PRELIMINARY STORM WATER MANAGEMENT STUDY

MCPL – LEE'S SUMMIT BRANCH REMODEL

150 NORTHWEST OLDHAM PARKWAY
LEE'S SUMMIT, MISSOURI

PREPARED FOR
MID-CONTINENT PUBLIC LIBRARY

PREPARED BY
OLSSON, INC.
OVERLAND PARK, KANSAS

JANUARY, 2021

(REVISED FEBRUARY, 2021)

OLSSON PROJECT NO. B18-0330.182

7301 W. 133rd Street, Ste. 200 • , Overland Park, KS 66213 • (913) 381-1170

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GENERAL INFORMATION

This Stormwater Management Study is being submitted on behalf of the Mid-Continent Public Library (MCPL) for the proposed remodel and expansion of the existing Lee's Summit Branch Library facility located at 150 Northwest Oldham Road in Lee's Summit, Missouri.

Project Location and Description

The site is located on a platted lot of land recorded as Mid-Continent Add Tract A in the Northeast ¼ of Section 1, Township 47 North, Range 32 West, in Jackson County, Lee's Summit, Missouri. Currently, the site is 1.6 acres, however, MCPL is exchanging property (approximately 0.1 acres) with the adjacent owner of the Summit Shopping to accommodate their branch expansion plans. The legal description for the adjacent property is Summit Shopping Center Lot 1 (See Exhibit 1 – Appendix A).

The Summit Shopping Center borders the library property on the north and east. Oldham Road (MoDOT Right of-Way) is to the east of the property. Residential properties border on the south. The proposed remodel plans anticipate the construction of a 6,100 sf building addition to the existing 16,500 sf. library facility. The improvements will also consist of the reconstruction of the existing parking lot, addition of a drive through service window and service area, and utility upgrades. To expand parking for the library site an agreement has been made with the owners of the Summit Shopping to construct new parking on their property.

The entirety of the existing and acquired sites are located outside of the 100-Year FEMA Floodplain (See Appendix B).

Study Purpose

The purpose of this study is to provide a Stormwater Management Plan for the proposed development in accordance with the American Public Works Association (APWA) *Standard Specifications and Design Criteria* Section 5600 "Storm Drainage Systems and Facilities",

APWA Manual of Best Management Practices (BMP) for Stormwater Quality, and applicable City of Lee's Summit, Missouri guidelines.

Soils Descriptions

Soil classifications were obtained from the Natural Resource Conservation Service's website by utilizing the Web Soil Survey feature. The site soil composition and classification are listed below:

10181 – Udarents-Urban Land-Sampsel Complex, 5 to 9 percent slopes – HSG Type C.

*HSG – Hydrologic Soils Group

See Soils Map in Appendix C.

METHODOLOGY

General Criteria and References

Analytical and design criteria conform to those of Division V - *Section 5600 – "Storm Drainage Systems and Facilities*" of the Kansas City Metropolitan Chapter of the American Public Works Association's *"Standard Specifications and Design Criteria"*. Based on these criteria's, Post-development discharge rates for the 1, 10, and 100-year storm events will be limited to provisions in section 5608.4-C1 *Performance Criteria – "Comprehensive Control"*. Post-development discharge rates are limited to 0.5 cfs per acre for 2-Year, 2.0 cfs per acre for 10-year, and 3.0 cfs per acre for 100-year storm events. Pre and post-development flows from the site are shown below and were calculated using HEC-HMS for the 1, 10 and 100-year storm events. Existing and proposed hydrographs were calculated using the 24-hour SCS Type II rainfall distribution. Existing times of concentration were determined using Inlet Time and Travel Time equations found in Section 5602.7 of APWA Section 5600. A minimum inlet time of five minutes was utilized when calculating the times that were under five minutes. This method was also applied during the calculation of the proposed times of concentration.

