LEE'S SUMMIT
MISSOURI

DESIGN AND CONSTRUCTION MANUAL DESIGN MODIFICATION REQUEST

PROJECT NAME: Longview Mansion – Parking Lot Addition

PREMISE ADDRESS: 1200 SW Longview Park Drive

PERMIT NUMBER:

OWNER'S NAME: NLV Mansion, LLC Mark Moberly

TO: The City Engineer

In accordance with the Lee's Summit Design and Construction Manual (DCM) Section 1002.A, I wish to apply for a modification to one or more specification (s). The following articulates my request for your review and action. (NOTE: Cite specific code sections and engineering justification and drawings.)

See attached.

SUBMITTED BY:

NAME: Stephen Saylor ( ) OWNER (X) OWNER'S AGENT

ADDRESS: 1301 Burlington St. Suite 100 Tel.# 816-442-6061

CITY, STATE, ZIP North Kansas City, MO 64116

Email: ssaylor@olsson.com SIGNATURE:

FORWARDING MANAGER: RECOMMENDATION ( ) APPROVAL ( ) DENIAL

SIGNATURE: DATE:

GEORGE BINGER III, P.E. – CITY ENGINEER: ( ) APPROVED ( ) DENIED

SIGNATURE: DATE:

COMMENTS

A COPY MUST BE ATTACHED TO THE APPROVED PLANS

March 1, 2024

City of Lee's Summit, Missouri
220 SE Green Street
Lee's Summit, MO 64063

RE: PL2023291 – Longview Mansion – Parking Lot Addition

Dear Mr. Binger:

We are submitting this memorandum to support the attached waiver request for the Longview Mansion - Parking Lot Addition to show that proposed stormwater conveyance and water quality measures improve existing stormwater conditions.

Reasons for site improvements for stormwater conveyance and water quality include:

- Stormwater overtops the county road downstream of the project for 10- and 100-year storm events under existing conditions. A proposed 15" HDPE pipe placed next to an existing 24" CMP culvert will reduce stormwater impacts to the road.
- An infiltration trench around the parking lot to treat stormwater runoff before entering the existing stormwater system.

An existing 24" CMP (Point of Interest A) is located at the low point of the road lying west of the proposed parking lot. The drainage area for this pipe does not change due to the proposed parking lot and results of the stormwater model demonstrate the 24" culvert conveys storm peak flows up to and including the 2-year storm event in existing conditions under the road. Larger storms reviewed, including the 10-, and 100-year storm events, result in the overtopping of the road in existing conditions. To reduce the impact of the proposed parking lot on this road, a 15" pipe is proposed to run next to the 24" CMP. The 15" pipe increases stormwater flows in the 2- and 100-year storm events to Longview Lake; however, stormwater does not overtop the road in the 2- or 10-year proposed conditions and stormwater flowing over the road is reduced in the 100-year storm event. Increases in flowrates from the stormwater study are summarized below:

Proposed Conditions vs. Existing Conditions Peak Flowrate

Point of Interest	Q_2 (cfs)	Q_{10} (cfs)	Q_{100} (cfs)
A	+0.99	-3.73	+2.19

There is an existing unnamed tributary between the county road and the lake that collects stormwater for a watershed of 133.66 acres, for which the proposed site accounts for ~0.75% of the watershed. This tributary was analyzed in existing conditions with a 5' bottom width and 8' depth with 3:1 slopes, and was determined to have flowrates at the point of entry to the lake (Point of Interest B, see Exhibit EX-04) as shown in the table below:

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Existing Tributary Conditions Peak Flowrate

Point of Interest	Q_2 (cfs)	Q_{10} (cfs)	Q_{100} (cfs)
B	337.72	656.07	1100.26

Percent Difference of Peak Flowrate with Proposed Parking Lot

Point of Interest	Q_2 (%)	Q_{10} (%)	Q_{100} (%)
B	+0.293	-0.569	+0.199

As shown in the table above, the percent increase of stormwater flow in the tributary area is less than 0.3% for the watershed in all stormwater events, and even decreased in the 10-year event.

