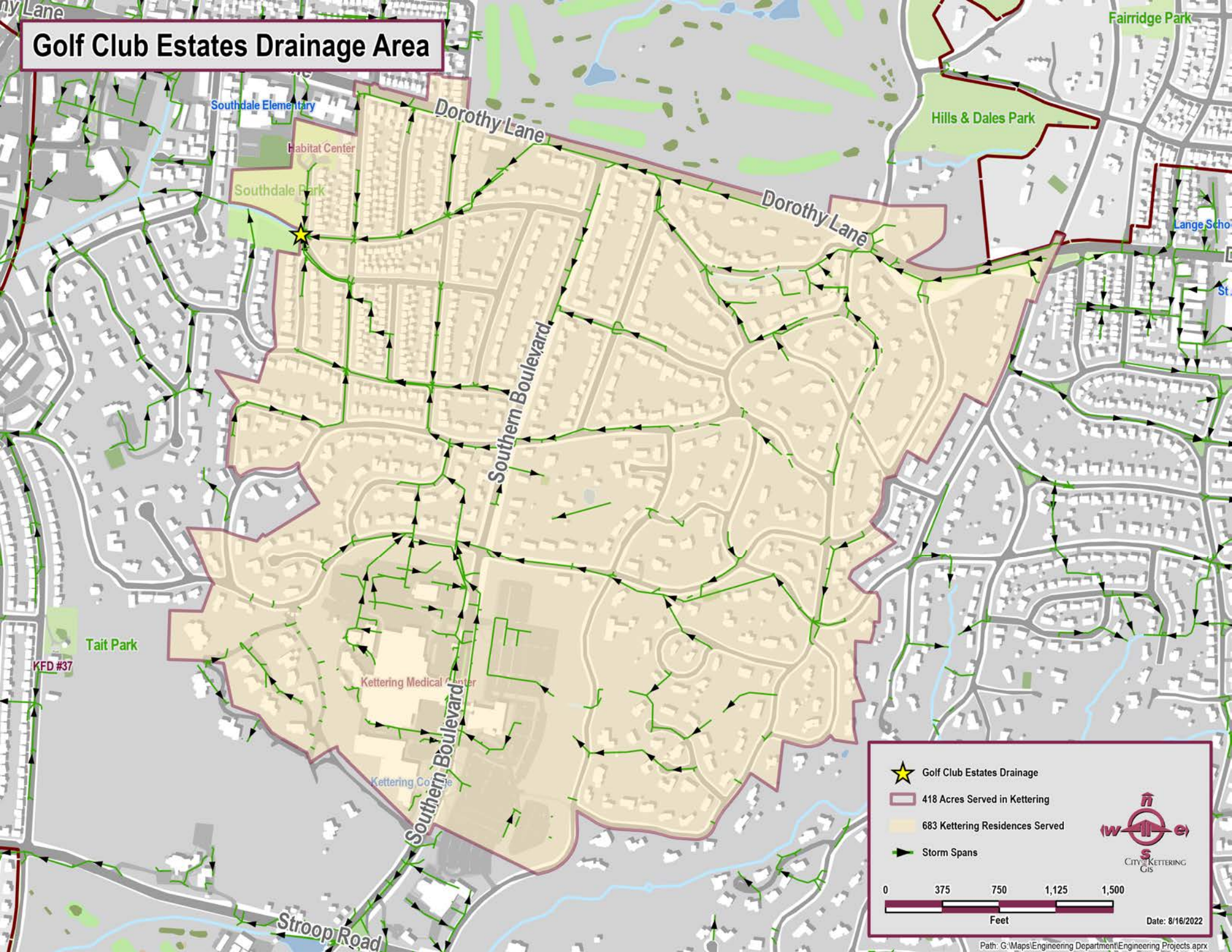
It remains unclear, after analyzing existing data and multiple site visits, how the low lying "detention" area north of the hospital's parking lot functions, outside of an area for the north parking lot to drain. No additional pipes/structures were found entering the area and no control structure was observed for a means of ponding water to exit. Further investigation of this area should be performed to determine if ponding water enters the storm sewer system.