HYDROLOGIC/HYDRAULIC ANALYSES

Existing Conditions Analysis

The existing site is currently functioning as a branch for MCPL. The Summit Shopping Center borders the library property on the north and east. Oldham Road (MoDOT Right of-Way) is to the east of the property. Residential properties border on the south. An agreement has been arranged with Summit Shopping Center to exchange property on the northern edge of the library property. The library will gain a portion of the shopping center property to enable the library to construct its expansion. The shopping center will gain ownership of the entrance. An access entrance will be granted to Library to maintain access.

Current runoff for the existing library is collected by existing storm infrastructure that drains to a ditch along Oldham Parkway and McClendon Drive on the east side of the property. Roof drains on the west side of the building daylight above ground. The runoff continues to the south and then turns to the east to an existing flume in the parking area. Approximately 4 acres to the north and west of the library drains from the existing shopping center parking across the northern edge of the library property. Almost the entirety of the studied area drains by pipe or ditch to a storm structure at the southeast corner of the site to an area inlet shown as Outfall ”A” on the existing conditions exhibit. A turfed area on the south of the site drains to the backyards of the residences to the south. Approximately 0.02 acres drain directly to McClendon Drive.

Exhibit 1 in Appendix A shows the existing conditions for the site.

Proposed Conditions Analysis

A new 6.100 sf addition will be constructed on the north side of the existing library. The parking area will be rearranged to maximize parking for the larger building. Additional parking will also be constructed to the northeast of the proposed building on the shopping center property. This will serve as parking for both library and shopping center patrons.

City staff has noted that there has been flooding issues in the areas south of the site. In order to prevent an increase in runoff, asphaltic pavement will be removed south and west of the building to offset the increase in impervious areas for the building and new parking. Impervious area on the library site will decrease by approximately 3100 sf on the library site. Impervious area will decrease by approximately 100 sf on the shopping center site. Exhibit 2 in Appendix A shows proposed site plan.

The Stormwater Management Plan noted as Exhibit 3 in Appendix A shows the proposed improvements. The site drainage patterns will remain the same as existing. Site drainage will be improved with the addition of more efficiently placed drainage structures and enclosed storm sewer system. The decrease in impervious area will decrease runoff from the site. The system continues to drain to Outfall "A". The structure at Outfall "A" will be reconstructed as a portion of the site improvements.

Table 1: Post-Development Curve Number Analysis

Sub-Area	Area (AC)	Soil Group	Curve Number
Pavement, Buildings, Impervious	1.7	C	98
Turf (Good)	0.9	C	84

A peak flow analysis of the post-development site was conducted using HEC-HMS, the composite curve number, and rainfall and distribution information acquired from APWA section 5600. Post-development peak flows to the outfall are summarized in the Table 2. Exhibit 4 in Appendix A shows the drainage calculations for the proposed site.

Table 2: Proposed Peak Flows

Sub-Area / Outfall	Tributary Area (acres)	Q (1-Year Storm) (cfs)	Q (10-Year Storm) (cfs)	Q (100-Year Storm) (cfs)
Outfall A	2.6	8.2	16.2	23.1

Existing offsite drainage patterns on the south side of the property and at the entrance will remain the same as pre construction.

Stormwater Detention Requirements

As stated previously, impervious areas will decrease on the site. Therefore, detention will not be required. The decrease in impervious area is below the 5000 sf increase threshold, and therefore exempt from the requirements Section 5601.3.

STORMWATER TREATMENT REQUIREMENTS

The decrease in impervious area is below the 5000 sf increase threshold, and therefore exempt from the requirements Section 5601.3

CLEAN WATER ACT SECTION 404 PERMITTING REQUIREMENTS

No jurisdictional Waters of the United States have been identified on the study site. Therefore, a Section 404 permit is not required.

FEMA/DWR PERMIT REQUIREMENTS

No FEMA permitting or submittals will be required on this site because there are no FEMA delineated floodplains on the site. A copy of the FIRM map for this area has been included in Appendix B.

CONCLUSIONS AND RECOMMENDATIONS

As outlined in the preceding report, removal of existing pavement south and west of the library building will result in a net decrease in impervious areas on the site. Therefore, runoff rates in the post-development condition will decrease, protecting downstream properties. Based on these facts and other information provided herein, we request approval of this stormwater study.

