

February 7, 2024

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Chairman and Board of Trustees
Sanitary and Improvement District No. 297
of Sarpy County, Nebraska
c/o Mr. John Bachman, Attorney
Erickson Sederstrom PC LLO
10330 Regency Parkway Drive, Suite 100
Omaha, NE 68114

REFERENCE: S.I.D. No. 297 (Southern Pines)
Water Quality Pond Conversion 2023
Job No. 0105087.90-388

Dear Members of the Board:

At the request of the Board we surveyed the current conditions of the permanent water quality pond that is in Outlot D (located between Aurora Street and Greenfield Street) within the District, commonly referred to as "the pond". We also evaluated the feasibility of creating a larger pond in Outlot D, and compared the current conditions of the pond with the requirements of the Post-Construction Stormwater Management Plan (PCSMP), commonly referred to as "the plan", the District has implemented in accordance with local, state and federal regulations. What follows is a brief history of how this pond came to be in its current condition, the options available for a larger pond and anticipated annual maintenance costs, and recommendations for the Board to consider regarding improvements in Outlot D.

PCSMP Information

All new developments are required by local, state and federal regulations to develop and implement a PCSMP with the goal of improving water quality, reducing peak flows during rain storms, and controlling flooding of streams, lakes, and rivers impacted by rainfall and resulting run-off of storm water. As the Engineer for the District, we prepared the PCSMP and worked with local regulatory agencies (Sarpy County initially, and now the City of Gretna) for review and approval of the plan, which spans from initial development to completion of all home and business construction. The plan is not considered to be complete and fully implemented until all temporary features are removed or converted to their final stage, subject to review by the City of Gretna.

The physical features implemented for treating storm water runoff change as the District develops. During grading, infrastructure construction (sewers, roads, utilities), and home construction, temporary silt basins were placed in strategic locations to capture silt and sediment to reduce the amount leaving the site during rain events. Other temporary measures were used to reduce pollution in storm water runoff, including silt fences, inlet protection devices, and natural filters such as grass and other vegetation.

When construction in the various drainage areas of the District reach a certain level of final development, temporary silt basins can be converted to permanent water quality features to provide the treatment of storm water as required by regulations. For most developments, including this District, commonly selected permanent features are dry ponds that retain a portion of the initial rainfall during a storm and then release the retained water over the next twenty-four (24) to forty-eight (48) hours. When taken together, this slowed release of storm water from numerous permanent dry water quality ponds has a dramatic impact on downstream lakes and rivers, and can help mitigate flooding risks.

Sarpy County provided the original review of the PCSMP developed for this District, provided comments, and indicated the plan is generally acceptable, while the District was still within their jurisdiction. The City of Gretna is now the local government with jurisdictional authority. The District's PCSMP is not considered fully implemented at this time. Remaining steps for full implementation include converting the last remaining temporary silt basin located on Outlot A near 169th Street and Giles Road to a permanent dry water quality pond, review and approval by the City of Gretna of all permanent water quality features implemented, and final review and approval by the City of Gretna of the District's fully implemented PCSMP.

Pond History

The pond in Outlot D was a temporary silt basin during infrastructure and home construction. We prepared construction plans to convert this temporary silt basin to a permanent dry water quality pond in 2019 in accordance with the District's PCSMP. These construction plans were reviewed and approved by Sarpy County, which at the time was the regulatory agency with jurisdiction of the District. Construction commenced in 2020 to clean out the accumulated sediment, re-grade the pond to the required dimensions, and re-establish grass and other vegetation damaged during construction.

However, during construction and at the request of members of the Board at that time, modifications were made to the construction plans to make the permanent pond deeper than required and to modify the outlet structure to hold storm water, all with the goal of creating a permanent wet pond. These construction plan modifications were not reviewed or approved by Sarpy County, and the District's PCSMP was not amended to include a wet pond as permanent water quality improvement feature.