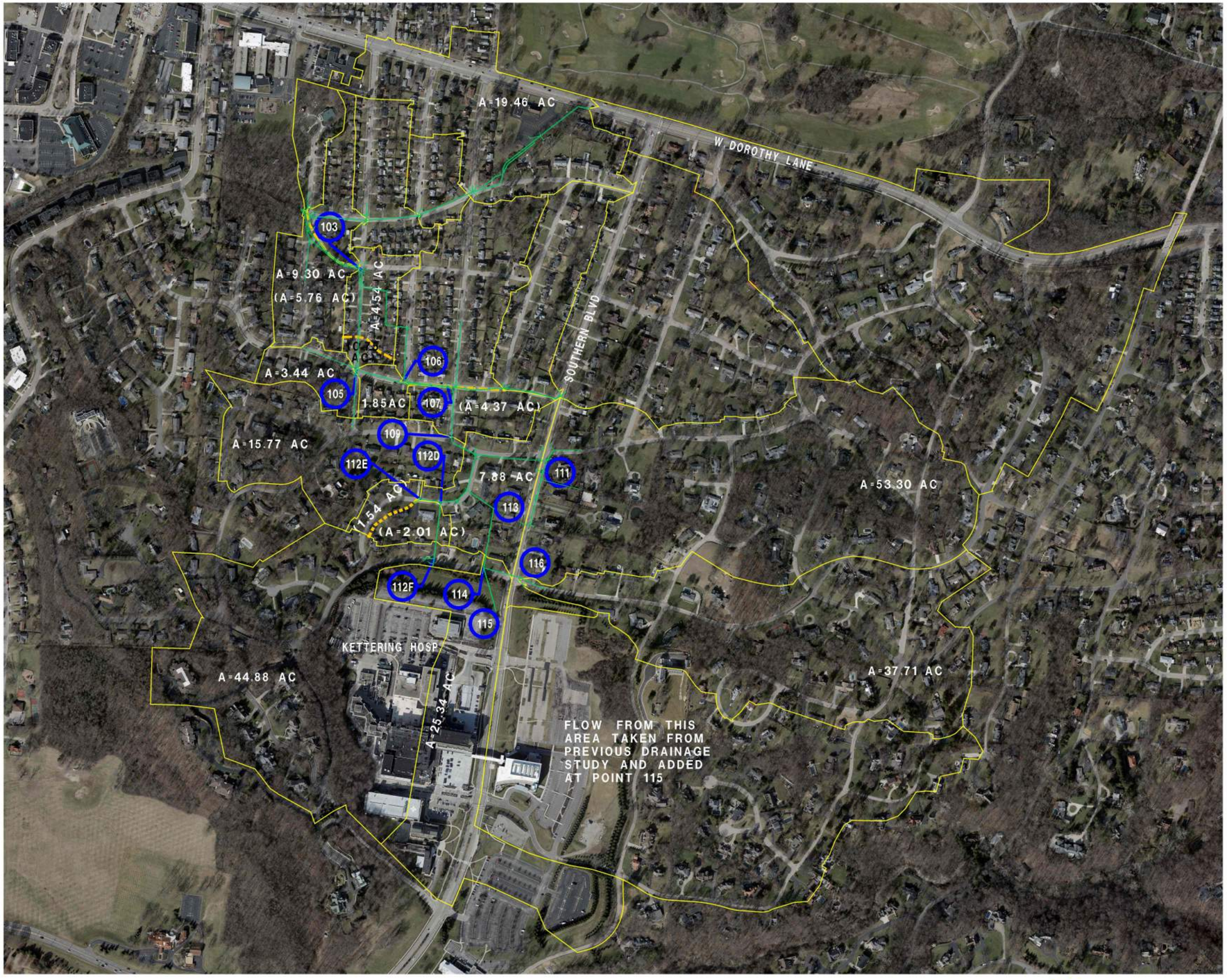
SOUTHERN BOULEVARD AREA DRAINAGE STUDY

Alternative 1			
Conduit Section	**Existing Size**	**Proposed Size**	**Approx. Length**
	(inches)	(inches)	(Feet)
116-114	24	30	213
114-113	42	54	342
113-112	42	54	183
112F-112D	36	42	324
112D-112A	36	42	96
112A-112	36	42	84
110-109	48	53x83	177
109-107	48	53x83	299
		Total Length	1718
Alternative 2			
Conduit Section	**Existing Size**	**Proposed Size**	**Approx. Length**
	(inches)	(inches)	(Feet)
116-114	24	36	213
112F-112D	36	42	324
112D-112A	36	42	96
112A-112	36	42	84
110-109	48	53x83	177
109-107	48	53x83	299
		Total Length	1193

Alternative 3			
Conduit Section	**Existing Size**	**Proposed Size**	**Approx. Length**
	(inches)	(inches)	(Feet)
116-114	24	30	213
114-113	42	42	
113-112	42	42	
114A-112F		48	290
112F-112D	36	54	324
112D-112A	36	54	96
112A-112	36	54	84
110-109	48	53x83	177
109-107	48	53x83	299
		Total Length	1483

STUDY STRUCTURE NO.		CITY STRUCTURE NO.
107	=	12299
111	=	10718
112	=	12797
112B	=	12796
112D	=	12792
112E	=	12791
116	=	10329


Golf Club Estates Drainage Area
Southdale Elementary
Habitat Center
Southdale Park
Dorothy Lane
Dorothy Lane
Hills & Dales Park
Fairridge Park
Southern Boulevard
Southern Boulevard
Tait Park
KFD #37
Kettering Medical Center
Kettering College
Stroop Road
Golf Club Estates Drainage
418 Acres Served in Kettering
683 Kettering Residences Served
Storm Spans
City of Kettering GIS
0
375
750
1,125
1,500
Feet
Date: 8/16/2022
Path: G:\Maps\Engineering Department\Engineering Projects.aprx