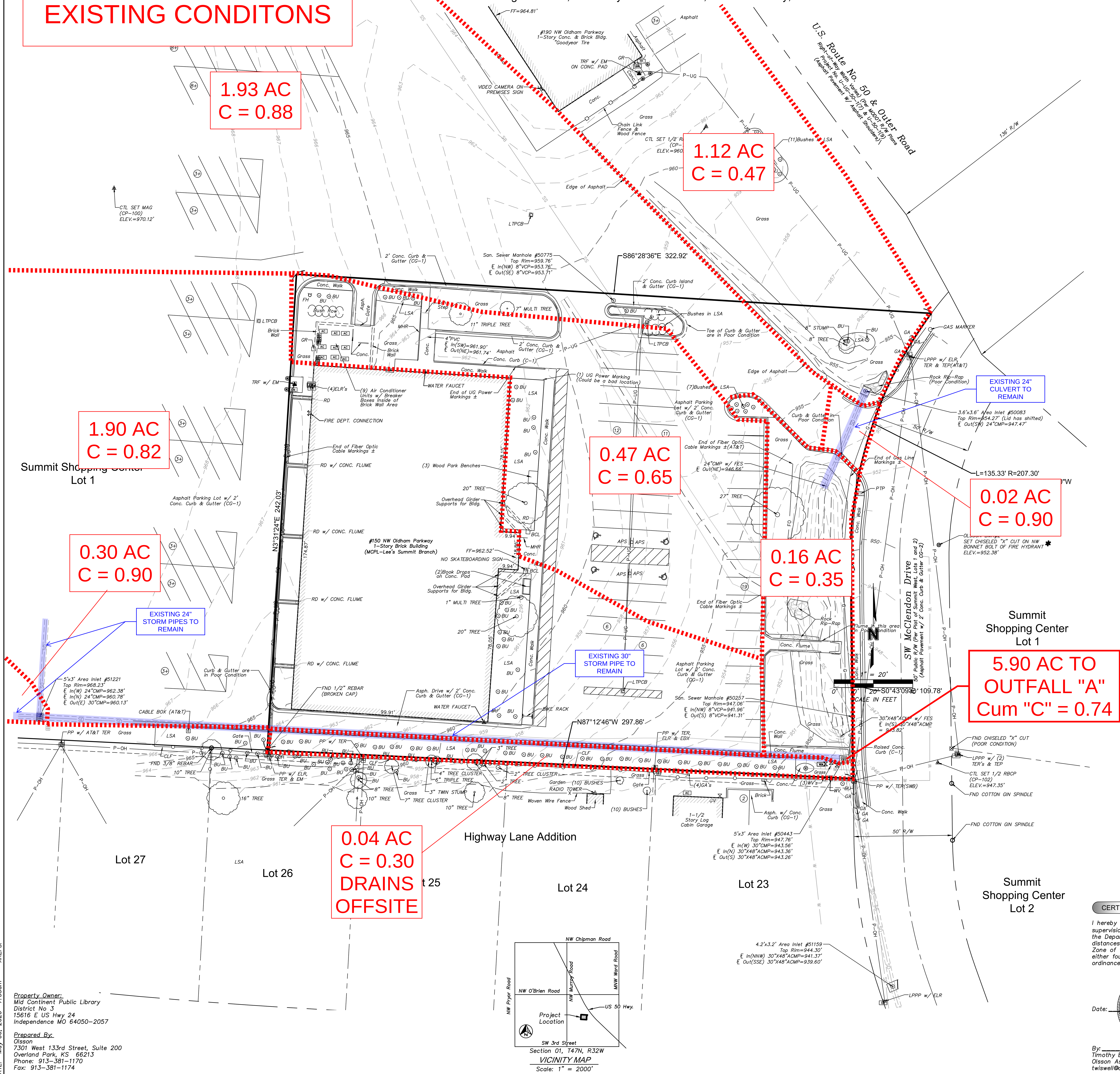
Appendix A

Map Exhibits

Topographic Survey

Mid-Continent Public Library Lee's Summit Branch - 150 NW Oldham Parkway

A subdivision lying in the Southeast Quarter of Section 1, Township 47 North, Range 32 West, in the City of Lee's Summit, Jackson County, Missouri