In the years after construction was completed in 2020, this pond has been maintained by the District, and it has become a point of contention among some residents. The District has treated the pond numerous times for algae, other undesirable vegetation, mosquitoes, and other nuisance issues. Recently the District has had comments and concerns from members of the Southern Pines HOA, and requests to install other permanent features including a fountain or similar device to agitate the water to reduce algae and mosquito issues.

Survey Results & Wet Pond Feasibility Study Results

At a meeting in 2023 we were asked by the Board to perform a topographic survey of the pond, and assess the feasibility of a larger pond in Outlot D.

As of our topographic survey conducted in October 2023, the pond has approximately six (6) to seven (7) feet of water capacity, however at the time of survey the actual water depth was four (4) to five (5) feet deep due to dry weather conditions. The shape of the pond is approximately the same as shown on the 2019 conversion plans. Water elevation in the pond fluctuates with seasonal rainfall, which is the primary source of water for the pond. Other sources of water include excess irrigation from nearby resident's private sprinklers and ground water infiltration. There is no well water or contributing creek flowing into this pond.

We reviewed Outlot D to determine if the overall shape and size of the pond could be expanded. Unfortunately, there is not any room for significant expansion of the pond. A sanitary sewer pipe and permanent sewer easement border the pond on the west and north, inhabited houses border the pond on the north and east, and an embankment and higher grades prohibit expansion to the south. Ponds also require space for access around the perimeter, generally thirty (30) to fifty (50) feet of space for equipment and materials for potential maintenance. At the narrowest point between the edge of pond and private property there is approximately forty (40) feet of open space and clearance. Storm sewer drainage pipes from Aurora Street and Greenfield Street drain the pond on the east and south sides, accordingly, which further limit pond expansion in these directions.

Wet Pond Compliance with District's PCSMP

In addition to conducting a feasibility study for potential pond expansion, we reviewed the District's PCSMP for possible modifications to include a wet pond in the permanent water quality improvement features. We used our recent survey information to model the pond and drainage areas for various rainfall events and compared those results with the requirements for retaining peak flows and treating storm water runoff for water quality.

Given the feasibility findings that showed no room for pond expansion, we modeled the pond in its current configuration and concluded the wet pond does NOT provide enough capacity to fulfil the intended water retention or water quality treatment as required by regulations. In short, the pond is currently not in compliance with the District's PCSMP.

However, if the outlet structure were to be modified with new holes drilled so the water elevation in the pond was approximately two (2) feet lower, the resulting wet pond with lower water elevation would bring it back within compliance of the District's PCSMP. Lowering the water elevation would provide sufficient capacity to retain storm water and meet peak flow reduction and water quality regulations. This would make the resulting pond approximately four (4) to five (5) feet deep in the full condition, and will fluctuate lower during periods of

dry weather. Unfortunately, a pond this shallow would be more susceptible to algae and other undesirable vegetation growth than the pond is currently.

Wet Pond Options & Lamp Rynearson's Recommendations

As previously indicated, the wet pond today does not provide the retention or water quality treatments as required by regulations or the District's PCSMP. There are several options for the Board to consider for changes to this pond.

The first option is to keep the pond as it currently is, even though it is not fulfilling the requirements of the District's PCSMP. There are risks to this course of action, which include possible enforcement action from regulatory agencies. Possible enforcement actions could include mandating the District bring the pond into compliance with the District's PCSMP, issuing fines, or some other action. Because the pond is not in compliance with the original PCSMP, Lamp Rynearson will not be able to certify the basin meets requirements as required by the District's PCSMP. This certification is typically required prior to the City of Gretna considering closure the grading permit and recognition of the full approval and implementation of the District's PCSMP. This option also does not address the intermittent nature of water feeding into the pond, as most of the water comes from rain and runoff from irrigation of nearby lawns. Additionally, this option also presents increased liability for the District as it poses a risk of drowning to humans and animals. If this option is selected, we recommend the District review and modify insurance coverage to include the presence of a permanent wet pond on District property.

