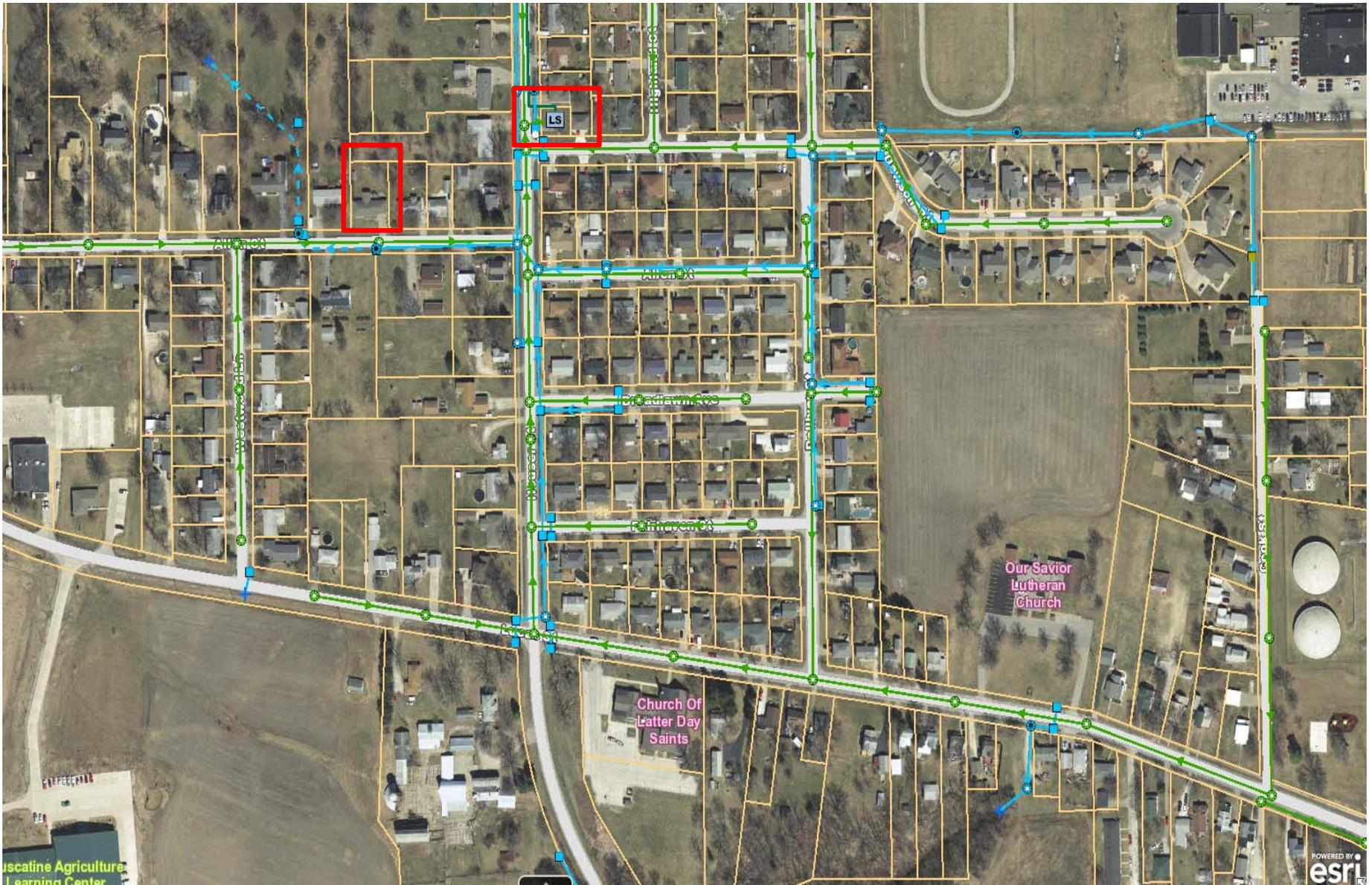


Allen Street Sewer Discussion

Council In-depth meeting

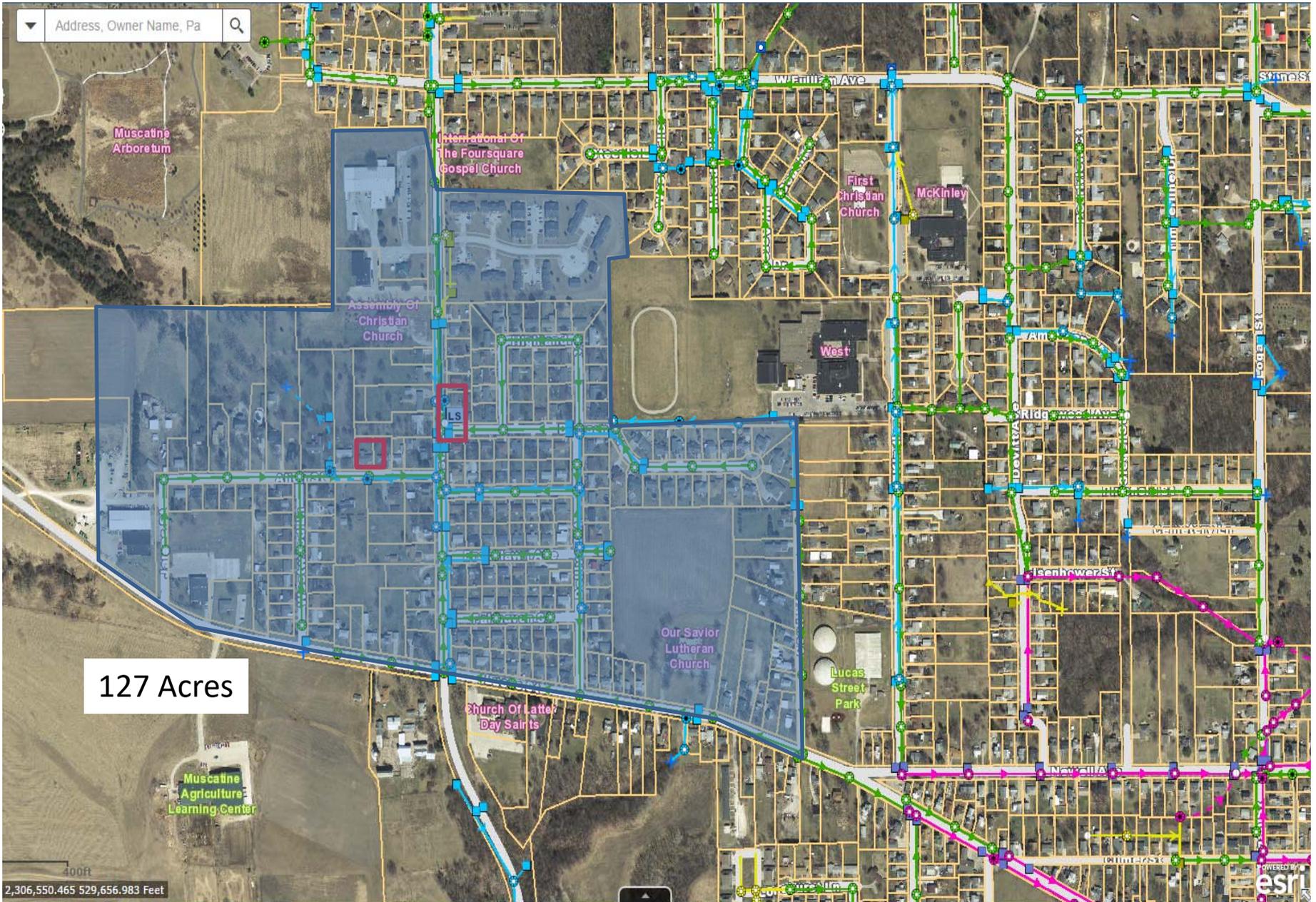
November 9, 2017

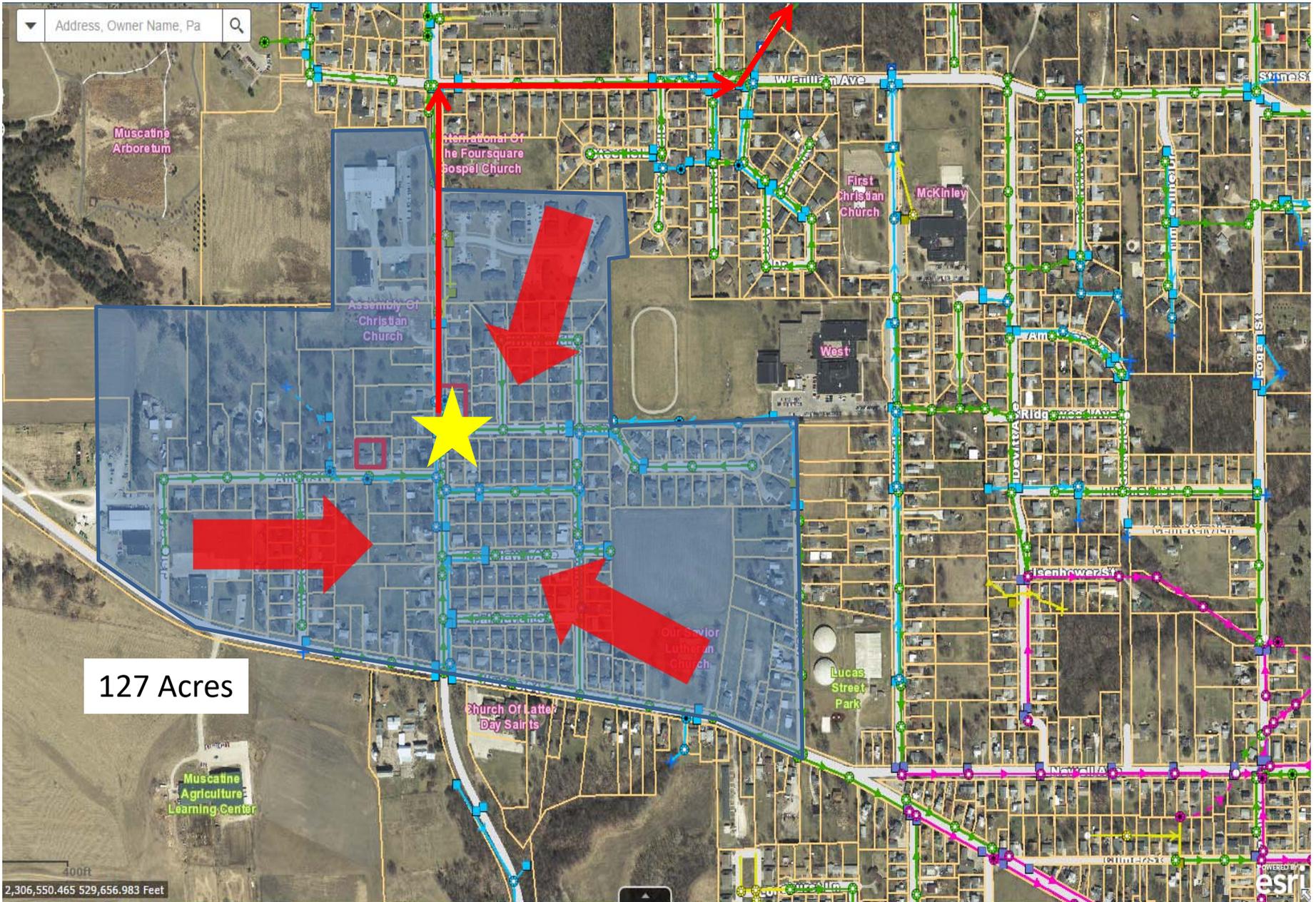


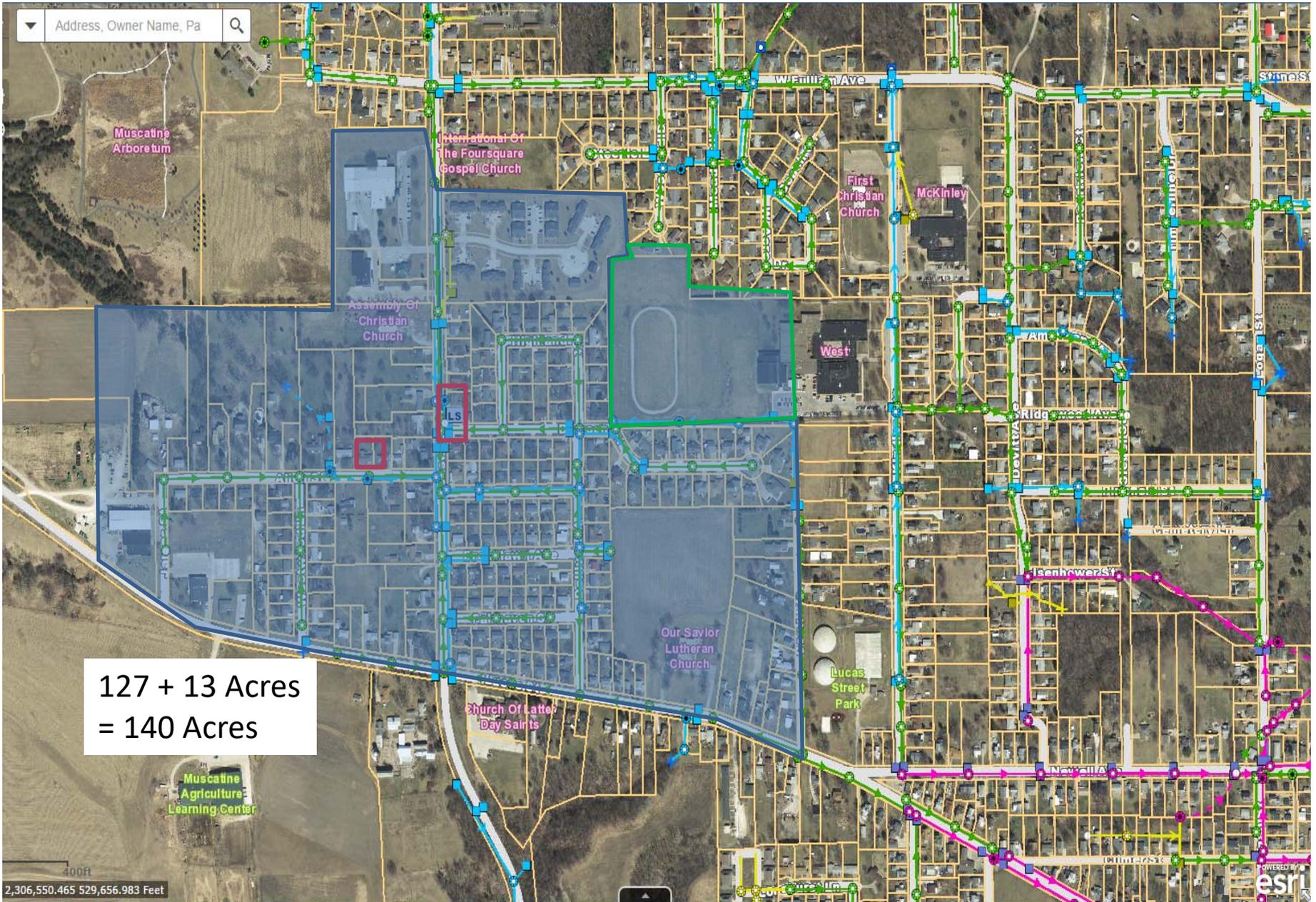
Historical Information

Memo of Settlement
Agreement As prepared
by Timothy Boller, Weilein
and Boller, PC. Attorney
for insurance company