The hydraulic grade line changes have been analyzed for the design storm events through the pipes and the existing tributary as seen in the table below between the existing and proposed conditions.

Hydraulic Grade Line (HGL) Differences between Existing and Proposed Conditions

Conveyance Type	Condition	Q_2 Depth (ft)	Q_{10} Depth (ft)	Q_{100} Depth (ft)
24” CMP and 15” HDPE	Existing (No 15” HDPE)	1.63	4.63	4.75
	Proposed (With 15” HDPE)	1.01	3.96	4.72
	Difference	-0.62	-0.67	-0.03 (Overtop Road)
Existing Tributary	Existing	2.77	3.73	4.67
	Proposed	2.77	3.72	4.67
	Difference	+0.00	-0.01	+0.00

The table above shows that the hydraulic grade line is reduced in the 24” CMP and 15” HDPE under the county road, and does not increase (negligible) or is reduced in the existing tributary to the lake.

To protect the water quality of stormwater runoff from the proposed improvements, an infiltration trench will be constructed around the north, west, and south sides of the parking lot. The infiltration trench will capture and treat the entire parking lot to a Level of Service rating of 9.00. Stormwater flowing to the 24” CMP and 15” pipe will be reduced by the trench for the water quality storm event.

Peak runoff rate results shown above do not include analysis of the effects of the water quality infiltration trench. Although not modeled, the infiltration trench will provide a storage volume of 0.09 acre-feet, which exceeds the increase in volume runoff produced by the parking lot improvements in the 2-yr and 10-yr storm events, and the majority of the increase in volume produced by the 100-yr storm event. Existing and proposed volumes are summarized below:

Proposed Conditions vs. Existing Conditions Runoff Volume

Storm Event	Condition	Volume		Difference	Infiltration Trench Volume	Existing vs. Proposed
2-Yr	Existing	1.54	ac-ft	0.07	0.09	-0.02
	Proposed	1.61	ac-ft			
10-Yr	Existing	2.85	ac-ft	0.09		0.00
	Proposed	2.94	ac-ft			
100-Yr	Existing	4.92	ac-ft	0.11		0.02
	Proposed	5.03	ac-ft			

With the reduction in impacts to the existing road and the water quality volume provided by the infiltration trench offsetting the majority of the additional runoff volume produced by the site, we request this waiver be approved.

Should you have any questions, please contact me at (816) 442-6061 or ssaylor@olsson.com.

Sincerely,

Stephen Saylor, PE
Project Civil Engineer

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Stormwater Management Study Excerpt

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NEW LONGVIEW MANSION PARKING LOT STORMWATER DRAINAGE STUDY

Prepared for:

NLV Mansion, LLC
1125 Grand Blvd Ste 202
Kansas City, MO 64106

Prepared By:

Olsson, Inc.
1301 Burlington, Suite 100
North Kansas City, MO 64116
(816) 361-1177

Revised January 2024

Revised December 2023

October 2023

Olsson Project No. 022-06318

1. INTRODUCTION

This Stormwater Drainage Study has been prepared to evaluate the stormwater hydrology of a proposed parking lot within the New Longview Mansion (NLV Mansion) property. The proposed parking lot will be placed on portions of developed and undeveloped areas.

The site is located northwest of the NLV Mansion building in Lee's Summit, Jackson County, Missouri. Figure 1 shows the general location of the proposed parking lot within the NLV Mansion property.

Stormwater runoff from the project site is tributary to Longview Lake, approximately 1/4 mile downstream of the study area.

This report is intended to serve as the project Stormwater Drainage Study for the NLV Mansion parking lot and has been prepared to evaluate the Existing and Proposed Conditions stormwater hydrology. Refer to Appendix B and C for hydrologic model input data and simulation results for Existing and Proposed Conditions. Refer to Appendix A for maps and exhibits.