The second option is to modify the outlet structure of the pond to lower the water elevation approximate two (2) feet to provide sufficient capacity during a rainfall event. This would still provide a wet pond for the District's residents, but could cause additional maintenance expenses for algae, mosquitoes, and the growth of other undesirable vegetation. There would also be the other issues associated with the first option, including the water feeding into the pond and liability risks. If the District selects this option, the pond would be back within compliance of the District's PCSMP which was originally approved by Sarpy County.

A third option is to convert the pond into a permanent dry retention basin. We would work with the District to prepare construction plans to modify the wet pond to convert to a permanent dry pond, provide the required retention capacity and water quality treatment, and reduce the construction costs as much as practicable.

Lamp Rynearson recommends implementation of the third option. This is the option that was initially planned and is included in the District's PCSMP.

Anticipated Maintenance Costs

Since the pond was modified to hold water in 2020, the District has incurred annual maintenance costs for treating algae and other undesirable vegetation, and spraying for mosquitoes. If the pond remains as it is

currently, the District and/or the HOA should budget and plan for continuing maintenance costs for these issues. The cost for treating algae and other vegetation has been approximately \$1,500 annually. The cost for spraying for mosquitoes around this pond has been approximately \$1,000 annually. Continuing these services is anticipated to cost approximately \$2,500 or more each year, and increasing with inflation. The District has also incurred engineering costs for coordinating these services.

The combination of the current depth of pond, intermittent flow of water, and years of vegetation growth will likely cause the effective depth of the pond to decrease over time. The District should plan to clean out mud and debris from the pond every five (5) to ten (10) years if a wet pond is kept in place. The cost of this work is difficult to predict this far in advance, but at least \$30,000 should be budgeted for this work based on the prices we are seeing now for current similar projects, and increased if the District wants any landscaping improvements beyond typical grass seeding to restore vegetation around the pond.

There have been discussions regarding installation of permanent power to the area and installation of a fountain or other device to agitate the water. This does have the potential to reduce mosquito populations but does not eliminate the issue. Costs for providing power, purchasing a fountain, and ongoing maintenance costs for such items is not included in this report but should be included in considerations regarding the future of this pond.

Summary

The District has a Post Construction Stormwater Management Plan (PCSMP) in place, in accordance with local, state and federal regulations, for retaining storm water to reduce peak flows and reduce downstream flooding risks, and for treating storm water to reduce pollution. The PCSMP is not fully implemented yet, and the plan and permanent features are subject to review and approval by the local regulatory agency (City of Gretna).

Instead of a dry retention basin in Outlot D as outlined in the PCSMP, the District has a wet pond that does not provide the required storage capacity or water treatment functions as required in the PCSMP. Furthermore, there is not a steady and reliable source of water to maintain water in the pond during drought conditions, and the lack of a steady water supply creates maintenance costs for the District. We reviewed the area for possible expansion of the pond, but a larger or deeper pond is not feasible given the physical restrictions and presence of other utilities and properties in and around Outlot D.

The District has several options for what to do, if anything, regarding the wet pond. We recommend modifying the pond to be a dry retention basin that holds water only during and shortly after a rain event, as described in the District's PCSMP. An annotated map of the District is included with this letter for reference, and a copy of our topographic survey from October 2023.

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Thank you for the opportunity to present this information. Please do not hesitate to contact us with questions or further discussion on this matter.