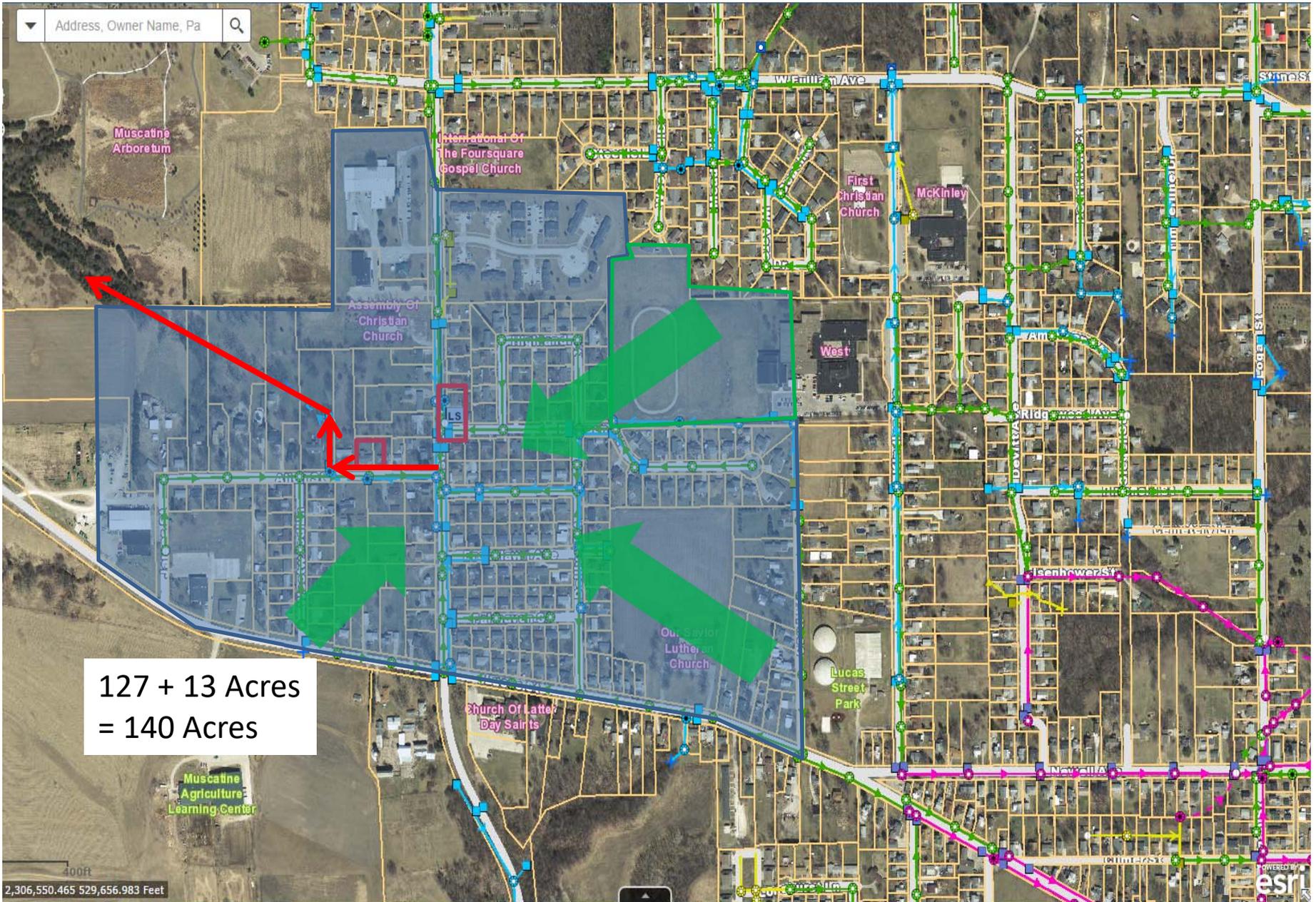
Report from Shoff
Consulting Engineers, L.C.



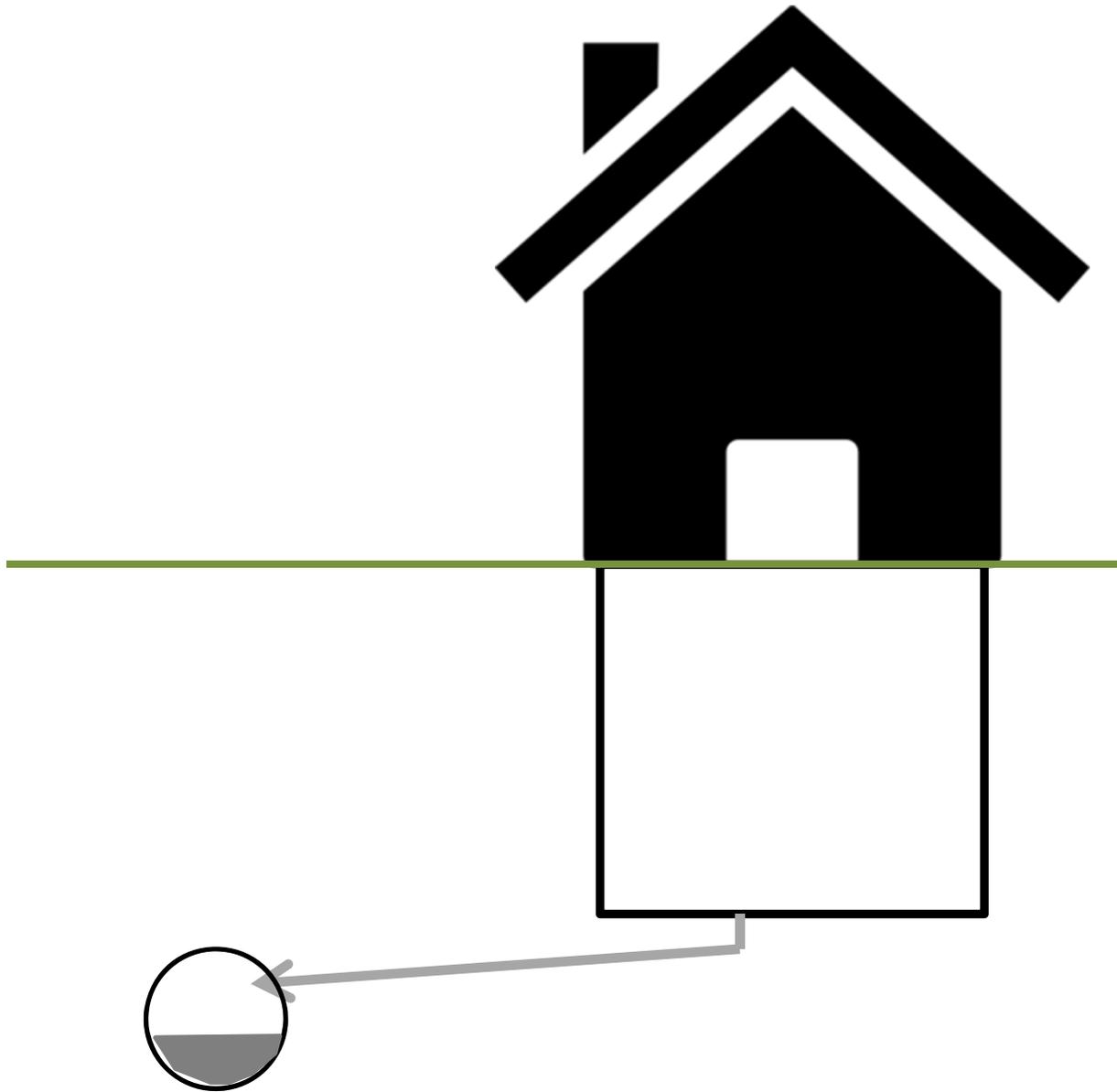




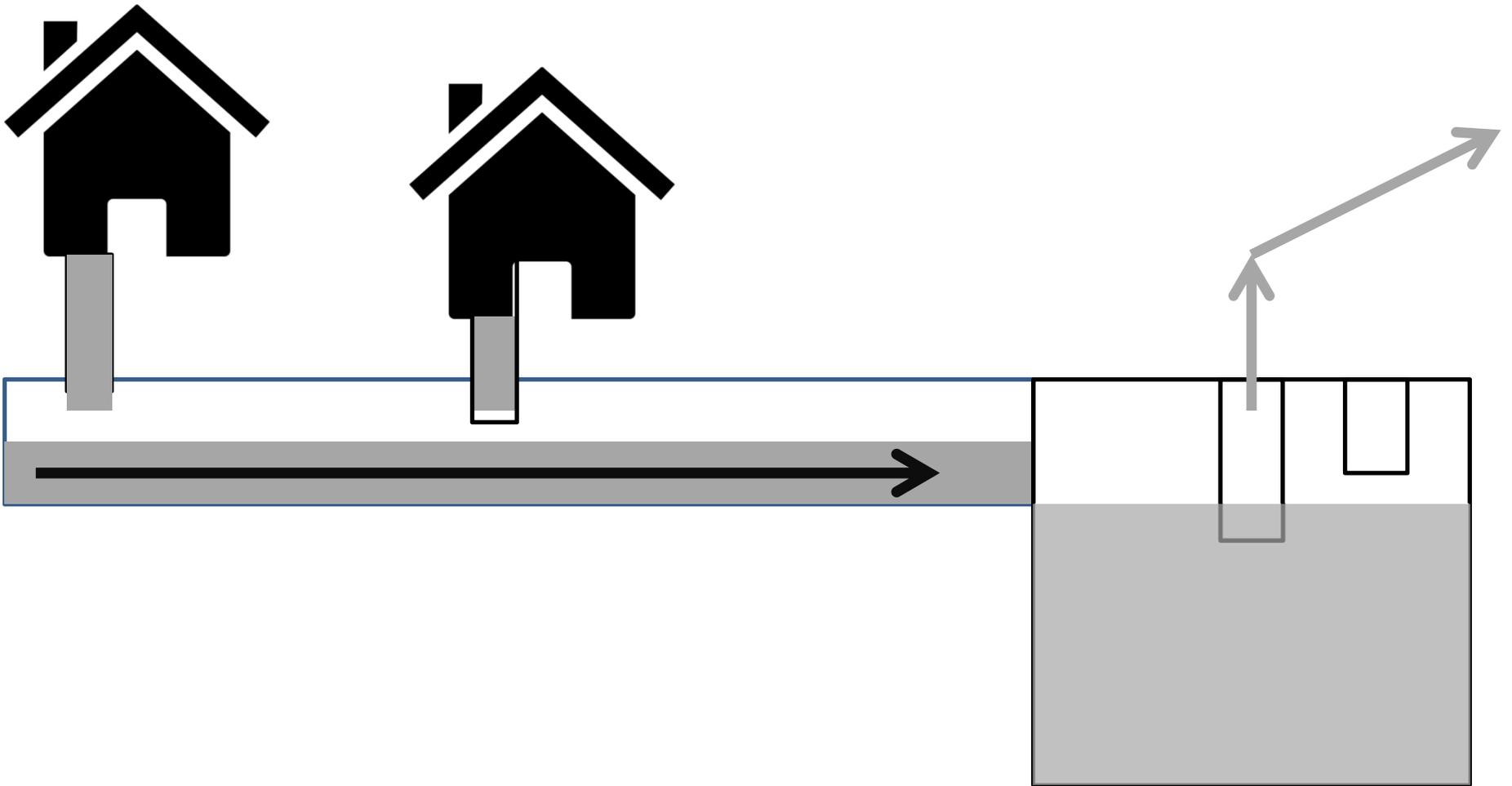
127 + 13 Acres
= 140 Acres

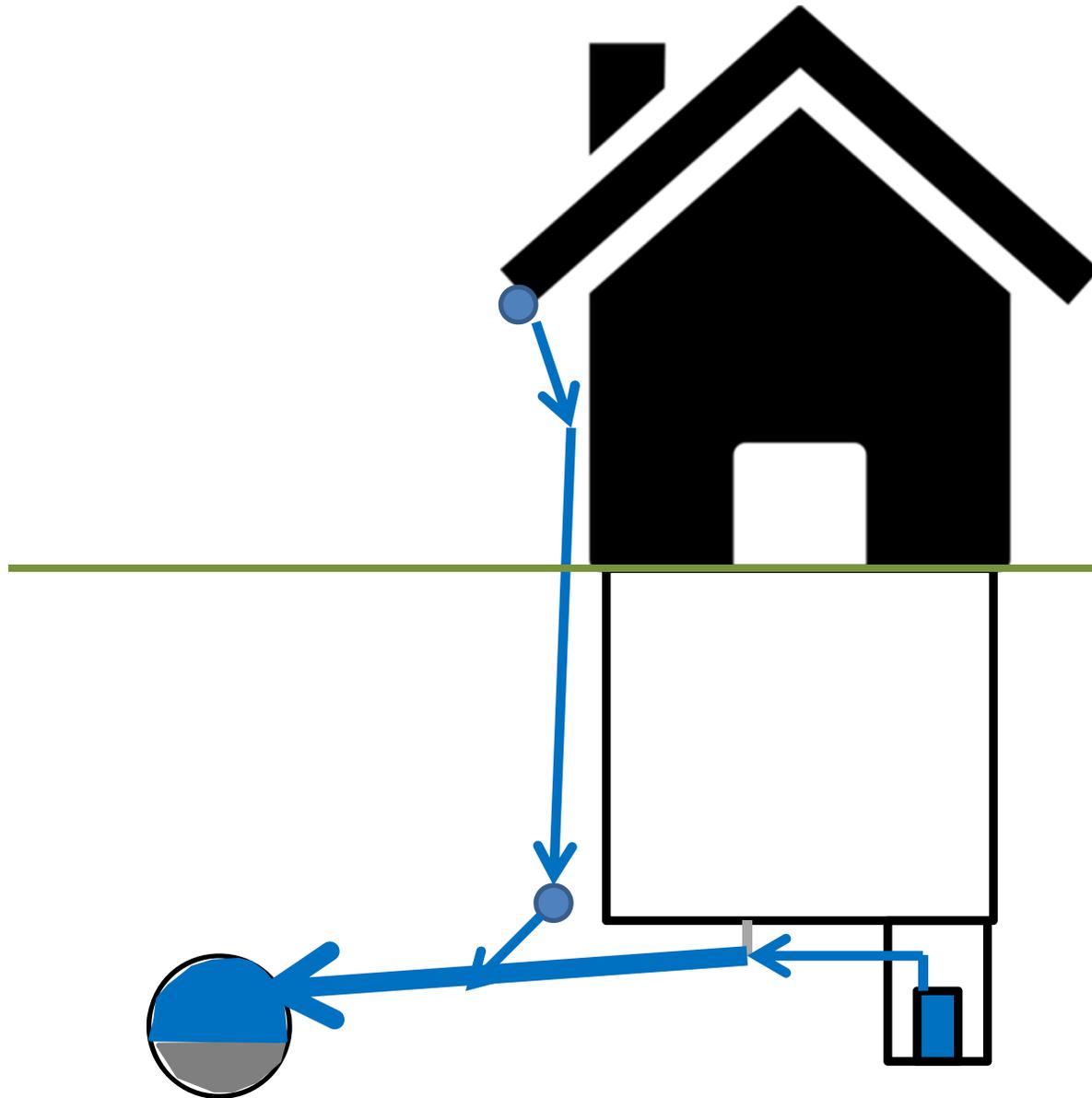


127 + 13 Acres
= 140 Acres



Typical Sanitary Setup:
All interior plumbing goes to sanitary sewer line and out lateral pipe to sewer main.
So: sink, toilet, tub, washing machine, all go to sanitary sewer