Property Owner:
Mid Continent Public Library
District No 3
15616 E US Hwy 24
Independence MO 64050-2057

Prepared By:
Olsson
7301 West 133rd Street, Suite 200
Overland Park, KS 66213
Phone: 913-381-1170
Fax: 913-381-1174

DWG: C:\Civil 3D Projects\018-0330\Xref\150 NW Oldham Parkway 2020 Summit Shopping Center -Lee's Summit 04-2019\V_XTOPO_80330-150 NW Oldham Parkway.dwg USER: tvalentine
DATE: May 06, 2020 7:53am XREFS:

CONTROL NOTES

Control: Horizontal & Vertical Control is based on the MoDOT Continuously Operating GNSS Network, Missouri Coordinate System 1983, West Zone, Metro Control Point JA-45.

Coordinate Datum: State Plane Bearings, Grid Distances, US Survey Feet

JA-43
KC Metro GRS Control Aluminum Disk, set in concrete flush with the ground and stamped JA-43, 1988. (Monument possibly been struck and damaged).
N: 307528.309 (m) N: 1008949.126 (ft)
E: 860514.793 (m) E: 2823205.614 (ft)
Elev. = 1034.77' (NAVD'88)

JA-136
KC Metro GRS Control Aluminum Disk, set in concrete flush with the ground and stamped JA-136, 1994.
N: 304466.750 (m) N: 998904.661 (ft)
E: 859083.036 (m) E: 2818508.258 (ft)
Elev. = 993.11' (NAVD'88)

OA CPT #100:
Set magnetic nail parking lot of Summit Shopping Center, 136' NW of the NW corner of the Mid-Continent Public Library, 229' SW of the South corner of Goodyear Tire Store.
N: 1001116.314
E: 2816706.842
ELEV. = 970.12' (NAVD'88)
Reference Ties:
1. 20.25' West-Northwest to the Southwest corner of a grate inlet.
2. 73.0'± East to the East end of parking stripes.
3. 99.50' Southeast to the center of a light pole on a concrete base.

OA CPT #101:
Set 1/2" Rebar w/ "Olsson Survey Control Point Cap", 162' NNE of the NE corner of the Mid-Continent Public Library, 75' East of the South corner of Goodyear Tire Store.
N: 1001147.681
E: 2817007.371
ELEV. = 960.98' (NAVD'88)
Reference Ties:
1. 48.50' Southwest to the Northeast edge of asphalt.
2. 48.55' Northwest to the Southwest corner of Midwest Auto Clinic (Goodyear Tire).
3. 25.30' East-Southeast to the center of a 4" Twin tree.

OA CPT #102
Set 1/2" Rebar w/ "Olsson Survey Control Point Cap", 229' East of the SE corner of the Mid-Continent Public Library, 28' East of the ℄ of McClendon Drive.
N: 1000824.707
E: 2817124.980
ELEV. = 947.35' (NAVD'88)
Reference Ties:
1. 3.00' West to the mid point of a back of curb.
2. 9.97' Northeast to a found chiseled "X" cut on concrete curb.
3. 11.45' East to the center of a power pole.

Elevations Datum: NAVD 1988

OA Bench Mark #1:
Elevation=973.75' (NAVD'88)
Set punch mark in chiseled "□" cut on the top East side of a concrete base for a light pole, First light pole East of the entrance to Genesis Gym. 205'± WNW of the NW corner of the Mid-Continent Public Library, 340' ENE of the South corner of Goodyear Tire Store.

OA Bench Mark #2:
Elevation=952.38' (NAVD'88)
Set chiseled "X" cut on top of curb on the North side of a concrete curb island, West of Equity Bank building. 213'± East of the East face of the Mid-Continent Public Library, 22' East of the ℄ of McClendon Drive.