Sincerely,

LAMP RYNEARSON



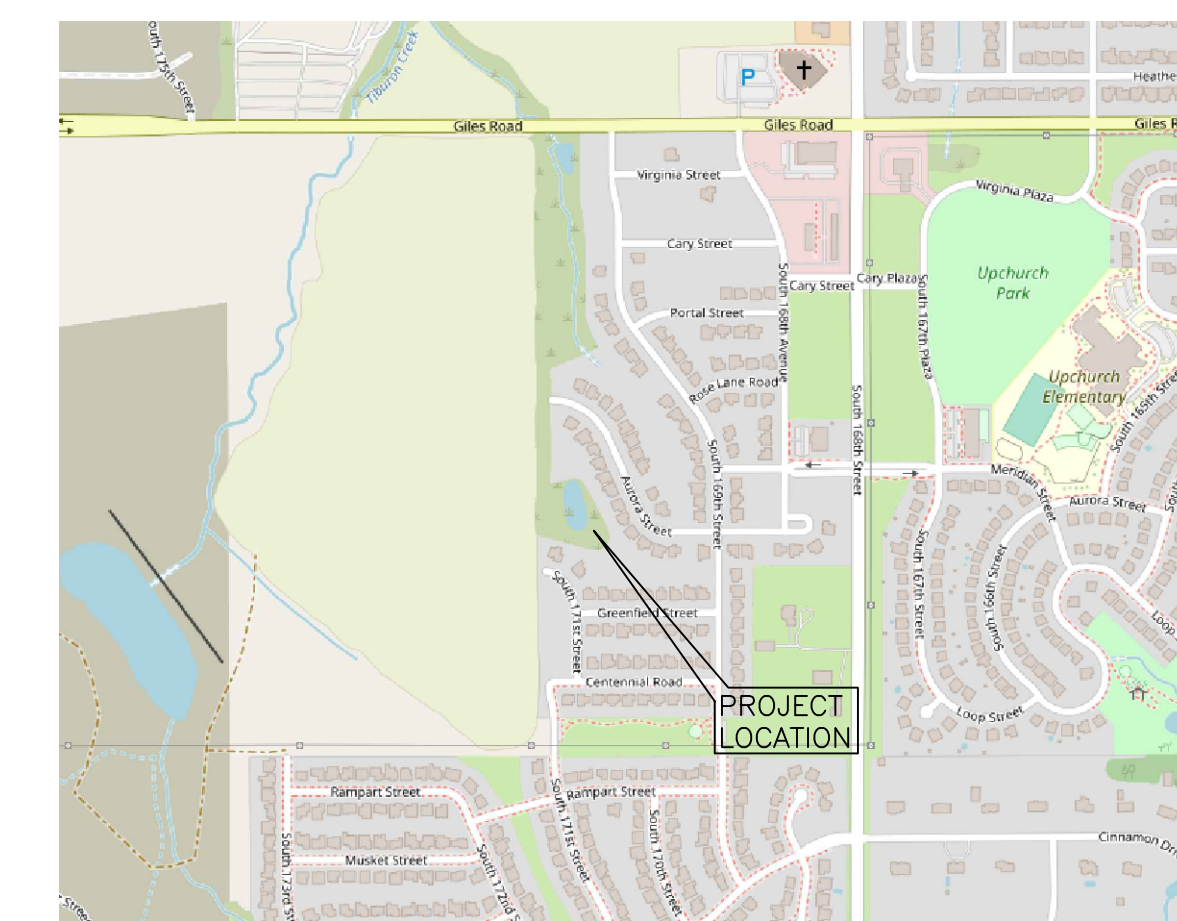
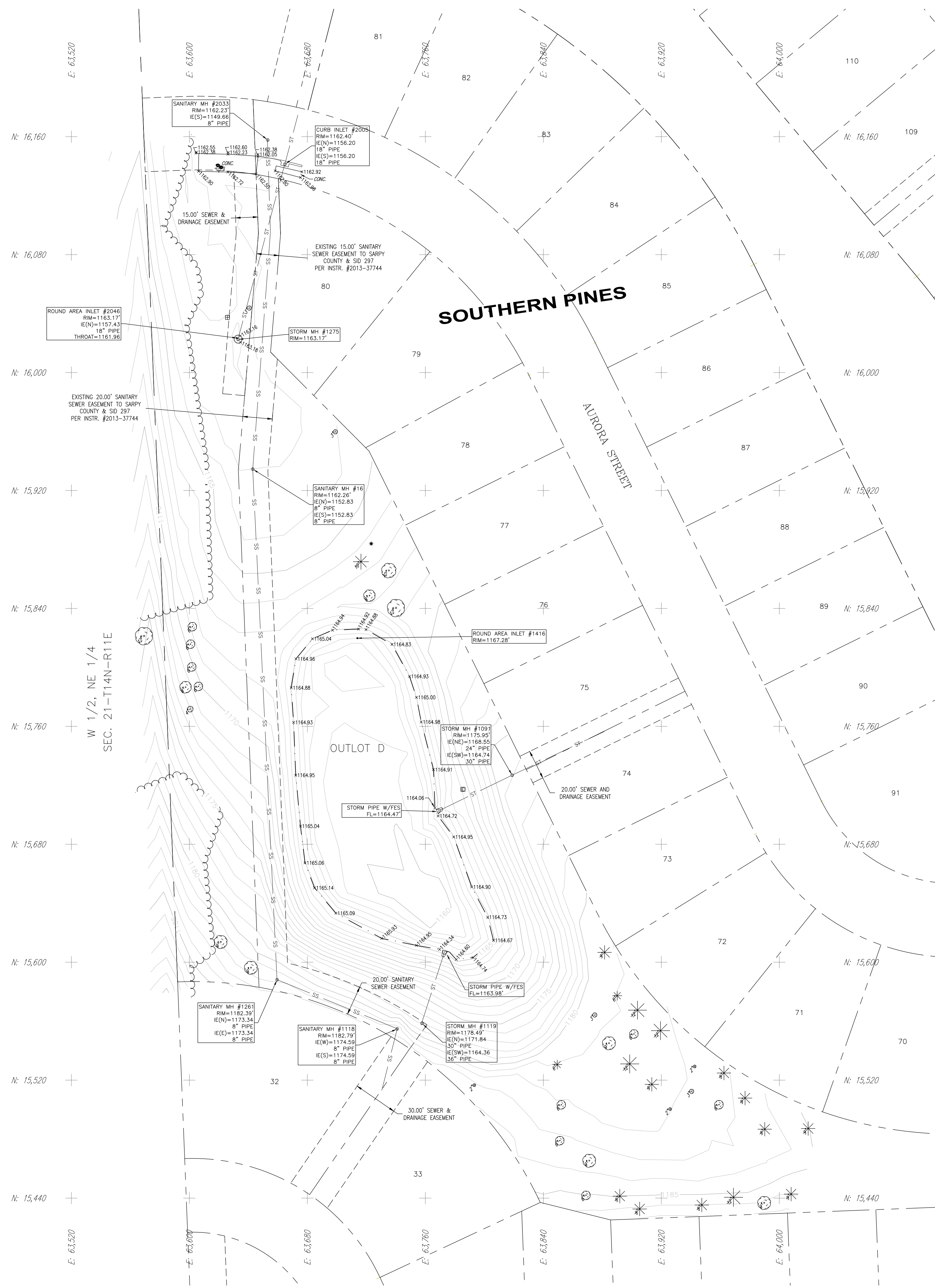
Matt Nelson, P.E., ENV SP
Senior Construction Engineer