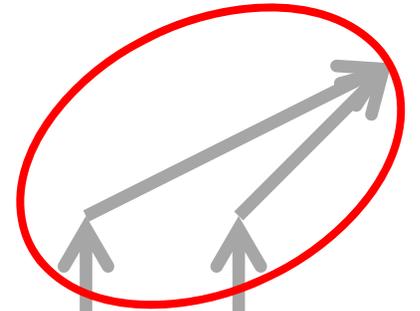
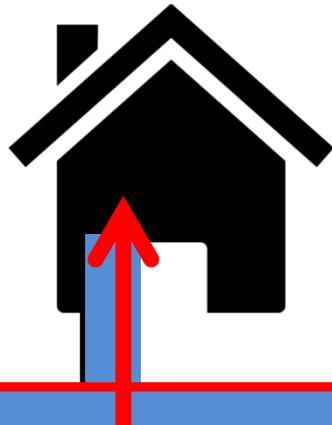
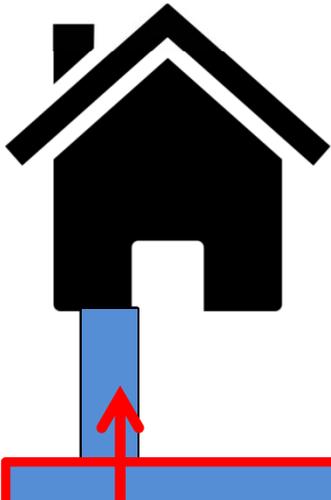




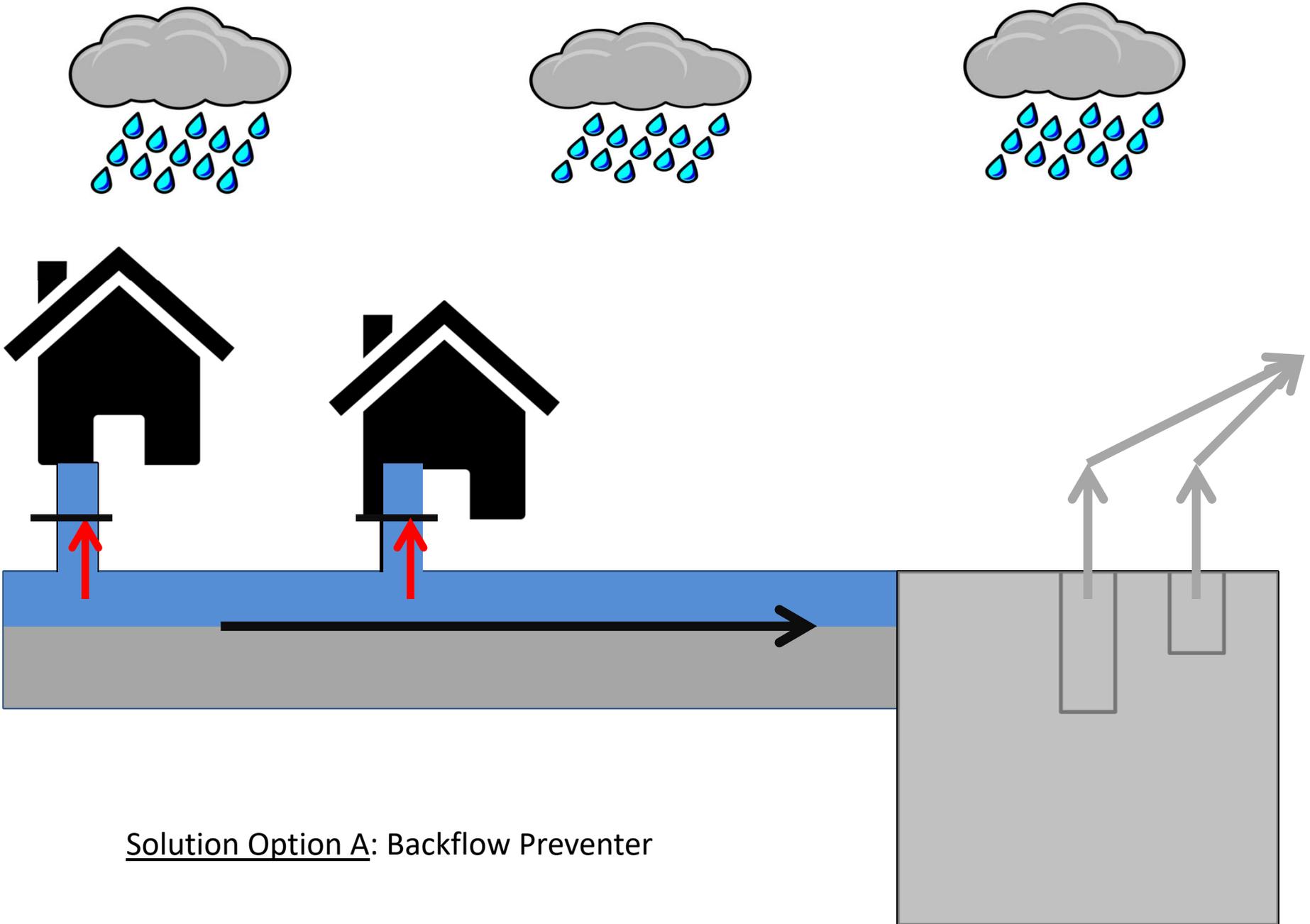
Inflow Situation:

Stormwater or ground water introduced to the sanitary sewer system via illegal connection.

Sump pump, foundation drains, gutters and downspouts should NOT be connected to the sanitary sewer.



4 limiting factors



Solution Option A: Backflow Preventer

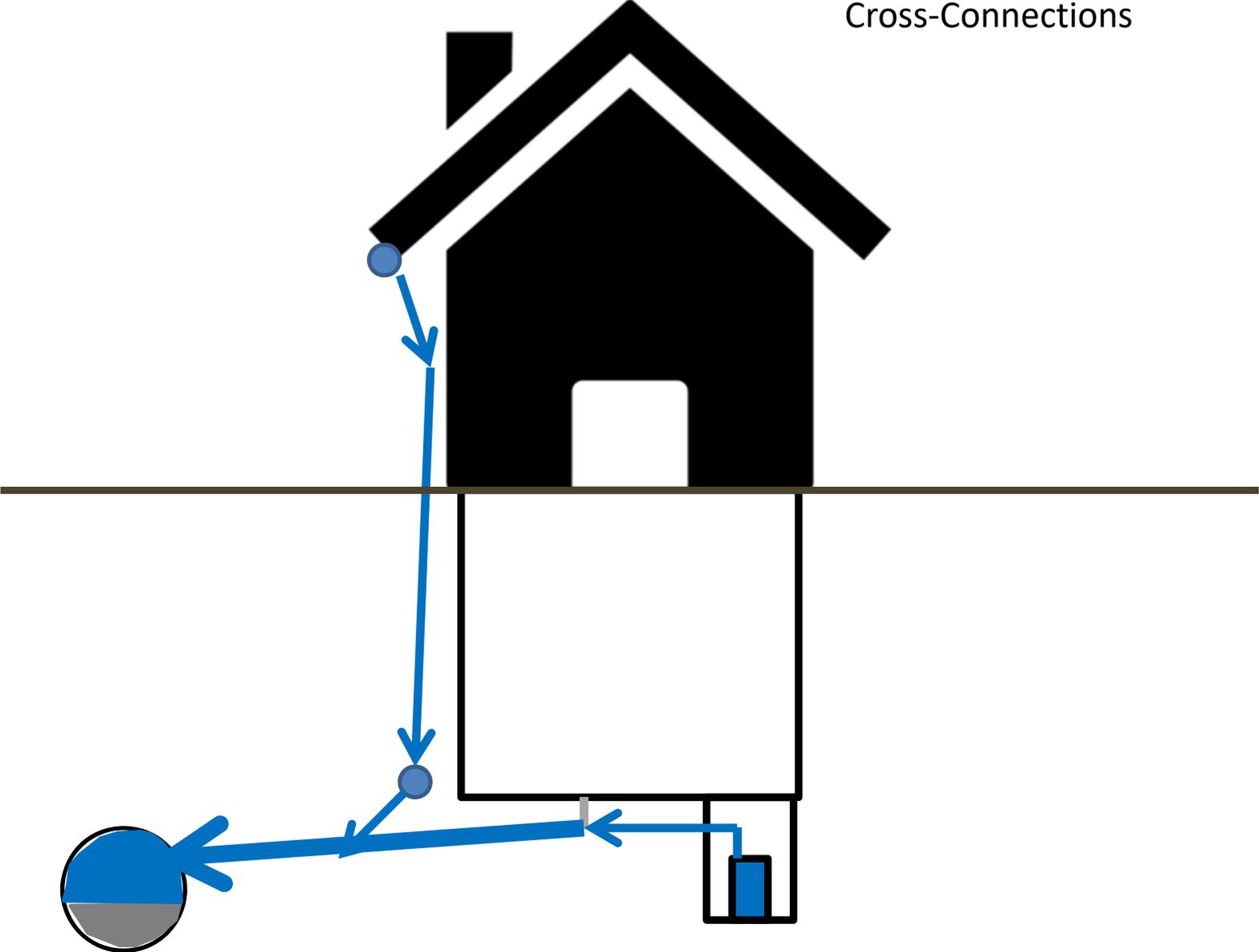
Option A

- Installation and maintenance of backflow preventer
- Cost \$100 to \$3,000
- Agreed to during initial lawsuit
- Neighbors have working backflow preventers and have had no issues