XX INDICATES DRAINAGE AREA OUTLET POINT FOR FOR MODELING PURPOSES

DRAINAGE AREA BOUNDARIES

HORIZONTAL SCALE IN FEET
0 150 300 600

EXHIBIT 1 - DRAINAGE AREA MAP

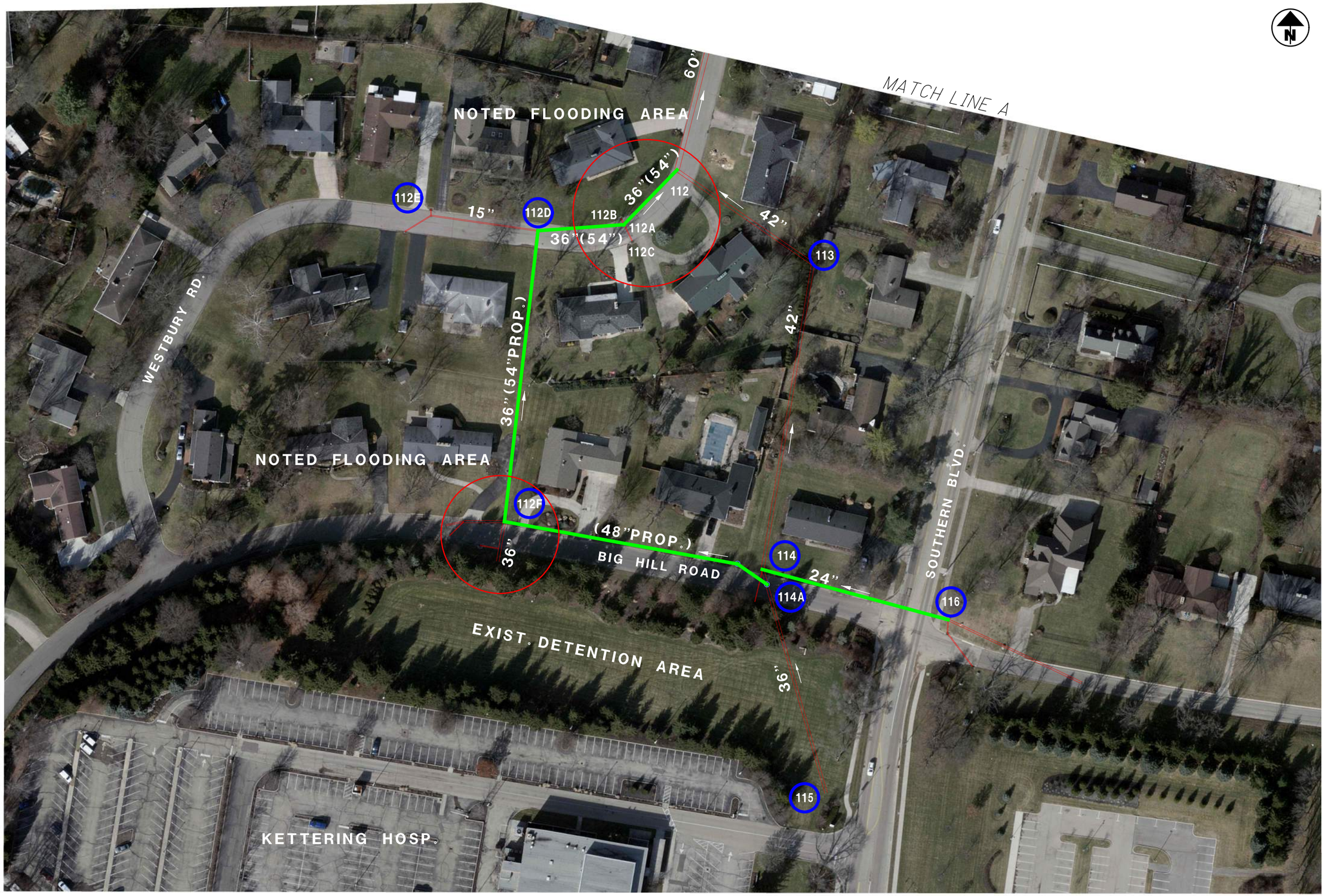
DESIGN AGENCY

DESIGNER JRE

REVIEWER BMG 1/26/22

PROJECT ID 0

SHEET 1 TOTAL 10



HORIZONTAL SCALE IN FEET
0 25 50 100

EXHIBIT 2 - ALTERNATIVE 3, PLAN 1/3

DESIGN AGENCY

DESIGNER JRE
REVIEWER BMG 1/26/22
PROJECT ID 0
SHEET 8 TOTAL 10

MODEL: Detail 1 PAPERSIZE: 17x11 (in.) DATE: 2/21/2022 TIME: 10:40:21 AM USER: jespellage
Q:\City of Kettering\0107004C.00 - Engineering Services 2019-2021\0052 Storm Hydaulic Analysis\Dev\Drawings\Civ\Design\Drainage3.dgn

MATCH LINE B

104
105
66”
106
66”
107
108
RIDGEVIEW AVE.
FAIRWAY DR.
48”
(53”x83”PROP.)
SOUTHERN BLVD.
109A
109B
109
48”
(53”x83”PROP.)
NOTED FLOODING AREA
110A
LAURELWOOD RD.
110
110D
110B
110C
68”
111