UTILITY NOTES

Utilities shown have been located from field survey information, together with obtained records. The Surveyor makes no guarantee that the utilities shown comprise all such utilities in the area, either in-service or abandoned. The Surveyor further does not warrant that the utilities shown are in the exact location indicated. Locates are in compliance with Subsurface Utility Engineering Quality Level "B", and were through the Missouri One-Call System.
Private utilities were located by Echo GPR Services, 24564 Lackman Road, Paola, Kansas, 66071, Phone Number 913-879-2200.

Utilities were ordered to be located through Missouri One Call per One-Call Ticket #200691141. The companies listed on the ticket are: AT&T Distribution; City of Lee's Summit Sewer; City of Lee's Summit Storm Sewer; City of Lee's Summit Water; Evergy (Formerly Kansas City Power & Light); Google Fiber; Spire Missouri West and Spectrum (Formerly Time Warner Cable).

LEGEND

Symbol	Description	Symbol	Description
	SET 1/2"x24" REBAR W/ OLSSON CONTROL CAP		TREE STUMP
	FOUND REBAR	GA	GUY ANCHOR WIRE
	FOUND CHISELED "X" CUT		BUILDING LINE
	SET CHISELED "X" CUT	ACU	AIR CONDITIONING UNIT
FH	FIRE HYDRANT	ASPH.	ASPHALT
WV	WATER VALVE	AT&T	AMERICAN TELEPHONE & TELEGRAPH
WM	WATER METER	BCL	BRICK SUPPORT COLUMN
W	WATER MANHOLE	BK.	BOOK
FDC	FIRE DEPARTMENT CONNECTION	BLDG.	BUILDING
GR	GAS REGULATOR	BMK	BENCHMARK
GV	GAS VALVE	CLF	CHAIN LINK FENCE
S	SANITARY SEWER MANHOLE	CMP	CORRUGATED METAL PIPE
D	SANITARY SEWER MANHOLE	CONC.	CONCRETE
E	ELECTRIC BOX	CP	CONTROL POINT
EM	ELECTRIC METER	CTL	CONTROL
TRF	TRANSFORMER	ELEV.	ELEVATION
B	BREAKER BOX	ELR	ELECTRIC RISER
ER	ELECTRIC RISER	ESMT.	EASEMENT
RD	ROOF DRAIN	℄	FLOW LINE
	STEEL PIPE BOLLARD	FES	FLARED END SECTION
—G—	GAS LINE	FF	FINISH FLOOR ELEVATION
—W—	WATER LINE	FND	FOUND
—P-UG—	UNDERGROUND POWER LINE	LSA	LANDSCAPE AREA
—P-OH—	OVERHEAD POWER LINE	MHR	METAL HANDRAIL
—FO—	UNDERGROUND FIBER OPTIC LINE	PG.	PAGE
—SS—	SANITARY SEWER LINE	PTP	PEDESTRIAN TRACTION PAD
—SD—	STORM LINE	PVC	POLYVINYL CHLORIDE PIPE
TP	TELEPHONE PEDESTAL	R/W	RIGHT-OF-WAY
T	TELEPHONE RISER	RBCP	REBAR WITH CAP
C	CABLE TELEVISION BOX	RCP	REINFORCED CONCRETE PIPE
BCL	BRICK SUPPORT COLUMN	TD	TELEPHONE DROP
MLB	MAILBOX	TEP	TELEPHONE PEDESTAL
	RADIO TOWER	TER	TELEPHONE RISER
	WATER FAUCET	VCP	VITRIFIED CLAY PIPE
	GRATE INLET	W/	WITH
	SIGN	(M)	MEASURED DIMENSION - THIS SURVEY
APS	ACCESSIBLE PARKING SIGN	(P)	PLATTED DIMENSION
PP	POWER POLE	(D)	DEED DIMENSION
LPPP	LIGHT POLE/POWER POLE		FLARED END SECTION
LTPCB	LIGHT POLE ON CONCRETE BASE		NUMBER OF PARKING STALLS
GA	GUY ANCHOR		ACCESSIBLE PARKING SPOT
AC	AIR CONDITIONER	✱	DENOTES OA BENCHMARK
	DECIDUOUS TREE		
BU	BUSH		