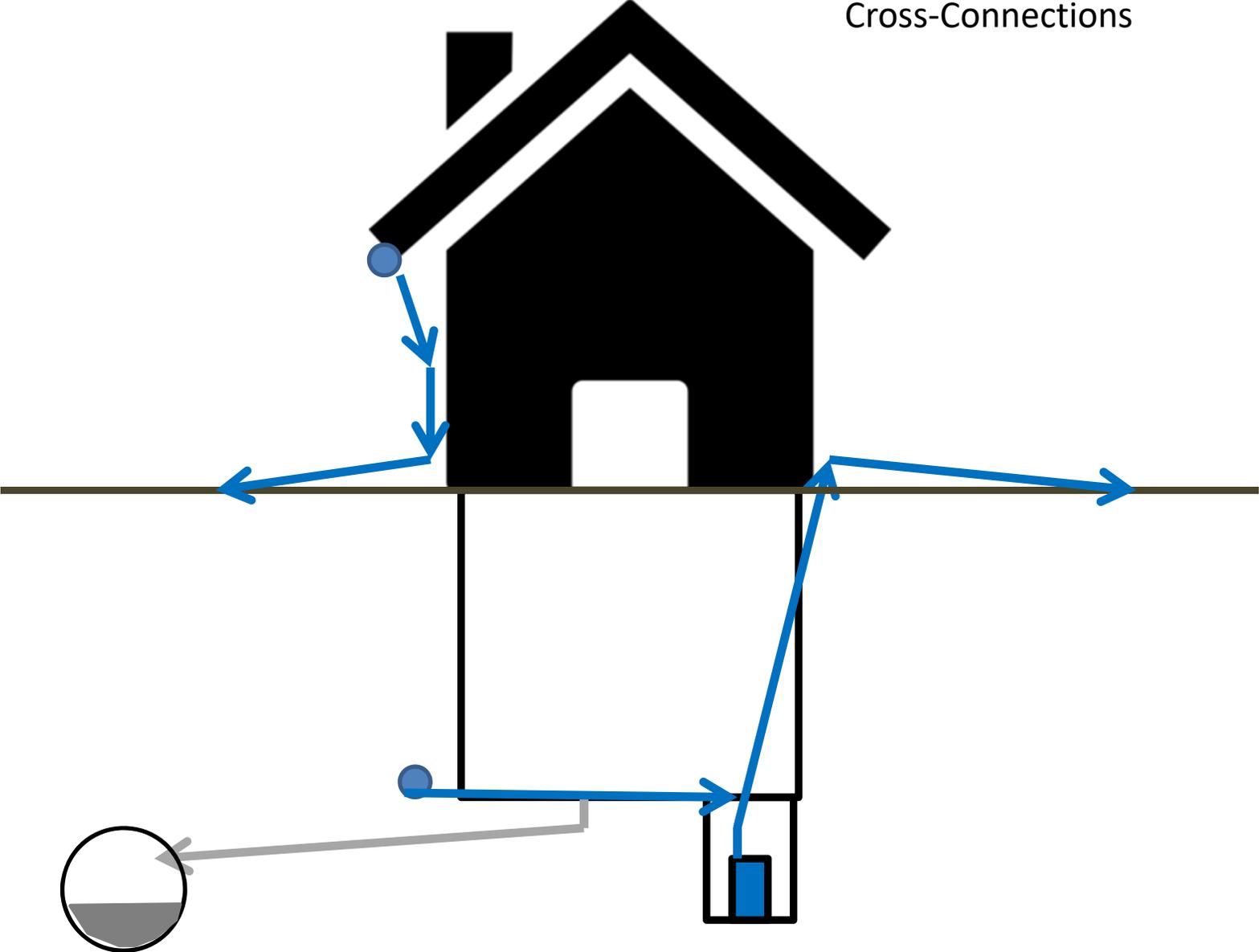
Option B

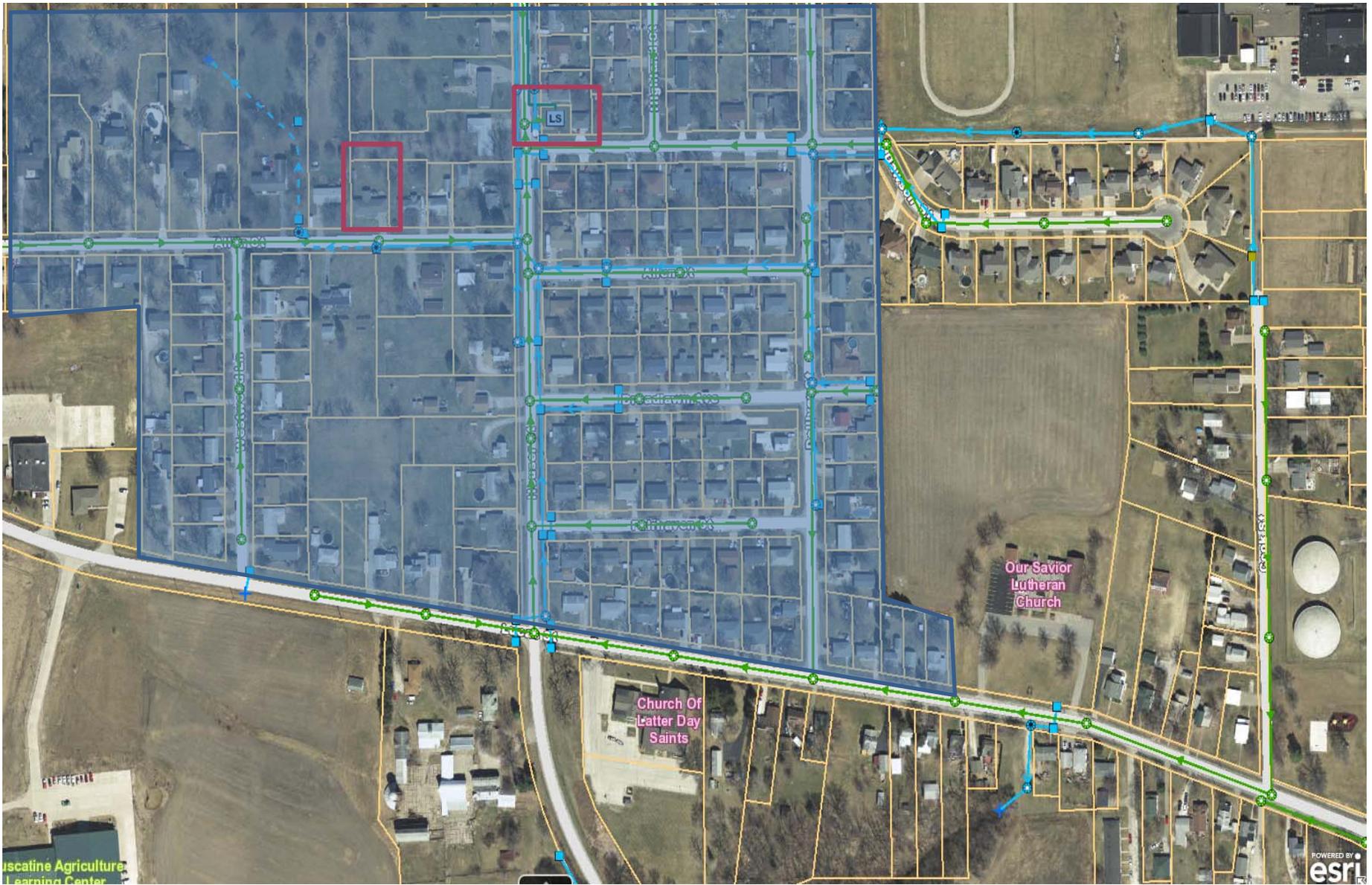
- Remove Cross Connections

Solution Option B: Remove Cross-Connections



Solution Option B: Remove Cross-Connections





uscatine Agriculture Learning Center

Church of Latter Day Saints

Our Savior Lutheran Church

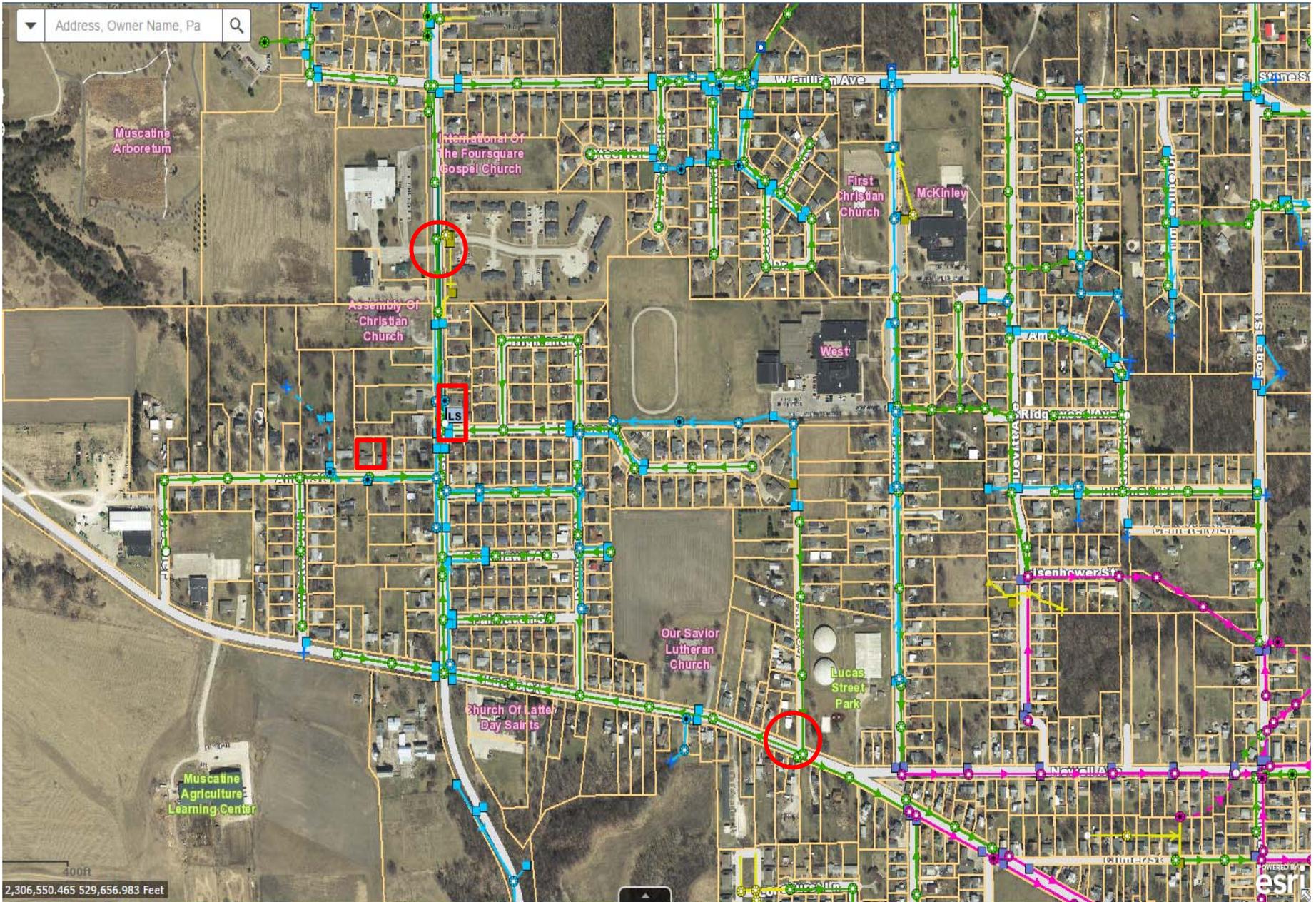
POWERED BY esri

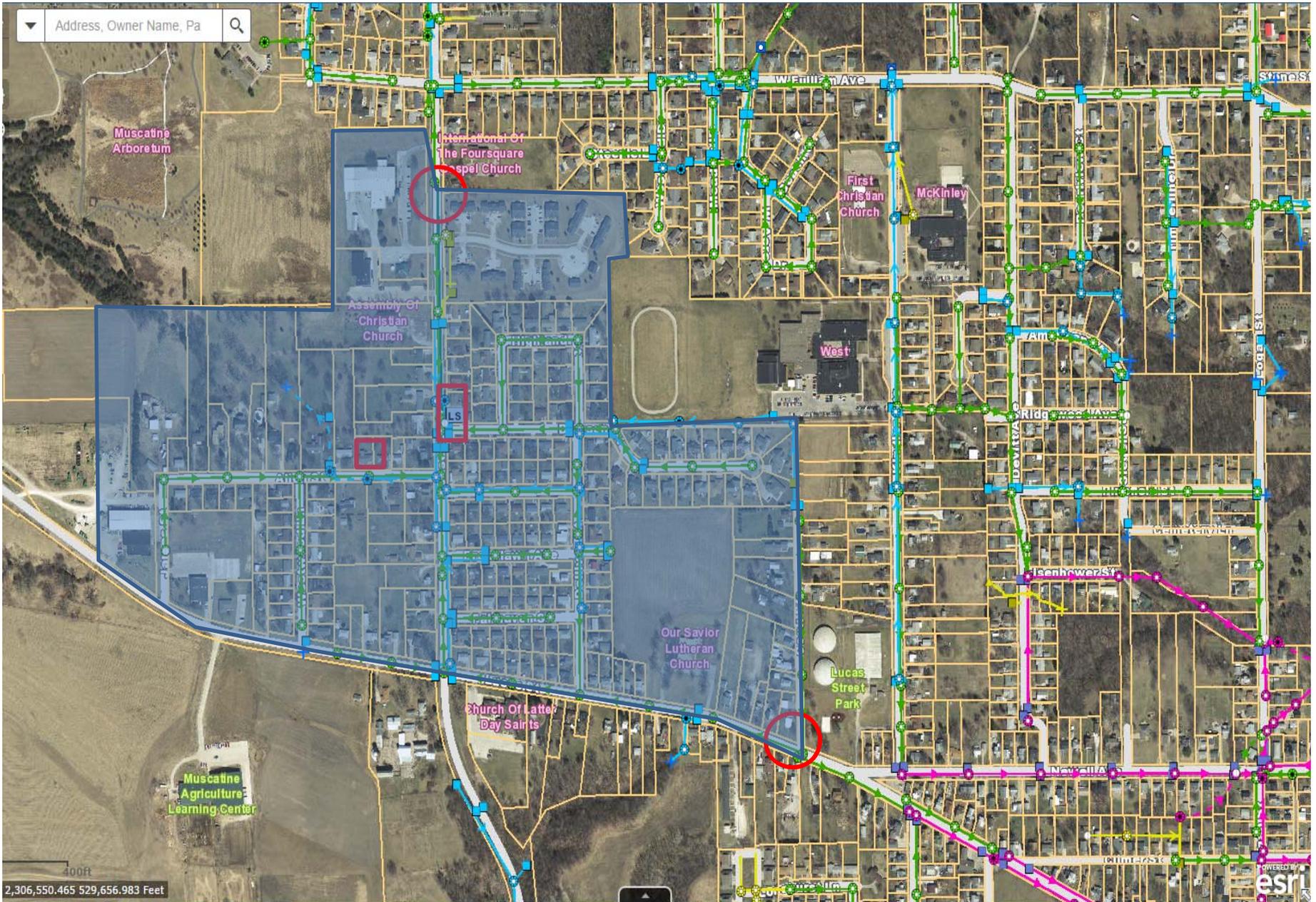
Option B

- City would need to inspect over 155 homes
- Undetermined who would conduct inspections
- All illegal connections would be ordered disconnected at owners' expense
- Estimated cost of disconnection \$5,000 to \$7,000
- No city funding to assist
- Lack of storm sewer to take water

Option C

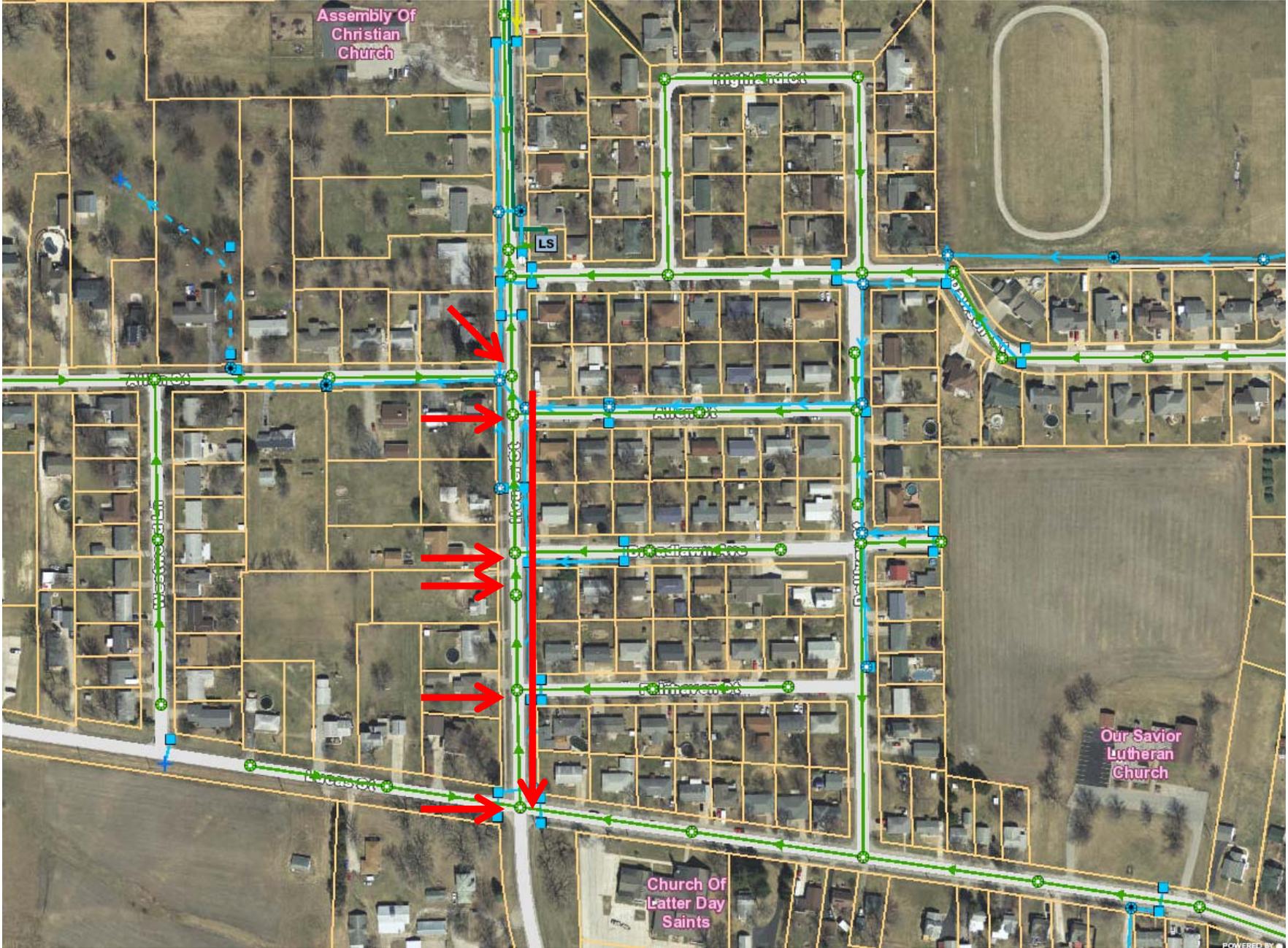
- Re-route sanitary sewer to gravity flow down Houser
- Three phases of discussion and construction to consider