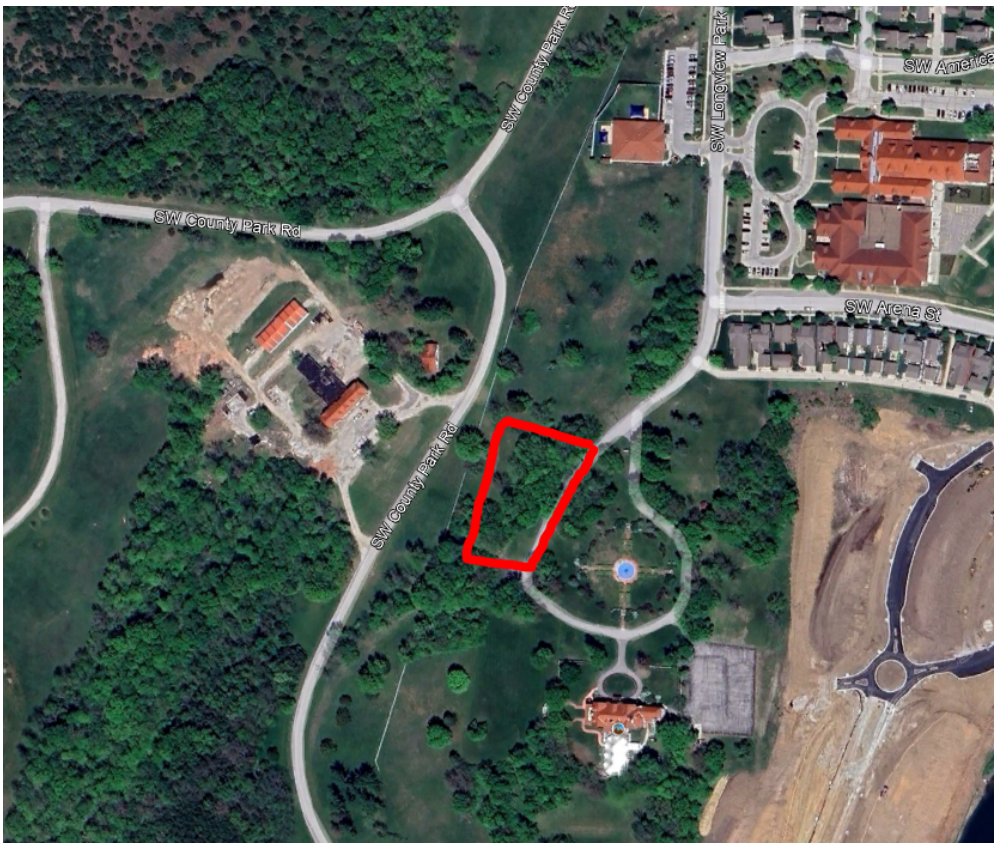

Figure 1. Vicinity Map

3. EXISTING CONDITIONS ANALYSIS

To quantify the effects of the proposed parking lot, the following area and point of interest have been chosen for existing and proposed conditions analysis. See Exhibit 01 – Existing Conditions Drainage Map in Appendix A for a visual depiction of the drainage area and point of interest.

Drainage Area represents the area north of the NLV Mansion building, which slopes westward toward SW County Park Road, then discharges to an existing 24” CMP running under the existing road. In existing conditions, the drainage area has an area of 10.56 acres.

Point of Interest A is located at the downstream invert of the existing 24” CMP on the west side of SW County Park Road and includes stormwater overtopping the road. The model references this point of interest as “Out-01” which stands for “outfall”.

Existing Detention is located at the upstream invert of the existing 24” CMP, on the east side of SW County Park Road. This detention is dry and is purely used in this study to effects of stormwater events at the road. The depth of Detention is 4.5’, from the invert of the 24” CMP and the crown of the roadway. See below for a brief description of the detention:

- Top of Roadway Elevation = 930.50
- Bottom of Basin / 24” CMP Invert = 926.00
- Outlet Pipe
    - 24” Corrugated Metal Pipe
    - Invert In = 926.00
    - Invert Out = 924.65
    - Pipe slope = 2.70%
    - Pipe length = 50.00’

Tables 3, 4, and 5 below summarize the results of the existing conditions analysis. The proposed conditions data is compared to these results in Section 4 of this report. Refer to Appendix B for output and a schematic for the existing conditions model and detailed calculations for the time of concentration.