CERTIFICATION

I hereby certify that the within Topographic Survey is based on an actual survey made by me or under my direct supervision and that survey meets or exceeds the current standards for "Urban" Class Property Surveys, as defined by the Department of Natural Resources 10 CSR 30-2.030 General Land Surveying Requirements. I further certify that the distances shown on this Survey are grid distances, based on the State Plane Coordinate System of Missouri, Western Zone of the North American Datum of 1983; that the subdivision corner monuments and Survey control monuments were either found or set as indicated on this plat; and that I have complied with all State and Clay County statutes, ordinances, and regulations governing the practice of Surveying to the best of my professional knowledge and belief.

STATE OF MISSOURI
TIMOTHY BLAIR WISWELL
NUMBER PLS-2009000067
PROFESSIONAL LAND SURVEYOR

Date: ____________

By: ____________

Timothy Blair Wiswell, MO PLS No. 2009000067
Olsson Associates LC-366
twiswell@olssonassociates.com

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REVISIONS

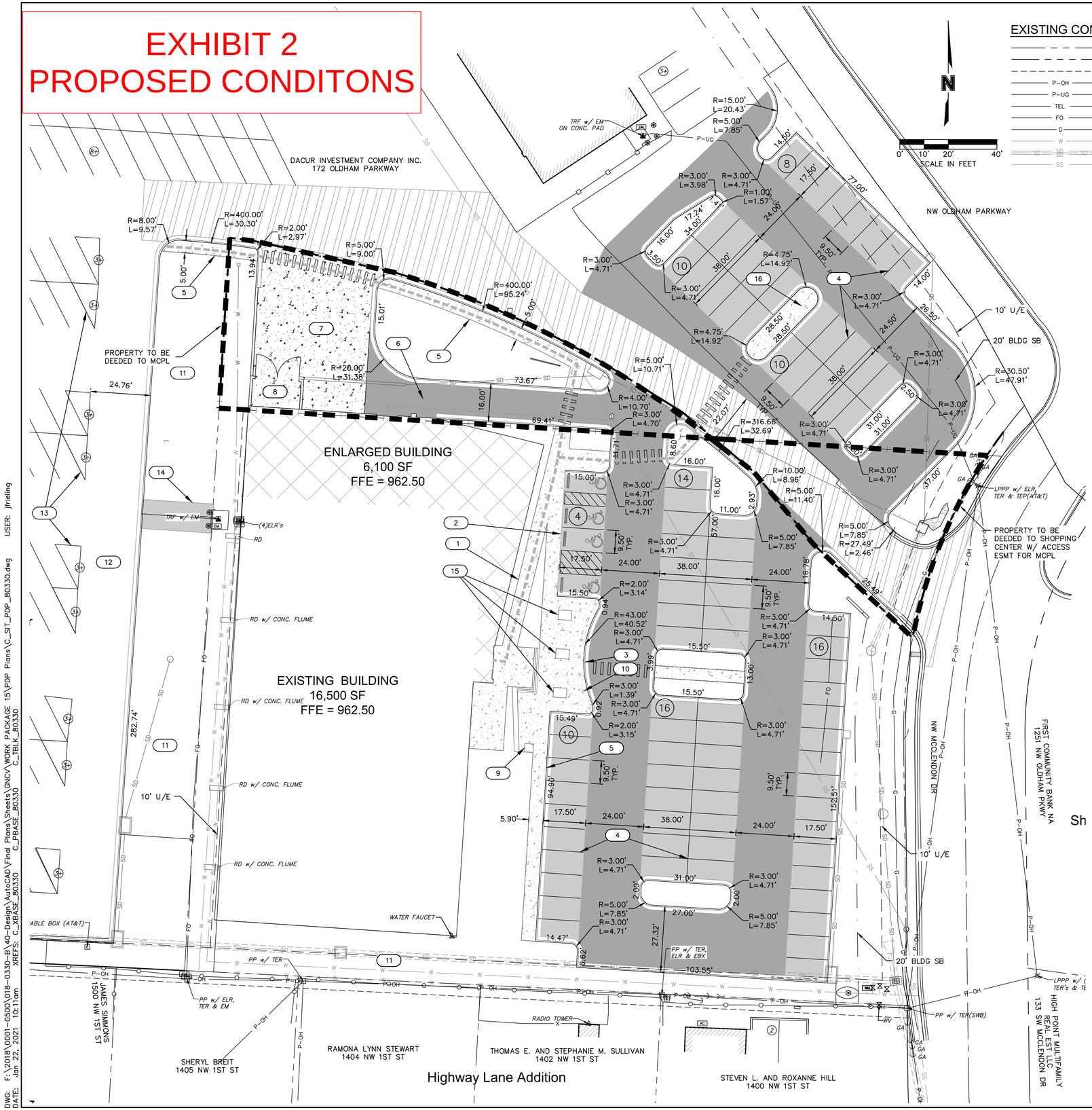
REV. NO.	DATE	REVISIONS DESCRIPTION	BY

Topographic Survey
Mid-Continent Public Library Lee's Summit Branch
A subdivision lying in the Southeast Quarter of Section 1, Township 47 North, Range 32 West
Lee's Summit, Jackson County, Missouri
2020

drawn by: TMV