Option C

- Phase I
- Houser Street reverse flow from Allen to Lucas
- Need to adjust and lower five manholes
- Need to install roughly 800 feet of new sewer line

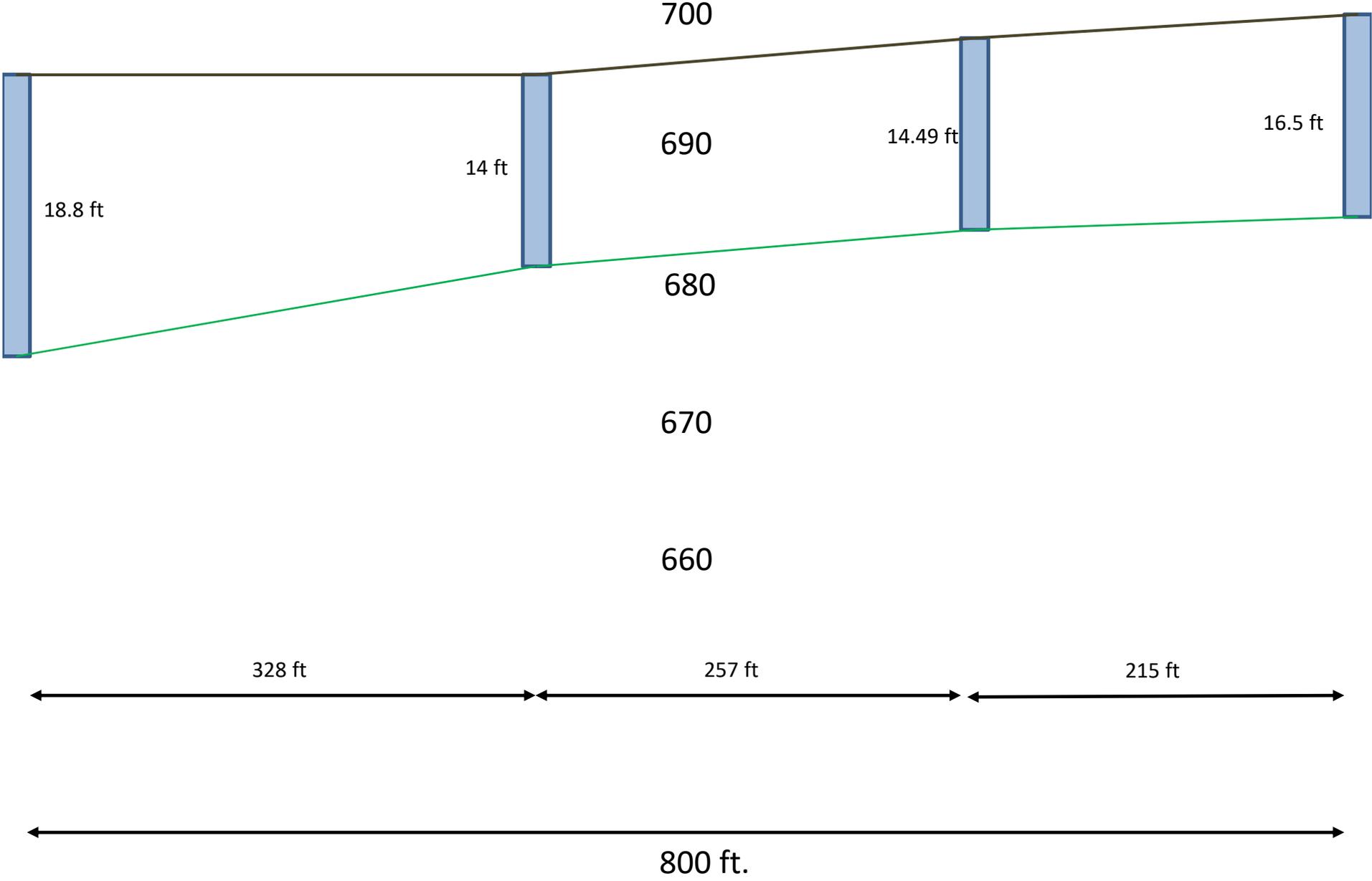


Allen St.

Broadlawn

Fairhaven

Lucas

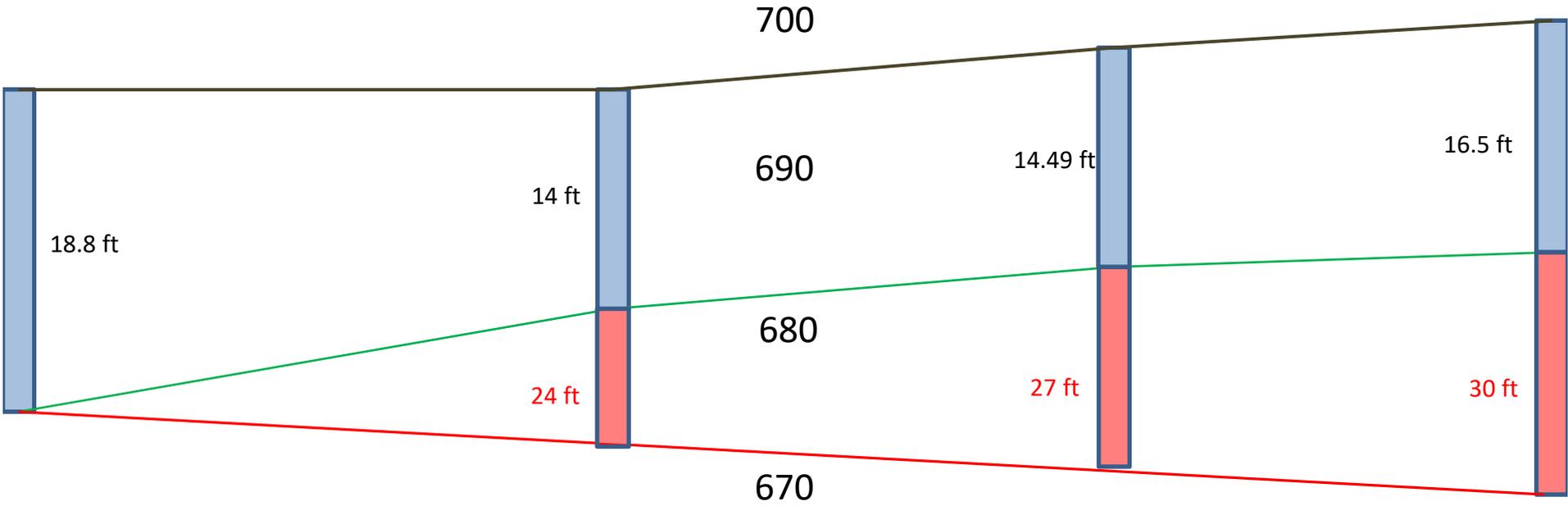


Allen St.

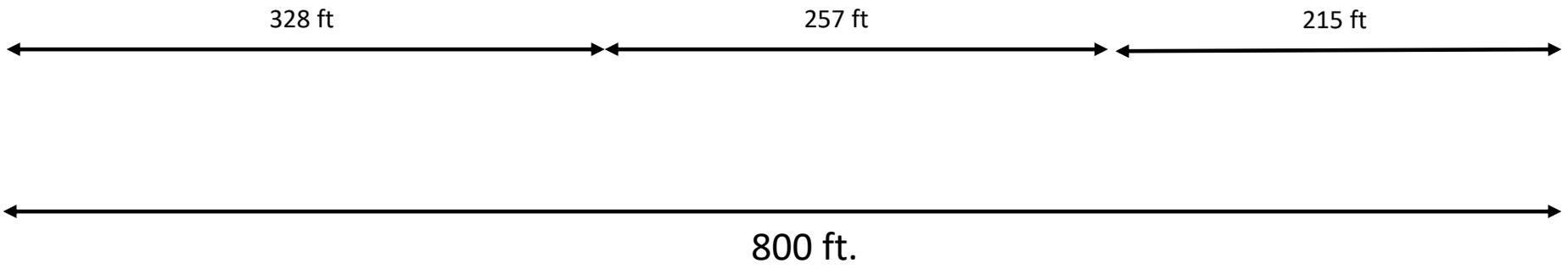
Broadlawn

Fairhaven

Lucas



Minimum slope for 10" sewer is 0.24%
Over 800 Ft. equals 2.4 ft of depth

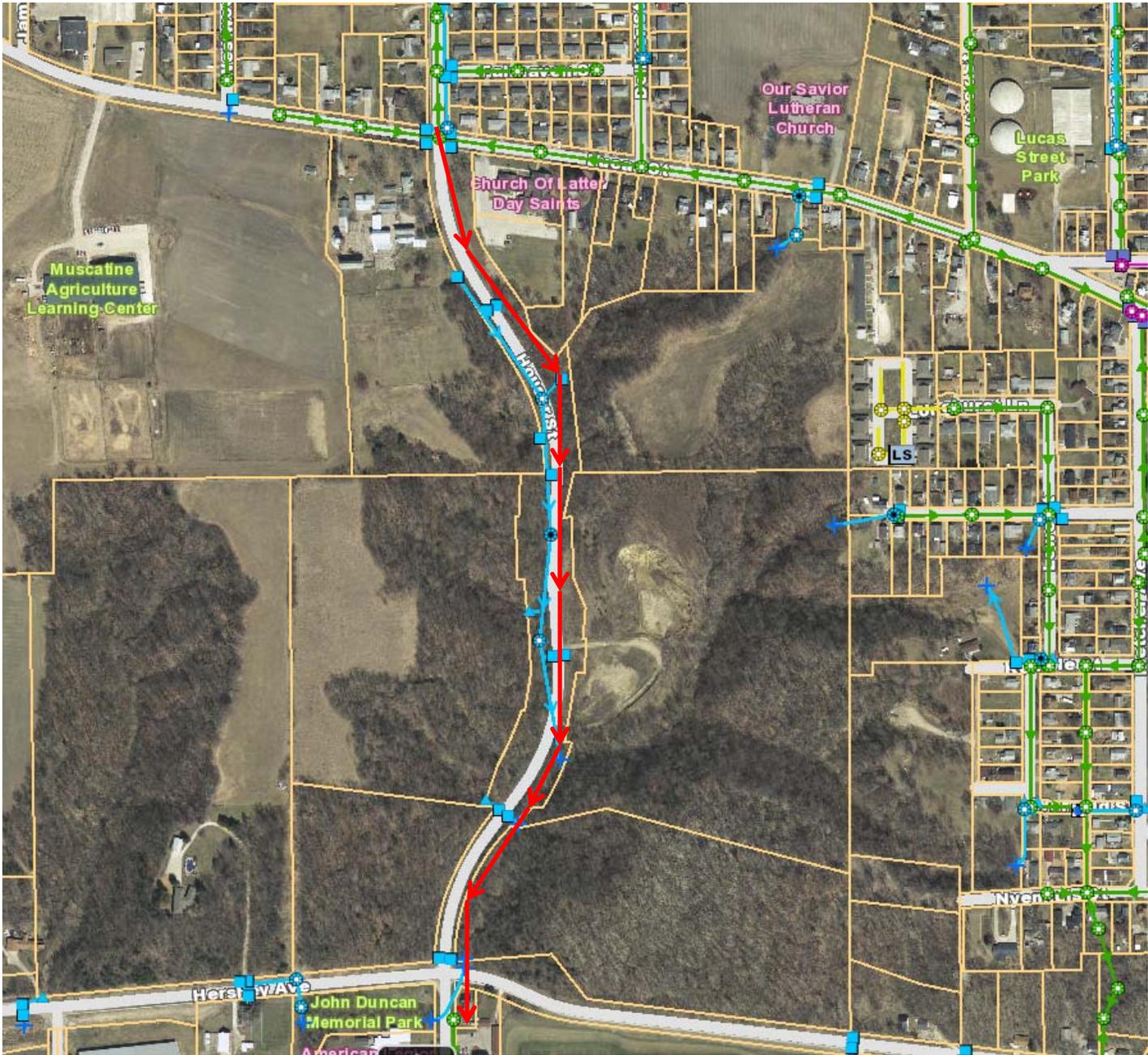


Option C, Phase I

Description	Unit	Quantity	Estimate	Total
Traffic Control	Lump Sum	1	\$20,000	\$20,000
Mobilization	Lump Sum	1	\$15,000	\$15,000
Pavement Removal	Square Yard	1,000	\$8.50	\$8,500
Sanitary Sewer Installation 10" (Micro-bore)	Linear Foot	800	\$450	\$360,000
Remove Manhole	Each	5	\$831.25	\$4,156.25
Deep Manhole Installation	Each	5	\$75,000	\$375,000
PCC Pavement	Square Yard	1,000	\$61.25	\$61,250
				\$843,906.25

Option C

- Phase II
- Houser Street, Lucas to Hershey
- Need to install roughly 3086 feet of new sewer line
- Need to install 11 manholes