Enclosures

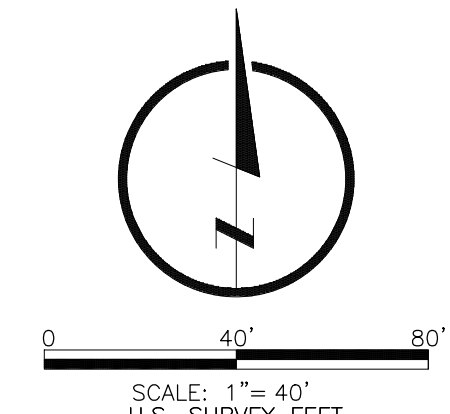
c: John Bachman

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VICINITY MAP



LEGEND

- LOT LINE
- - - - - EASEMENT
- SS --- SANITARY SEWER
- ST --- STORM SEWER
- AREA INLET ROUND
- BOLLARD
- * CONIFEROUS TREE
- CURB INLET
- DECIDUOUS TREE
- ELECTRIC METER
- ▭ FLARED END SECTION
- ⊕ FIRE HYDRANT
- ⊕ LIGHT GROUND
- ⊕ SANITARY MANHOLE
- ⊕ STORM MANHOLE
- ⊕ TELEPHONE PEDESTAL
- ⊕ UNIDENTIFIED MANHOLE
- ⊕ WATER VALVE