Curve numbers were determined for existing and proposed conditions as shown in Table 3.

Table 3. Curve Numbers.

Land Use	Hydrologic Soil Group	Curve Number
Woods & Grass Combination	D	79
Paved Parking & Roofs	D	98

4. PROPOSED CONDITIONS ANALYSIS

The proposed conditions sections of this analysis assume the parking lot at NLV Mansion is fully constructed. This analysis includes the construction of the pavement, curb, and BMPs. The difference between the existing conditions model and the proposed conditions model will be evaluated in this section as well as the allowable release rates. Refer to Exhibit 02 – Proposed Conditions Drainage Map in Appendix A for a visual depiction of the drainage area and point of interest.

During the pre-application meeting for this project, it was agreed upon with City of Lee's Summit officials that detention for this project should be waived due to the proximity of the parking lot and Longview Lake at ¼ mile. To keep the balance of stormwater that drains from the site to Longview Lake close to the current time of concentration, detention of stormwater will not be included for this project on site. BMPs are still required to meet the MARC manual water quality volume requirements.

4.1. Effects of Development

The proposed conditions analysis assumes completion of the parking lot at New Longview Mansion. The modeled point of interest is the same as the existing conditions model. The drainage area also remains the same since the parking lot is surrounded by the drainage area boundary. The following is a summary of the proposed conditions drainage area. See Exhibit 02 – Proposed Conditions Drainage Map in Appendix A. Table 7 summarizes the proposed conditions area data.

Drainage Area represents the same area as described in the existing conditions. Impervious area and curve number have been increased due to the parking lot.

To meet or reduce the increase of stormwater overtopping SW County Park Road compared to existing conditions, a 15" HDPE pipe is proposed to run parallel to the existing 24" CMP with the same invert elevations.

The analysis provided in Section 3 established existing conditions of the parking lot's drainage area.

The following tables summarize the results of the proposed conditions analysis. Tables 7 and 8 shows the effects of the parking lot for the drainage area. Refer to Appendix C for output and a schematic of the proposed conditions Storm and Sanitary Analysis 2022 model.

Table 8. Proposed Conditions Area Data.

Area Name	Total Area (acres)	T_C* (hours)	Weighted Curve Number	Q_2 (cfs*)	Q_{10} (cfs*)	Q_{100} (cfs*)
A	10.56	0.294	81.58	21.56	40.49	66.57

*Tc = Time of Concentration

Table 9. Proposed Conditions at Point of Interest.

Point of Interest	Q_2 (cfs)	Q_{10} (cfs)	Q_{100} (cfs)
A	21.51	32.64	65.29

Table 10. Proposed Conditions Detention Basin Data.

	Peak Q In (cfs)	T_P In (hr.)	Peak Q Out (cfs)	T_P Out (hr.)	Max V_R (ac-ft)	Peak W.S.E. (ft)
2-Year	21.51	12.08	21.47	12.10	0.002	927.01
10-Year	40.45	12.08	32.17	12.10	0.102	929.96
100-Year	66.44	12.08	64.22	12.10	0.215	930.72 (Overtop)

*cfs = cubic feet per second

Table 11 shows post-development peak discharge values at the points of interest.

Table 11. Proposed Conditions vs. Allowable Release Rates.

Point of Interest	Q_2 (cfs)	Q_{10} (cfs)	Q_{100} (cfs)
A	+16.07	+11.32	+32.54

Table 12. Proposed Conditions vs. Existing Conditions at Point of Interest A.

Point of Interest	Q_2 (cfs)	Q_{10} (cfs)	Q_{100} (cfs)
A	+0.99	-3.73	+2.19

Table 13. Proposed Conditions vs. Existing Conditions at Existing Detention Basin.