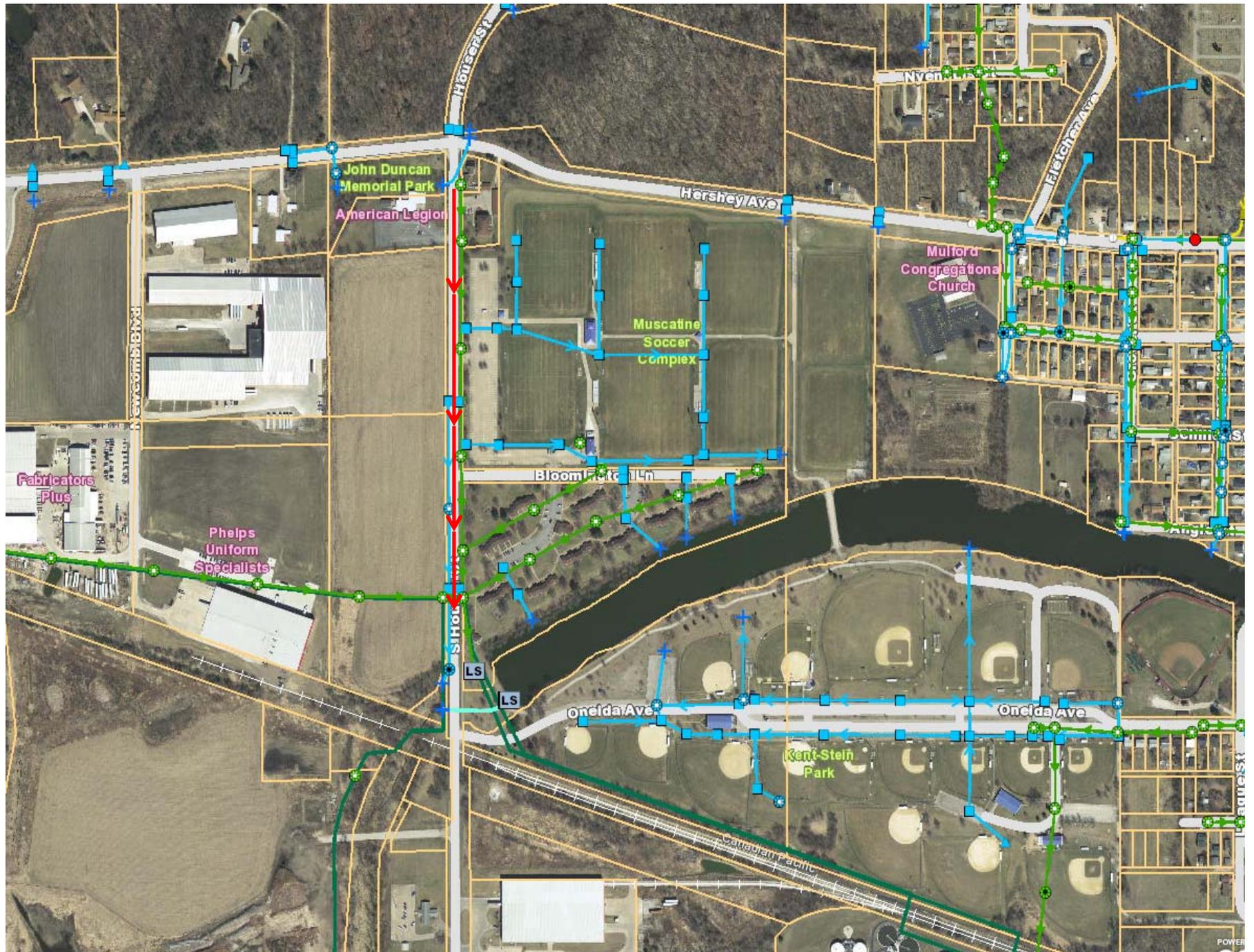


Option C, Phase II

PCC Pavement	Square Yard	1,000	\$61.25	\$61,250
Traffic Control	Lump Sum	1	\$20,000	\$20,000
Mobilization	Lump Sum	1	\$15,000	\$15,000
Pavement Removal	Square Yard	100	\$8.50	\$850
Sanitary Sewer Installation 10"	Linear Foot	3086	\$116.50	\$359,519
Install Manhole	Each	11	\$5945.75	\$65,403.25
PCC Pavement	Square Yard	100	\$61.25	\$6,125
				\$466,897.25

Option C

- Phase III
- Hershey to manhole upstream of Lift Station
- Need to install roughly 1,355 feet of new 12” sewer line
- Need to adjust or modify 5 manholes
- Unknown whether lift station can handle new flow. Anticipated that it will need to be reconstructed as well



Option C, Phase III

PCC Pavement	Square Yard	1,000	\$61.25	\$61,250
Traffic Control	Lump Sum	1	\$20,000	\$20,000
Mobilization	Lump Sum	1	\$15,000	\$15,000
Pavement Removal	Square Yard	100	\$8.50	\$850
Sanitary Sewer Installation 12"	Linear Foot	1355	\$116.50	\$157,857.50
Adjust Manhole	Each	5	\$962.50	\$4,812.50
PCC Pavement	Square Yard	100	\$61.25	\$6,125
Rebuild Lift Station	Each	1	\$200,000*	\$200,000*
			* Cost is rough guess only	
				\$404,645*

Option Comparisons

Option A Backflow Device	Option B Disconnection	Option C Gravity Sewer
\$100 - \$1,000 homeowner expense	8 inspections per day, 8 hours per day, \$32/hour, 19 days of inspections \$4,864	Phase I \$843,906.25
	\$5,000 - \$7,000 disconnection cost to homeowner	Phase II \$466,897.25
	No estimate of storm sewer installation costs	Phase III \$404,645*
\$0.00 City	\$4,864 City	\$1,915,448.50* City
\$100 - \$1,000 homeowner	\$775,000 - \$1,085,000 homeowners	

Questions/Discussion?

MEMORANDUM

TO: Burr File

FROM: TCB

DATE: 12/21/2015

RE: Effect of the Settlement Agreement on potential future claims.

Near the end of the mediation on November 25, 2015, there was discussion as to whether the City could condition settlement upon Plaintiff's agreement not to sue the City in the future for any sewer backup claims. The mediator Greg Jaeger correctly pointed out, we cannot obtain an agreement for any events which have not yet occurred. In other words, if the City's sewer line gets plugged or the lift station malfunctions in the future, we cannot expect Plaintiff to release a claim for an event which has not yet occurred. However, if Plaintiff dismisses his pending action, then he will waive any claims related to the current condition of the sewer line pursuant to claim preclusion. Therefore, if he has a backup in the future and attempts to sue the City claiming that the sewer line or the lift station is defective, he will be barred pursuant to claim preclusion because he asserted his claim, settled it, and dismissed it. In essence, he is going to have to show that something new occurred with the City's sewer line that caused any future backup in order to be able to proceed. Obviously, as noted, the City cannot obtain a release for such a claim. Consequently, we decided to proceed with the settle without any specific condition related to future claims.

Nevertheless, as a condition of settlement, Plaintiff agreed to maintain his backflow prevention valve. I thought this was the best way to protect the City from future claims, even for events that have not yet occurred such as plugged lines or future malfunctions at the lift station. Even if those events occurred, if Plaintiff maintained his backflow prevention valve, then it might prevent a sewer backup. The mediator Greg Jaeger included this as a provision in his mediator agreement and announced this to the parties at the close of the mediation.

Also, at the close of the mediation, Plaintiff Attorney Meloy was rather insistent that he receive the settlement check as soon as possible. He did not believe that a written settlement agreement was necessary. He promised to dismiss the case the next day. I received a Dismissal the next day on November 26, 2015.

Nevertheless, after some thought, I decided to proceed with the written Settlement Agreement to reiterate Plaintiff's agreement to maintain his backflow prevention valve. On December 18, 2015, I received an e-mail from Plaintiff Attorney Meloy stating that Plaintiff would not a Settlement Agreement because they did not agree to sign an additional document. The claim had been dismissed as they had received the settlement check. I believe that Plaintiff Attorney Meloy mistakenly thinks that by signing the Settlement Agreement, Plaintiff will be

waiving any future claims. I do not believe that he realizes that his client has already waived these claims with the exception of events that have not yet occurred.

Upon further reflection, I decided it was not necessary for Plaintiff to sign a written Settlement Agreement and would actually harm the City's position. First, Plaintiff agreed as stated by mediator Jaeger to maintain his backflow prevention valve. Second, he was put on notice during the course of the lawsuit, particularly based upon defense Expert Jerry Shoff's report, that he needed to maintain his backflow prevention valve. Third, by dismissing his claims with prejudice, Plaintiff effectively waived any claims for future backups under the doctrine of the claim preclusion, unless he can show that the event is related to some problem which has not yet occurred. If we insisted on a written settlement agreement, it was then likely that Plaintiff would want to include language preserving future claims and thus we were better off leaving things well enough alone.

I dictated this memo to use as future reference in the unlikely event that there is a future backup and Plaintiff attempts to assert a claim.

dj

Ralph Burr Complaint
3015 Allen Street

The following is a summary of the Ralph Burr issues and potential resolutions.

First, Mr. Burr is responsible for maintaining his backflow prevention valve. The City does not know when his backflow prevention device was installed, but it either needs maintained or replaced. There are many options available to private home owners for a backflow prevention device and Public Works has an example of one that is relatively inexpensive and works very well. The installation and maintenance of the device is Mr. Burr's responsibility and can work with a private contractor/plumber to accomplish this. Mr. Burr's contention that the sewer is backing up into his residence is proof that any existing backflow prevention devices are not functioning properly.

Second, given that there have been no changes or issues with our lift station, sewer, or related equipment and since Mr. Burr settled out of court on a previous claim, Mr. Burr is may be precluded from bringing this issue forward with the City. Please see the following:

Attach a portion of Attorney Boller's (Insurance Company's/City's Attorney) memo regarding future claims from Mr. Burr.

Essentially, we cannot get a release for claims that have not occurred, but there was a condition of the settlement that he would maintain his backflow prevention valve. In addition, he can no longer claim the city's lift station and sewer line are defective. He will have to claim something new that occurred that caused a backup.

Near the end of the mediation on November 25, 2015, there was discussion as to whether the City could condition settlement upon Plaintiff's agreement not to sue the City in the future for any sewer backup claims. The mediator Greg Jaeger correctly pointed out, we cannot obtain an agreement for any events which have not yet occurred. In other words, if the City's sewer line gets plugged or the lift station malfunctions in the future, we cannot expect Plaintiff to release a claim for an event which has not yet occurred. However, if Plaintiff dismisses his pending action, then he will waive any claims related to the current condition of the sewer line pursuant to claim preclusion. Therefore, if he has a backup in the future and attempts to sue the City claiming that the sewer line or the lift station is defective, he will be barred pursuant to claim preclusion because he asserted his claim, settled it, and dismissed it. In essence, he is going to have to show that something new occurred with the City's sewer line that caused any future backup in order to be able to proceed. Obviously, as noted, the City cannot obtain a release for such a claim. Consequently, we decided to proceed with the settle without any specific condition related to future claims.

Nevertheless, as a condition of settlement, Plaintiff agreed to maintain his backflow prevention valve. I thought this was the best way to protect the City from future claims, even for events that have not yet occurred such as plugged lines or future malfunctions at the lift station. Even if those events occurred, if Plaintiff maintained his backflow prevention valve, then it might prevent a sewer backup. The mediator Greg Jaeger included this as a provision in his mediator agreement and announced this to the parties at the close of the mediation.

Third, there are internal and external repairs or fixes that the homeowner could choose to do in addition to the above noted valves. We would suggest that the homeowner contact a private contractor to discuss those options. There are two options that have been discussed internally (external wet well or an internal sewer pump) and are reasonable solutions for the owner to install. City staff would be willing to discuss these options with the owner or contractor.

Fourth, the City could conduct an Inflow & Infiltration Study (I&I) for the neighborhood to identify foundation drains, gutter downspouts and sump pumps that are tied improperly/illegally into the City's sewer system. Homes that are improperly tied into the sewer system would be identified and they could contact a private contractor to correct the issue. The cost of this work is estimated at \$5,000 to \$7,000 per home. Some cities have begun incentive programs that offer cost sharing, i.e. \$2500 per home. Typically, the City creates a list of authorized contractors for this work. This most likely will create additional issues for the neighborhood, poor drainage in this neighborhood exists and surface discharging additional water to the surface would make the existing drainage problem worse. Additional storm sewer in this neighborhood maybe necessary due to this addition discharge of water to the surface of the neighborhood. The additional storm sewer would be a significant cost estimated to be in excess of \$100,000.00. Additional costs would also be incurred to plan and design the improvements and to estimate the construction costs so it can be included in the CIP. This would be a significant expense for the benefit of one single family house.

Fifth, this issue could possibly be addressed when Allen Street and Houser Street are redone in the future. However, this could possible add a significant amount to the cost of the project. Please note, these streets are not schedule for repair or replacement in the foreseeable future. However Public Works Department is in the process of preparing a five-year streets plan to list the street projects that need to be done in the next 5 years.

Sixth, Mr. Burr mentioned that all that is needed is a "relief" sewer installed down Houser Street to the Lucas Street. This option results in a very deep, redundant sewer that would be very costly to install. Estimated cost is approximately \$250,000.00. This option is also not likely to be 100% guaranteed. Heavy rains, and high sewer flows could cause this sewer to back up too. Thus the least cost option of a private backflow preventer that works is the solution that makes the most sense at this location.



Houser St. Lift Station



Allen St. from Houser St.



Burr House



**Ralph Burr, Plaintiff
v.
The City of Muscatine, an Iowa Municipal
Corporation, Defendant**



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Phone: (319) 266-0258
Fax: (319) 266-1515

November 4, 2015

By email: tboller@wbpclaw.com

Mr. Timothy Boller
Weilein and Boller, PC
Attorneys at Law
515 Main Street, Suite E
PO Box 724
Cedar Falls, IA 50613

Re: Burr v. City of Muscatine Engineering Report

Dear Mr. Boller:

We are pleased to forward the following Engineering Report prepared for the pending “Burr v. City of Muscatine” lawsuit. We have attached documents and exhibits and conducted a site visit prior to the preparation of this report.

INTRODUCTION

On June 30, 2014 between the hours of approximately 4:00 pm and 11:00 pm a 5.0 inch rainfall event occurred in the City of Muscatine, Iowa. This rainfall has a recurrence interval of approximately 40 years and resulted in street flooding and storm sewer and sanitary sewer system overloads. Due to the intensity of the unusual rainfall event, portions of the City’s wastewater collection and pumping system experienced actual flow rates in excess of their design capacity. The Allen Street/Houser Street area of the City served by the Houser Street Wastewater Pumping Station was one such area.