LEGAL DESCRIPTION

OUTLOT D, SOUTHERN PINES, A SUBDIVISION AS SURVEYED, PLATTED AND RECORDED IN SАРRY COUNTY, NEBRASKA.

CONTROL NOTE

- HORIZONTAL DATUM IS BASED ON MODIFIED NEBRASKA STATE PLANE COORDINATES.
- VERTICAL DATUM IS BASED ON NAVD88 (GEOID-12A).

UTILITY NOTES

1. THIS DRAWING INCLUDES OBSERVED EVIDENCE OF SERVICES AND UTILITIES EVIDENT AT THE TIME OF SURVEY ONLY. NO RESPONSIBILITY OR LIABILITY IS ASSUMED BY THE SURVEYOR FOR THE FAILURE TO SHOW ANY BURIED SERVICE AND/OR UTILITY LINES EVEN THOUGH THEY MAY EXIST. CONTACT "ONE CALL" (811) PRIOR TO ANY EXCAVATION ON THIS SITE.

LAND SURVEYOR'S CERTIFICATION

I HEREBY CERTIFY THAT THIS TOPOGRAPHIC SURVEY WAS MADE BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL LAND SURVEYOR UNDER THE LAWS OF THE STATE OF NEBRASKA.

DATE OF SIGNATURE: _____



LAMP RYNEARSON

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KANSAS CITY, MISSOURI
3001 STATE LINE RD. STE. 200 (816) 361-0440
MO AUTH. NO.: E-2013011603 | LS-2019043127