MATCH LINE A

N

HORIZONTAL SCALE IN FEET
0 25 50 100

EXHIBIT 2 - ALTERNATIVE 3, PLAN 2/3

DESIGN AGENCY

DESIGNER JRE
REVIEWER BMG 1/26/22
PROJECT ID 0
SHEET 9 TOTAL 10

MODEL: Detail 2 PAPERSIZE: 17x11 (in.) DATE: 2/21/2022 TIME: 10:40:23 AM USER: jespelage
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MODEL: Detail 3 PAPERSIZE: 17x11 (in.) DATE: 2/21/2022 TIME: 10:40:25 AM USER: jespelage
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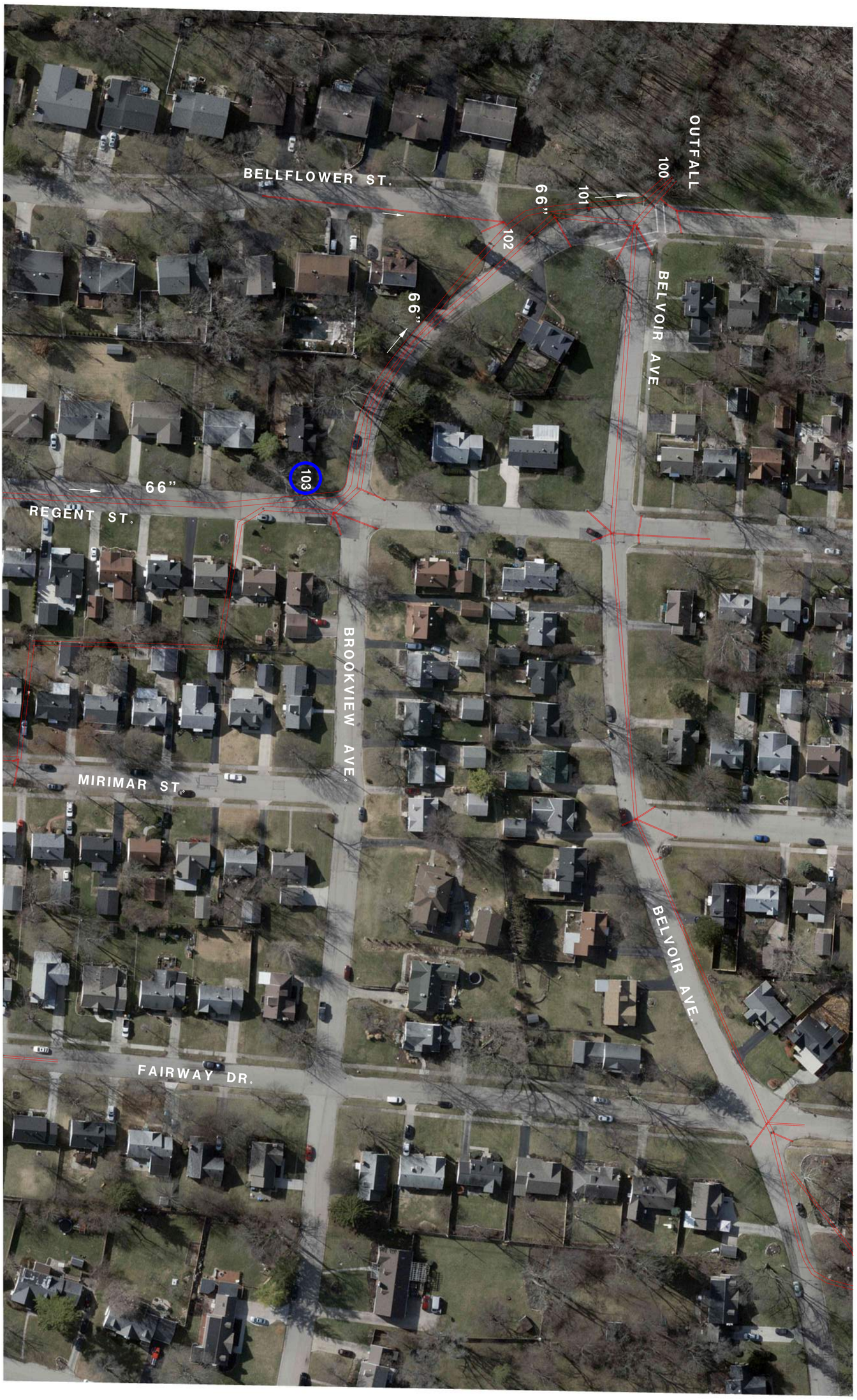

MATCH LINE B

EXHIBIT 2 -ALTERNATIVE 3, PLAN 3/3

SHEET	TOTAL	PROJECT ID	REVIEWER	DESIGNER	DESIGN AGENCY
10	10	0	BMG 1/26/22	JRE	

HORIZONTAL SCALE IN FEET
0 50
25 100