A careful review of the City’s wastewater records including the “SCADA” (Supervisory Control and Data Acquisition) computerized monitor system clearly indicate that the Houser Pump Station (constructed in the early 1960’s) functioned as designed and as expected. However, due to the large rainfall event creating significant additional inflow and infiltration (commonly referred to as “I & I”) into the collection system. Parts of the system were hydraulically overloaded.

The plaintiff, Mr. Ralph Burr, alleges that this overload resulted in wastewater backflowing through his residential sewer service into the basement of his residence, located at 3015 Allen Street. The purpose of this report is not to dispute Mr. Burr’s claim of basement water damage, but to explain and clarify our opinion of what occurred and why.

EXECUTIVE SUMMARY

There are two areas or primary system functions that merit additional review and clarification:

Houser Street Pumping Station

- 1) Mr. James L. Egger, a retired professional civil engineer and designated expert for the plaintiff, prepared an Engineering Report dated October 1, 2015. In reviewing Mr. Egger's report we generally concur with the elevation data presented. However, we vigorously disagree with Mr. Egger's conclusion that the "lag" pump or secondary pump was not operating during this storm event. A thorough review of the SCADA (Supervisory Control and Data Acquisition) monitoring system, although somewhat difficult to interpret, clearly shows that both pumps in the Houser Pumping Station were fully functioning and both were concurrently operating during the heavier rainfall events.

Burr Residence Backflow Prevention Valve

- 2) Mr. Ralph Burr, in his deposition of June 16, 2015, states that he had a sanitary sewer backflow prevention valve installed around 1980. He is the original owner of the house that was constructed in 1965. No reason is given for the installation at that time. Subsequently, in the late 1980's, in 1990 and again in 2000 and 2009, sewer backflows occurred resulting in various levels of flooding in his basement. His deposition reflects that in all of that time he did not have any form of maintenance performed on the backflow prevention valve. When asked why, he replied that they don't work anyway.

The wastewater industry data and conclusions are irrefutable that when backflow prevention valves are properly installed **and properly maintained** they provide excellent protection against sewage backflow events from an overloaded municipal wastewater collection system into a residential sewer service. Clearly, by Iowa Code and most, if not all municipal codes in Iowa, the ownership, repair and maintenance responsibility for residential sewer services lies with the property owner. Manufactures of backflow prevention valves recommend biannual or annual maintenance of the valve by a qualified home owner or plumber. Some municipalities or sewer districts recommend monthly maintenance. The primary mode of failure with backflow prevention valves is a buildup of fats, oils and grease (FOG) from the residential home. This causes the valve mechanism to stick in the open position. Annual or semi-annual inspection and cleaning will generally keep the valves functioning properly.

Mr. Burr has not ever performed a maintenance cleaning of his backflow device in the entire 30 years plus that it has been installed. Valve failure during a storm related backup was all but inevitable. It would seem prudent, after four previous failures resulting in basement flooding, to at least consider a maintenance

inspection and/or replacement of the valve. Apparently, because of past history in the neighborhood, some area residents have installed backflow prevention valves in their homes. The number is unknown. However no other basement flooding events were reported to the City in this area following the June 30, 2014 rainfall.

Immediately following this letter is a section entitled "Detailed Discussion" which further expands on the basement flooding issues.

We have provided internet links to various manufacturer's websites and municipal wastewater districts that provide data on backflow prevention devices in the Detailed Discussion section.

We appreciate the opportunity to provide this report. Please contact us with any questions or comments you may have.

Sincerely,
Shoff Consulting Engineers, LC



Jerry L. Shoff, PE, PLS
Iowa Engineering License No. 9671

DETAILED DISCUSSION

RAINFALL

According to the official rainfall log of the Muscatine Wastewater Treatment Facility, the observed rainfall for the period 7AM 6/30/2014 to 7AM 7/1/2014 was 5.00 inches. Based on city personnel observations and on data recorded at the Houser Street Lift Station, the majority of this rainfall fell in an approximately 7 hour period between 4:00PM and 11:00PM June 30, 2014.

Using the rainfall depth and intensity data from Table 2B-2.07 of the Iowa SUDAS (Statewide Urban Design and Specification) Manual we can interpolate approximate recurrence intervals for the storm. If we accept that the 5.00 inches of rain fell in the 7 hour time block, the event would be considered between a 25 year and a 50 year event. Interpolating the data, we find that this was an approximately 40 year recurrence interval event.

LIFT STATION

The functioning of the pumps in the Houser Street Lift Station has been questioned. The issue has been raised as to whether or not the second pump in the lift station was operating during the rainfall event. The city wastewater treatment facility staff put the saved data from 6/30/2014 for the Houser lift station in their SCADA system and displayed the collected operational data for both lift station pumps. From this data, it is clear that both pumps were fully operational during the rainfall event, and were pumping at capacity for that time.

WASTEWATER COLLECTION SYSTEM MAINTENANCE

In reviewing City records, the deposition statements of city wastewater staff members, and in conversation with staff, we find the city has been proactive in maintenance and repair actions for the city collection system over the span of recent decades. The sanitary sewer main in Allen Street and in the surrounding area served by the Houser Street lift station was constructed in the early 1960s, as was the lift station. A project constructed in 1996 or 1997 performed maintenance and repairs to manholes in Allen Street and the surrounding area. According to furnished drawings and contract data, the manhole adjacent to Mr. Burr's house had a new cover and seals installed. The city has an ongoing maintenance plan where all sanitary sewer lines are flushed on a five year cycle. The most recent cleaning of the sanitary sewer in Allen Street was conducted in 2012.

In conversation with the wastewater facility staff, it was related that 18 of the city's 21 lift stations are monitored through the SCADA System and physically checked regularly. The Houser Street lift station had been visited in the morning of June 30, 2014 as evidenced by data recorded in the SCADA system reflecting an alarm that the lift station building door had been opened at that time. During our visit to the Houser Street lift station we observed a clean well maintained facility. The maintenance staff was knowledgeable about the system including the pumps, the operational levels in the lift station and the operation of the monitoring system.

In the larger picture, the City of Muscatine has entered an agreement with the EPA to separate combined sewer system segments. They are currently pursuing a multi-phase project to separate all combined sewers by 2024. This work does not affect the area served by the Houser Street lift station.

It is clear that the sanitary sewer collection system has significant inflow and infiltration (I&I). The city is aware of this and takes reasonable action to correct this condition when and where feasible. It should be noted that the level of I&I, while significant and problematic, is not unique. Older communities in Iowa, and in general, throughout the United States, have significant I&I in their systems. Efforts by the EPA over the years have encouraged communities to attempt corrective action to I&I problems. The results of these projects generally reflected that the improvements obtained in reducing I & I were not cost effective. In recent years, new technologies such as pipe lining have made such efforts more effective.

SANITARY SEWER BACKFLOW PREVENTION VALVE

One of the central issues in this lawsuit has to do with the existence of a sewer backflow prevention valve installed at Mr. Burr's direction in his home. According to his deposition, Mr. Burr makes the following comments:

His home was constructed in 1965. Around 1980 Mr. Burr had a sewer backflow prevention valve installed in his 4" diameter sanitary sewer discharge piping. This is located in his basement below basement floor depth. Subsequently, in the late 1980s, in 1990 and again in 2000 and 2009, sewer backflows occurred resulting in various levels of flooding in his basement. His deposition reflects that in all of that time he did not have any form of maintenance performed on the backflow prevention valve. When asked why not, he replied that they don't work anyway. Finally in 2014, a much more serious flooding occurred and Mr. Burr then decides that it is the city's fault that the flooding occurred and that they should be responsible for his repairs.

It was not asked what caused him to install the backflow valve in 1980 in the first place, nor why he determined that they did not work. If one goes to the effort of installing a device to prevent backflows and is subsequently flooded about 10 years later, one would think that the owner would have a plumber determine why it did not function properly and have the problem corrected. With the warning of four previous flooding events with no action taken to find out why the valve did not work, one would have great difficulty finding that the responsibility for the damage would fall on the City of Muscatine.

Some references for backflow prevention valves:

- Backflow Valve Operational Demonstration www.youtube.com/watch?v=FMBznnNV-ss
- Maintenance of a Stuck Backflow Valve www.youtube.com/watch?v=iQNM01WJFrQ
- Mainline Backwater Valves www.backwater-valves.com
- Hempfield Township Municipal Authority www.thtma.org/downloads/Backwater-valves.pdf
- City of Cambridge Massachusetts Backwater Valve Regulation
[www.cambridgema.gov/inspection/~media/A888EAB3DB71415AA57DFB7C5B1CA410.ashx](http://www.cambridgema.gov/inspection/~/media/A888EAB3DB71415AA57DFB7C5B1CA410.ashx)

SUMP PUMP MALFUNCTION

Upon considering the possible alternatives to the cause of the 2014 flooding, one must also consider the existing sump pump. As noted in the deposition and as seen in the photographs, the sump pump is a pedestal type. Pedestal pumps are usually available in ½ horsepower or less, while submersible pumps are available in sizes up to 1 horsepower or more. If there is any doubt as to the maximum rate of flow to the basement sump pump, a larger capacity pump would be the wise choice. There is no information given as to how quickly rainfall ponding on the ground adjacent to the house will infiltrate to the foundation drains and to the sump pump. Since the June 30, 2014 rainfall event was unusually heavy, the 5 inches of recorded rainfall may well have directed significant runoff to the foundation drain. If this flow was unusually heavy, the sump pump may well have been unable to keep up. It is also possible that the actuator float switch may have become jammed and failed to turn the pump on. This is more common with pedestal type pumps than with submersible pumps. With the approximately 7 hour duration of the total rain event, a large quantity of storm water may have entered the basement from the foundation drain sump equipped with the low capacity pedestal type of sump pump installed in the Burr residence as well as from backflow through the sanitary sewer system.

SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM

The Muscatine wastewater treatment facility monitors and controls the treatment process facilities and monitors the operation of most city lift stations with a Supervisory Control and Data Acquisition (SCADA). This computer system, based on Wonderware software, gathers information from the remote lift station locations including wastewater levels, pump on and off conditions, pump alarms, and security functions such as facility doors being opened. The information is recorded in the computers at the treatment plant. The SCADA system is programmed to alert operators to unusual conditions, and includes the ability to send out telephone alerts for serious conditions 24 hours a day. All of the measured operational data is recorded and the data is permanently stored for future reference should it be needed.

EXHIBITS

1. Plaintiff's Engineering Report prepared by James Egger
2. Rainfall data June/July 2014 at Muscatine, IA Wastewater Treatment Facility
3. SCADA Display of Lift Station Water Levels and Pump Conditions During Storm of 6/30/2014
 - 3a. Pump #1 Running
 - 3b. Pump #2 Running
 - 3c. Pump #1 and #2 Running
4. Allen Street / Houser Street Photos
5. Houser Street Pump Station Photos

October 1, 2015

Mr. Michael Meloy
Attorney at Law
2535 Tech Drive
Suite 206
Bettendorf, Iowa 52722

RE: Burr vs. The City of Muscatine

On August 16, 2015, I met with homeowner Ralph Burr at 3015 Allen Street, Muscatine, Iowa. I inspected Mr. Burr's home and discussed with him the raw sewage backup at his residence that occurred around June 30, 2014. I also have read the Depositions of: Mr. Jon Koch, Mr. Matt Chandler, and Ms. Stephanie Romagnoli.

I also acquired information from the US National Weather Service (NWS). From these NWS records the June 30, 2014 rain event in Muscatine produced 5 inches of rain. I believe that rain occurred during the times of 4pm to 11pm on the evening of June 30th. The Houser Street Lift Station pump activity chart provided by the City as Exhibit E affirms this. Exhibit E shows that the pump shut off sensor routinely is activated at Stage 1.6, which Stage equates to Muscatine vertical datum elevation 425.1. Exhibit E states the pump turn on sensor activates at elevation 427.4, which correlates with the City's letter dated September 4, 2015.

A normally designed sanitary sewer lift station has two or more pumps within the station. These pumps are noted as the "lead" and the "lag" pump. The lead pump activates first when the sewage levels rise in the lift station to a certain preset elevation. When heavy incoming sewage flows occur and the lead pump is operation with the sewage still rising in the lift station, then the lag pump is automatically activated by another sensor. These two pumps are then running together and discharging sewage uphill through a forcemain pipe to a receiving manhole on the gravity sanitary sewer system. Both pumps normally run until the sewage level in the lift station is lowered to the preset turn off pump elevation. After the two pumps are shut off, the lead and lag sequence is reset and the cycle of pump operation returns to normal. In reviewing the data shown on Exhibit E, it is apparent the Houser Street lift station did not operate according to this normal sequence.

Using the information obtained from the City of Muscatine Sanitary Sewer Improvement Plan and Profile drawing of the Allen Street and Westwood Lane Sewer Construction dated May, 1963, I noted the top of the manhole at Station 3+40, more or less, has an elevation of 442.0. This same manhole is located in Allen Street adjacent to the driveway of the Burr residence. After visiting the Burr property in August of this year, I observed that the main floor of the home is approximately 3 feet higher than the elevation of Allen Street in front of the house. That would place Ralph Burr's main floor at elevation 445.0. The basement area of the Burr

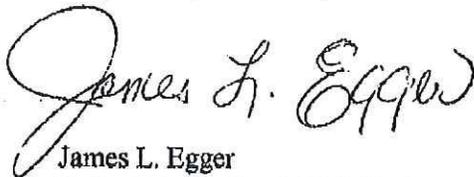
residence has a normal height ceiling, which produces a basement floor approximately 9 feet lower than the main floor. Therefore, the basement floor should be at or near elevation 436.

By inscribing a new line on Exhibit E at Stage elevation 12.5, (the elevation of the Burr basement) any sewage that rises in the Houser Street lift station above Stage 12.5 is likely to back up into the Burr basement. The longer the sewage stays in this lift station above Stage 12.5, the more sewage will disperse throughout the sanitary sewer collection system that feeds raw sewage to this lift station. Exhibit E clearly shows that the Houser Street lift station was not capable of keeping the sewage level below Stage 12.5 with only one pump running during the heavy sewage flows of June 30, 2014, thereby causing sewage to backup into the sanitary sewer collection system and into the Burr basement. If the second pump had turned on when its sensor should have activated this pump, the sewage level in the lift station more likely would have stayed near Stage 6.5, being equivalent to elevation 430.5, or 5.5 feet, more or less, lower than the basement floor of the Burr residence. Exhibit E further shows that for most of the rainfall event of the evening of June 30, 2014, the Houser Street lift station had only one pump operating, causing sewage to backup in the collection system. This backup of sewage caused severe damage to the Burr basement.