TOPOGRAPHIC SURVEY

SOUTHERN PINES - 169TH AND AURORA STREET
OMAHA, SАРRY COUNTY, NEBRASKA

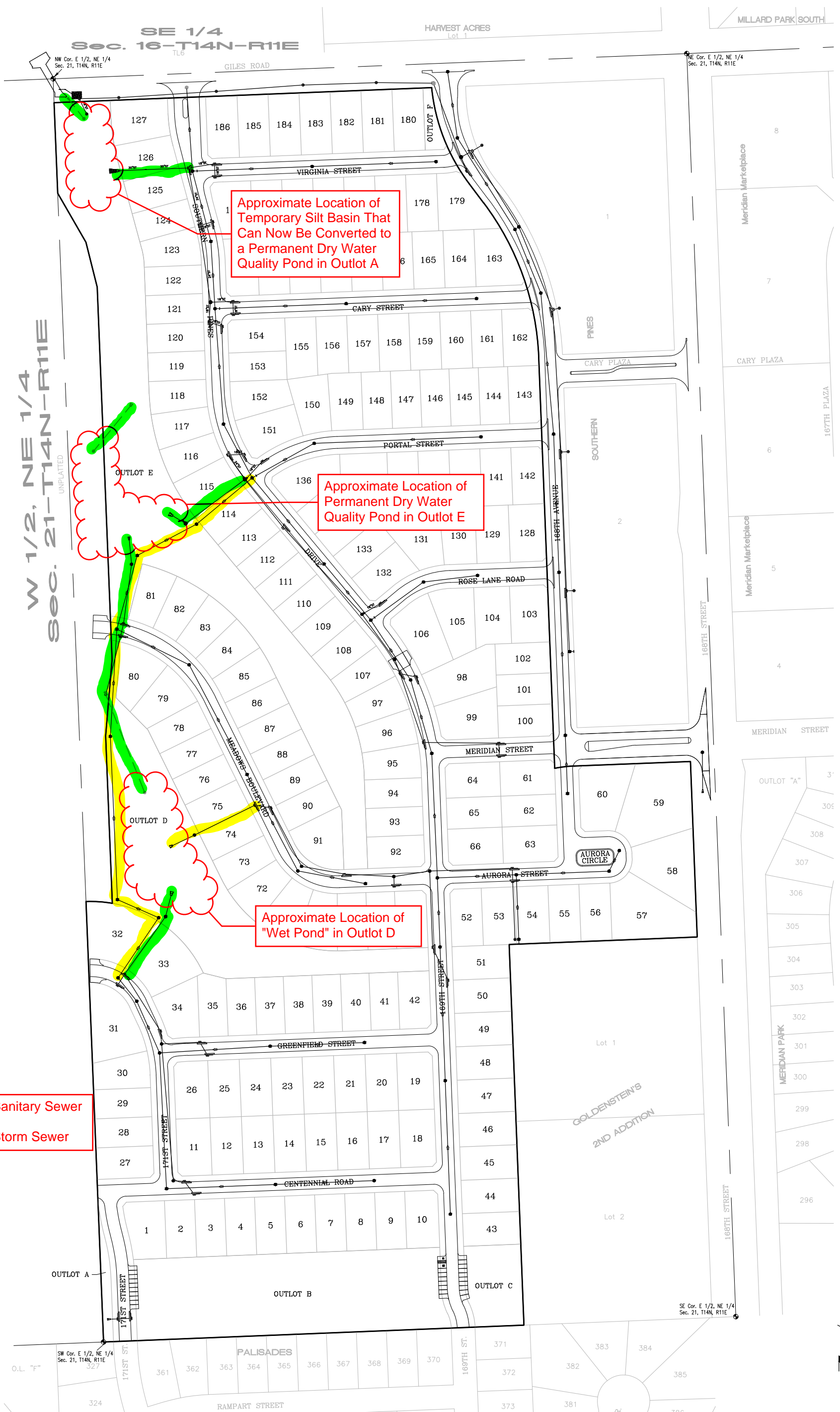


REVISIONS

NO.	DATE	DESCRIPTION

DESIGNER / DRAFTER
BILL KNIGHT/RACHEL RENNECKER
DATE
10/10/2023
PROJECT NUMBER
0105087-90-388
BOOK AND PAGE
05087#3, 24

SHEET
1 OF 1



Approximate Location of Temporary Silt Basin That Can Now Be Converted to a Permanent Dry Water Quality Pond in Outlot A