	Peak Q In (cfs)	T_P In (hr.)	Peak Q Out (cfs)	T_P Out (hr.)	Max V_R (ac-ft)	Peak W.S.E. (ft)
2-Year						
Existing	20.44	12.17	20.02	12.17	0.008	927.64
Proposed	21.51	12.08	21.47	12.10	0.002	927.01
Difference	+1.07	-0.09	+1.45	-0.07	-0.006	-0.63
10-Year						
Existing	39.09	12.17	33.48	12.17	0.175	930.63 (Overtop)
Proposed	40.45	12.08	32.17	12.10	0.102	929.96
Difference	+1.36	-0.09	-1.31	-0.07	-0.073	-0.67
100-Year						
Existing	64.58	12.17	62.86	12.17	0.235	930.75 (Overtop)
Proposed	66.44	12.08	64.22	12.10	0.215	930.72 (Overtop)
Difference	+1.86	-0.09	+1.36	-0.07	-0.020	-0.03

Tables 11, 12, and 13 show increases of flow from the proposed condition compared to the allowable release rates and existing conditions at the Point of Interest, except for the 10-year flow due to the proposed 15” pipe. The 15” pipe removes the overtopping of stormwater of the road in the 10-year proposed condition and reduces the amount of stormwater overtopping the road in the 100-year proposed condition.

With the reduction in stormwater overtopping SW County Park Road and the increase of stormwater being directed under the road towards Longview Lake, a waiver is requested that the proposed conditions be accepted as is, with the increase of these flows. It should be noted that the increase of the flow to existing conditions is not more than 5% for all storm events.

4.2. Proposed BMP Facilities

Although detention for the proposed parking lot is requested to be waived, water quality volume requirements must be met through BMPs. The treatment area for the BMPs will only include areas of disturbance, and not the entire drainage area. BMP Worksheet 1 in Appendix C shows that the level of service required for the parking lot is a 7, with most of the disturbed area being impervious.

With the requirement of a level of service 7, an infiltration trench will be used with the high value rating and versatile footprint required to meet the level of service. The soil type, Greenton silty clay loam, that covers the entire disturbed area for the parking lot, has a low hydraulic conductivity and would not naturally be able to drain the treatment area under 72 hours, a requirement per the MARC Manual. Soil with a hydraulic conductivity rate of 2 micrometers/second or higher must be placed at a depth of 2’ minimum below the infiltration trench to obtain proper hydraulic conductivity. A perforated pipe to drain heavy stormwater flows to the point of interest within the drainage area (see Exhibit-03 in Appendix A). A worksheet for calculations of the infiltration trench can be found in Appendix C that show meeting the design criteria for water quality volume.

LEGEND

DRAINAGE AREA

IMPERVIOUS AREA

WOODS/GRASS

TOTAL IMPERVIOUS AREA = 1.44 ACRES
TOTAL WOODS/GRASS AREA = 9.12 ACRES

N

0' 50' 100'
SCALE IN FEET

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MISSOURI CERTIFICATE OF AUTHORITY # 001592

DWG: F:\2022\06001-06500\022-06318\40-Design\Reports\GNCV\Stormwater Drainage Study\Calcs\Proposed Drainage Areas_02206318_Rev2.dwg USER: ssaylor
DATE: Jan 06, 2024 8:56pm XREFS: C_PBASE_02206318

PROJECT NO: 022-06318	NLV MANSION PARKING LOT PROPOSED CONDITIONS DRAINAGE MAP	EXHIBIT
DRAWN BY: SMS		EX-02
DATE: 01/08/2024		