MY CONCLUSION: After reviewing the Exhibits and other data, I conclude the Houser Street lift station malfunctioned during the rain event of June 30, 2014. This malfunction and the heavy flows of sewage entering the lift station caused raw sewage to backup in the City's sanitary sewer collection pipes, and ultimately into the basement of the Burr residence. If the Houser Street lift station had operated both sewage pumps continuously during this particular storm event of June 30, 2014, it is highly likely no sewage would have entered the basement of the Burr residence.

In the future, if the Houser Street lift station is not improved, and rain events similar to what occurred on June 30, 2014 return to this Muscatine neighborhood, the Burr basement will be subjected to more sewage backups.

Respectfully submitted,

A handwritten signature in black ink that reads "James L. Egger". The signature is written in a cursive style with a large initial "J".

James L. Egger
Retired Professional Civil Engineer

CC: Mr. Ralph Burr

PRINT



19:57:22

23:09:55

15:02:14 23:49:45

Zoom In Zoom Out

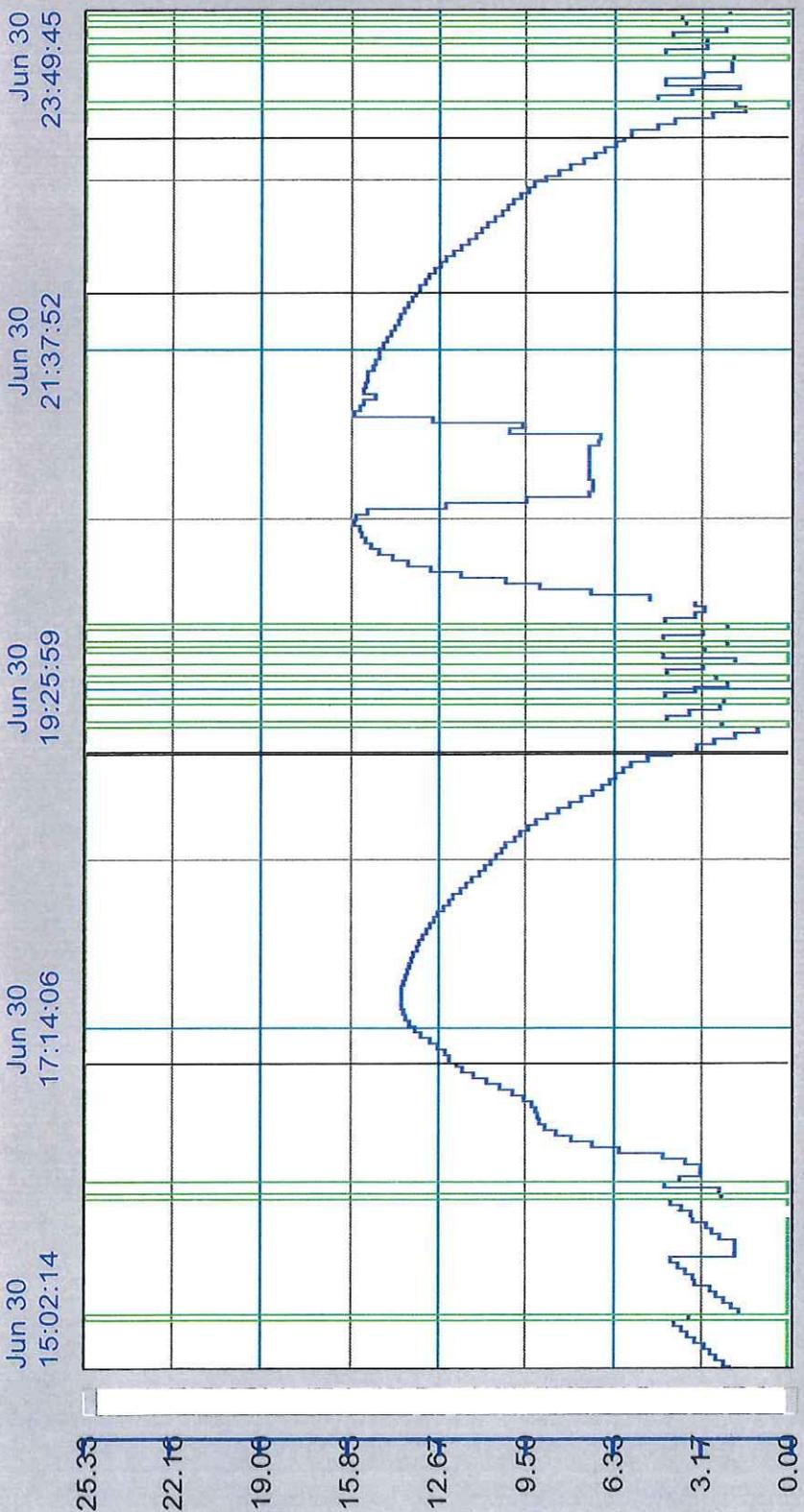
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Minutes 30 minutes

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2				Clear	4	Clear	6	Clear	8	Clear
					Server1.HouserPump1Runn	1.00	1.00			

Exhibit 3A

PRINT



15:02:14 23:49:45

Zoom In 8h 47m 31s Zoom Out

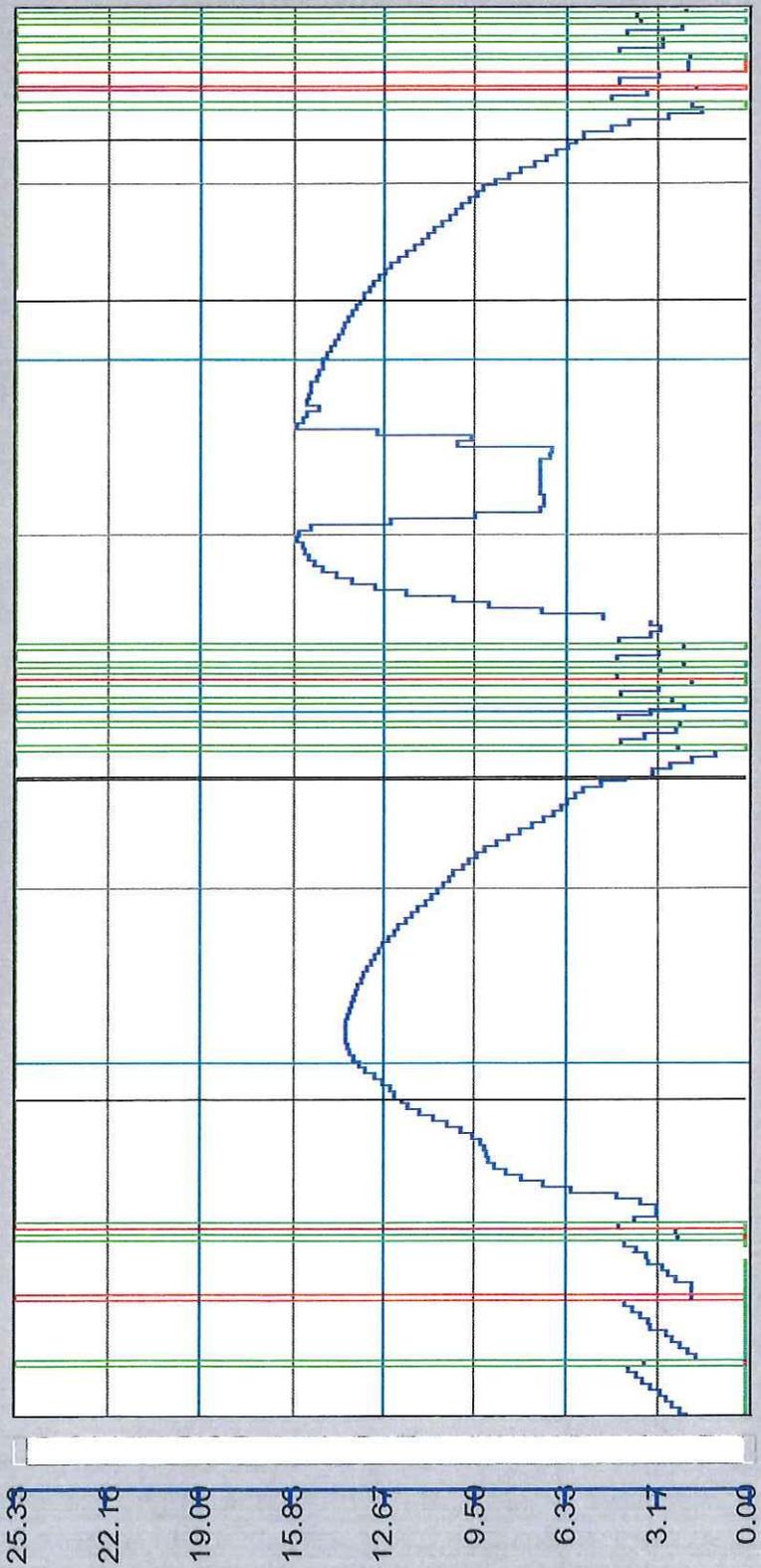
4 hours 1 hour 30 minutes 10 minutes

1	Server1.HouserWetWellLev	2.15	2.18	Clear	5	Clear	7	Clear
2				Clear	6	Clear	8	Clear
					Server1.HouserPump2Runn	0.00	0.00	

Exhibit 3B

PRINT

Jun 30 15:02:14 Jun 30 17:14:06 Jun 30 19:25:59 Jun 30 21:37:52 Jun 30 23:49:45



15:02:14 23:49:45

Zoom In 8h 47m 31s Zoom Out

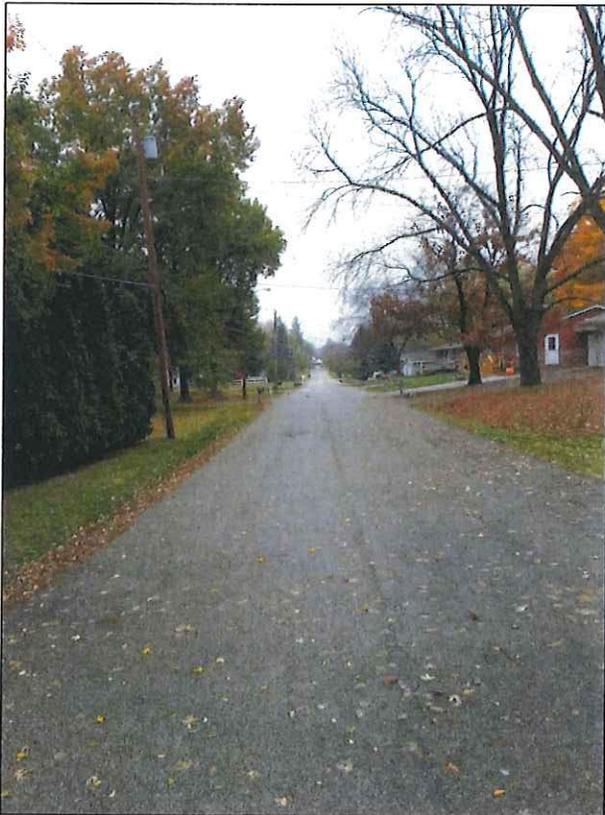
4 hours 1 hour 30 minutes 10 minutes

1	Server1.HouserWetWellLev	2.15	2.18	Clear
2				Clear
3	Server1.HouserPump1Runn	0.00	0.00	Clear
4	Server1.HouserPump2Runn	0.00	0.00	Clear
5				Clear
6				Clear
7				Clear
8				Clear

Exhibit 3C



Burr Residence



Allen Street looking West



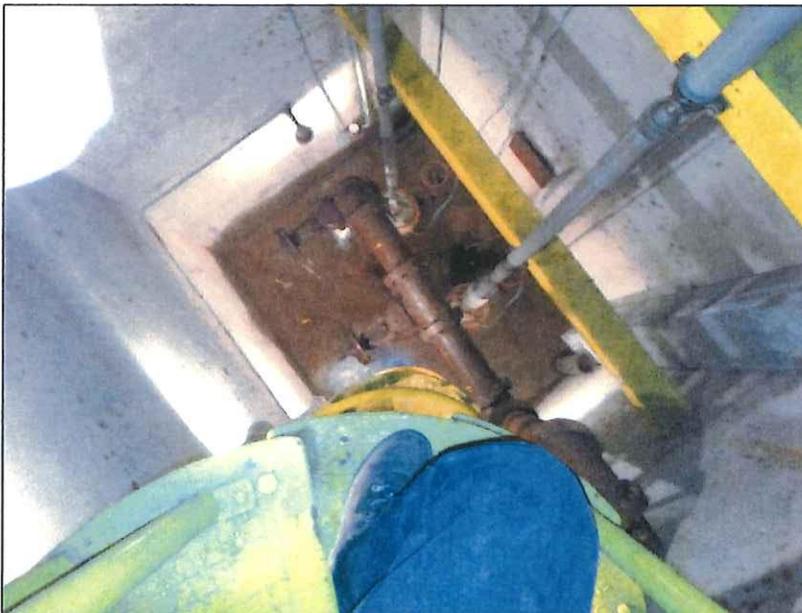
Allen Street looking East



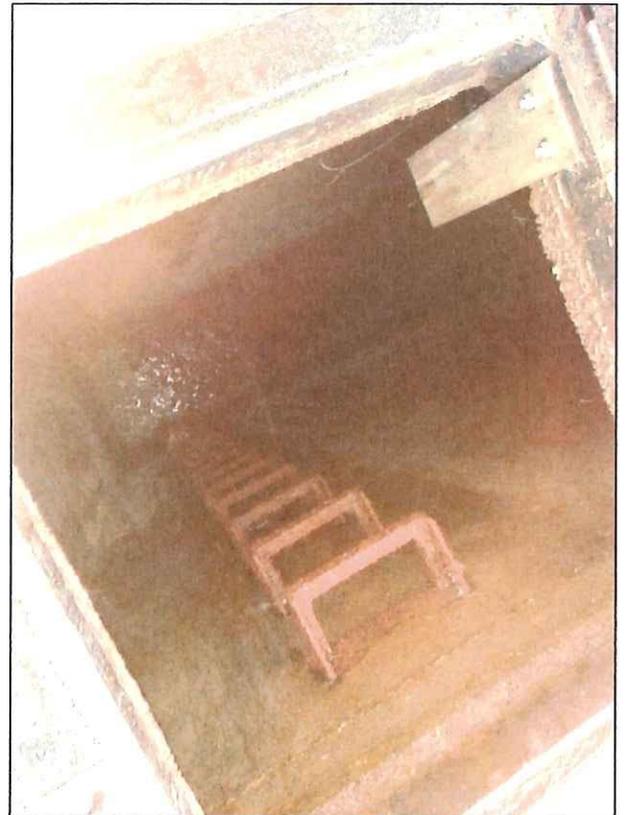
Houser Pump Controls



Houser Pump Station Dry Well



Houser Pump Station Dry Well



Houser Pump Station Wet Well