Approximate Location of Permanent Dry Water Quality Pond in Outlot E

Approximate Location of "Wet Pond" in Outlot D

Sanitary Sewer
Storm Sewer



LAMP RYNEARSON
& ASSOCIATES

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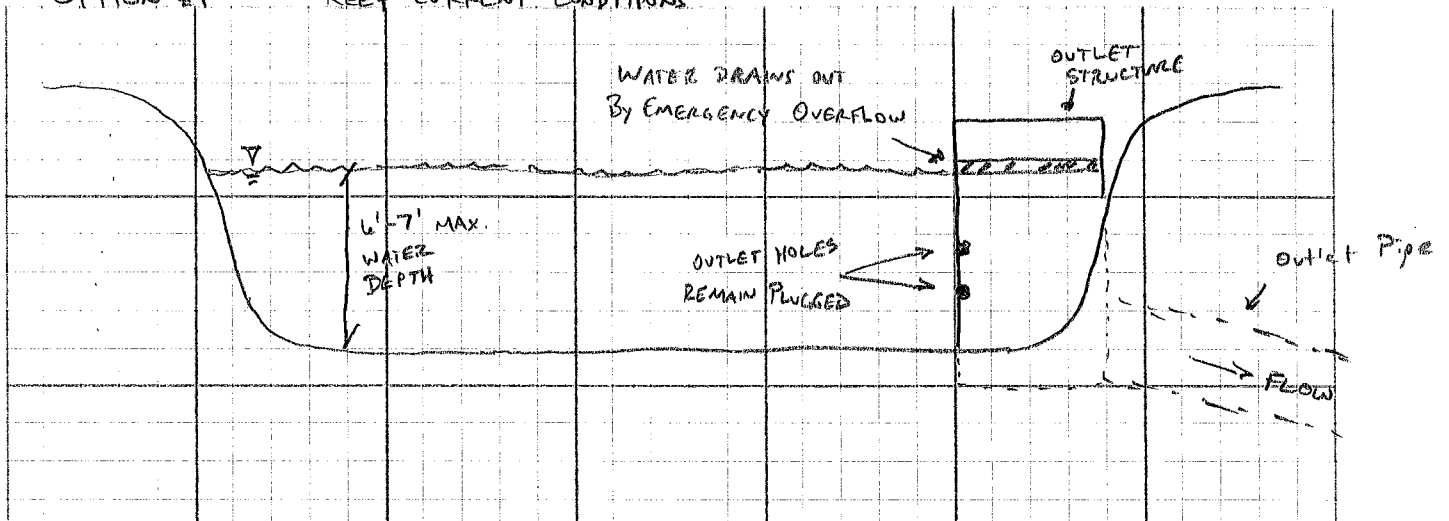
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RJK			0105087.90-392	09-28-2016		

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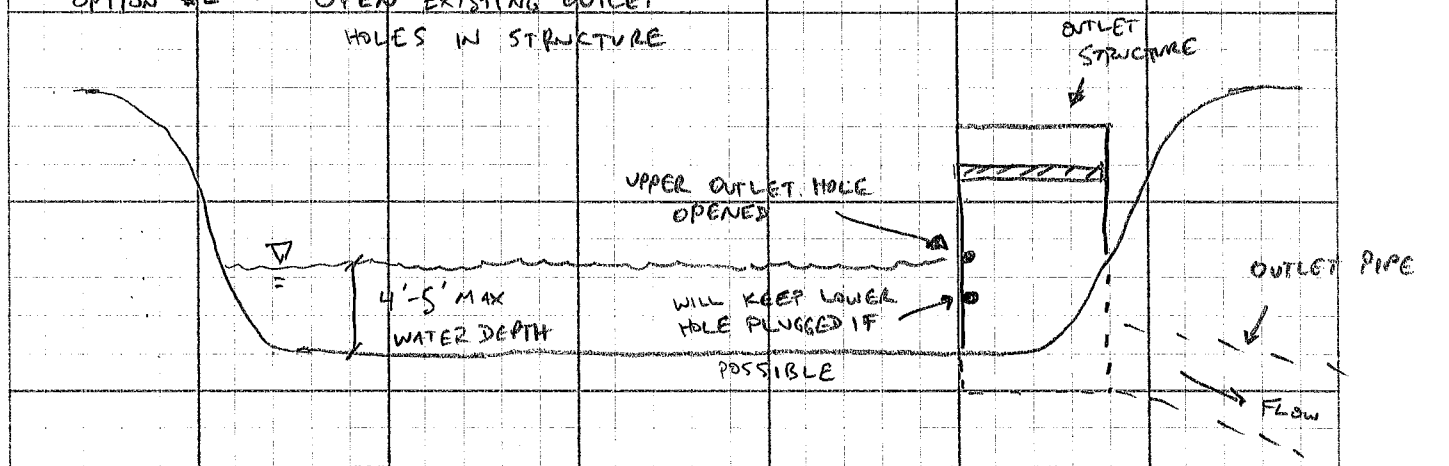
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SOUTHERN PINES
PH 1 & 2

* NOT TO SCALE *

OPTION #1 - KEEP CURRENT CONDITIONS



OPTION #2 - OPEN EXISTING OUTLET HOLES IN STRUCTURE



OPTION #3 - CONVERT WET POND TO "DRY" RETENTION BASIN