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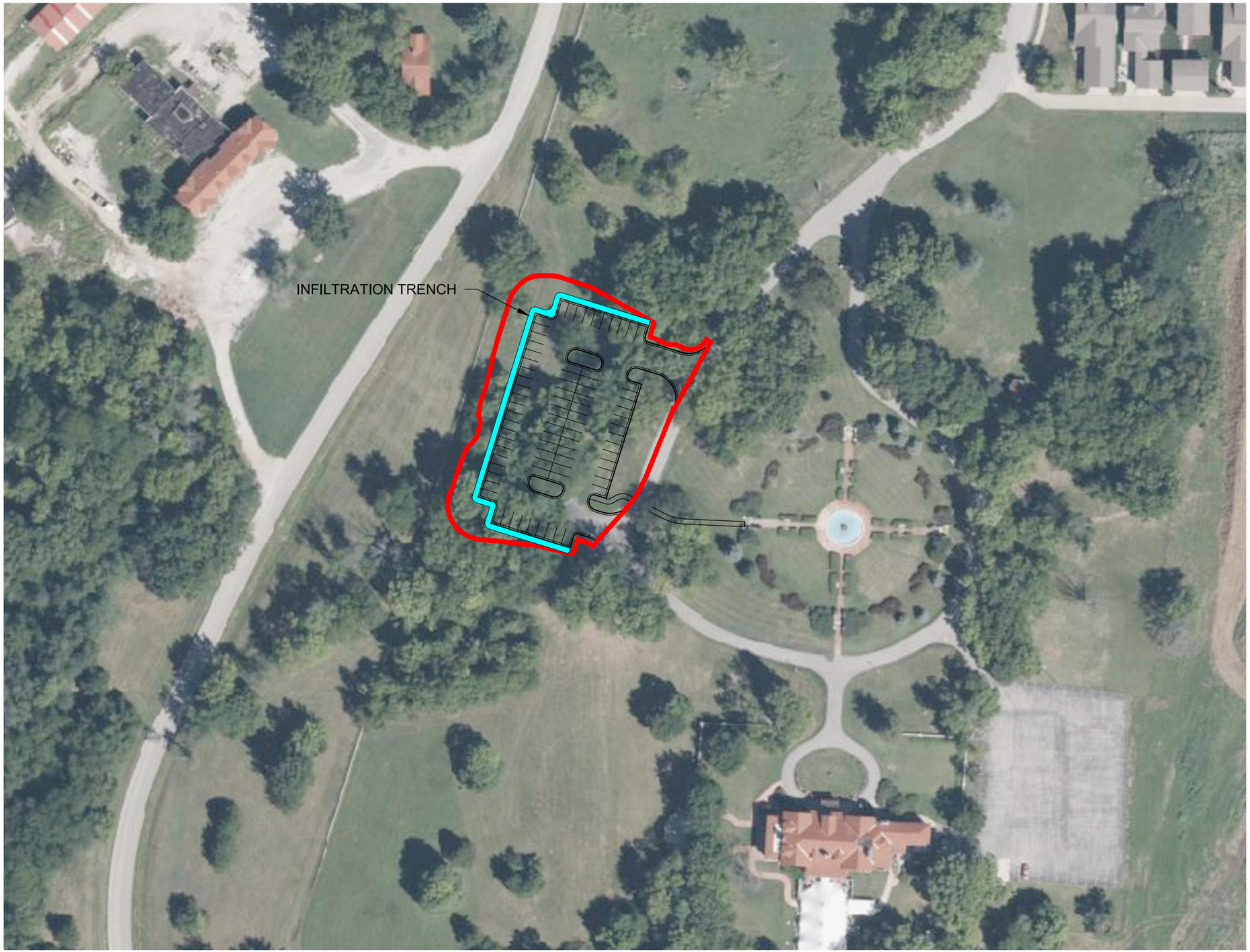

LEGEND

TREATMENT AREA

INFILTRATION TRENCH

N

0’ 50’ 100’

SCALE IN FEET

OLSSON - CIVIL ENGINEERING
MISSOURI CERTIFICATE OF AUTHORITY # 001592

PROJECT NO: 022-06318	NLV MANSION PARKING LOT BMP MAP	EXHIBIT
DRAWN BY: SMS		EX-03
DATE: 12/12/2023		

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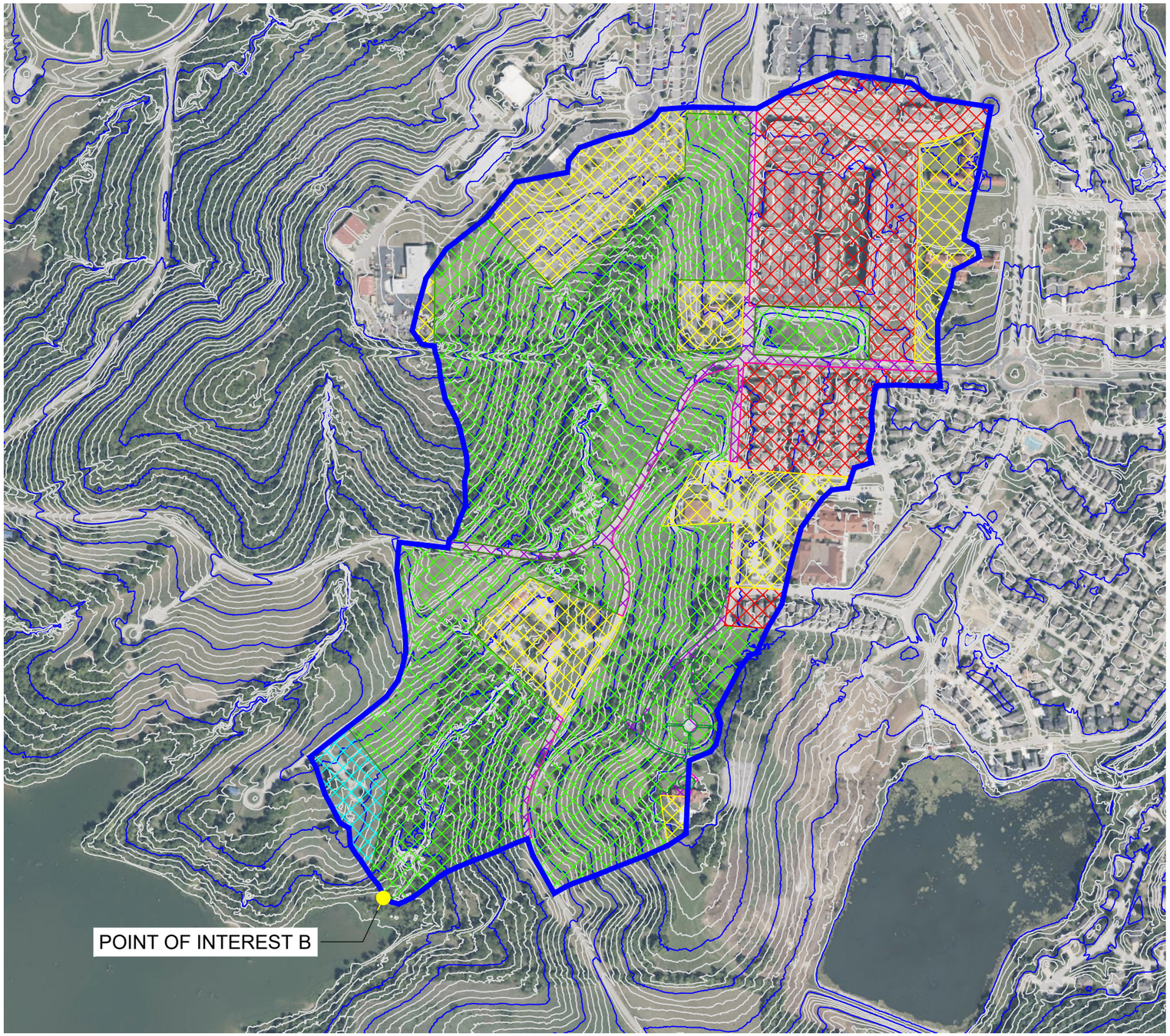
LEGEND

- DRAINAGE AREA
- IMPERVIOUS AREA
- WOODS/GRASS
- CHURCHES AND SCHOOLS
- MULTI-FAMILY
- PARKS

TOTAL DRAINAGE AREA = 133.66 ACRES
TOTAL IMPERVIOUS AREA = 4.76 ACRES
TOTAL WOODS/GRASS AREA = 77.22 ACRES
TOTAL CHURCHES/SCHOOLS AREA = 24.36 ACRES
TOTAL MULTI-FAMILY AREA = 24.88 ACRES
TOTAL PARKS AREA = 2.44 ACRES



N

0' 250' 500'
SCALE IN FEET

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DATE: Jan 23, 2024 9:07am USER: ssaylor

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DATE:	01.23.2024

WATERSHED DRAINAGE MAP

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Missouri COA #001592

EXHIBIT
EX-04