checked by: TBW
approved by: TBW
QA/QC by: TBW
project no.: 018-0330
drawing no.: V_XTOPO_80330-NW Oldham Prkwy
date: 04/10/20

SHEET 1 of 1

EXHIBIT 2
PROPOSED CONDITONS



EXISTING CONDITIONS LEGEND

- PROPERTY LINES
- RIGHT-OF-WAY LINES
- EASEMENT LINES
- P-OH — OVERHEAD ELECTRIC
- P-UG — UNDERGROUND ELECTRIC
- TEL — UNDERGROUND TELEPHONE
- FO — UNDERGROUND FIBER OPTIC
- G — GAS LINE
- W — WATER LINE
- SD — STORM SEWER LINE
- SS — SANITARY SEWER LINE

PROPOSED CONDITIONS LEGEND

- E — PROPOSED UNDERGROUND ELECTRIC
- FO — PROPOSED FIBER OPTIC
- W — PROPOSED WATER LINE
- FP — PROPOSED FIRE PROTECTION LINE
- SD — PROPOSED STORM SEWER LINE
- T — PROPOSED TURF DRAIN LINE
- SS — PROPOSED SANITARY SEWER SERVICE
- PROPOSED AGGREGATE PATH
- TYPE CG-1 CONCRETE CURB & GUTTER
- PROPOSED CONCRETE PAVEMENT
- PROPOSED HEAVY DUTY ASPHALT PAVEMENT
- PROPOSED LIGHT DUTY ASPHALT PAVEMENT
- PROPOSED MILL & OVERLAY ASPHALT PAVEMENT
- ADA PATH – SIDEWALKS NOT DELINEATED AS ADA PATHS MAY NOT BE ADA COMPLIANT.
- ACCESSIBLE RAMP
- (X) PARKING COUNT

NOTE

- DIMENSIONS ARE TO BACK OF CURB
- EDGE PARKING STALLS ARE 9.5'X17'
- CENTRAL PARKING STALLS ARE 9.5'X19'

KEYNOTES:

1 CONSTRUCT ADA ACCESSIBLE RAMP
2 ADA PARKING STALL LAYOUT
3 PROPOSED DROP OFF ZONE
4 INSTALL PAVEMENT STRIPING – TYPICAL.
5 INSTALL CONCRETE SIDEWALK
6 PROPOSED DRIVE THRU WINDOW AND LANE
7 SERVICE AREA
8 TRASH ENCLOSURE
9 PROPOSED BOOK DROP-OFF
10 PROPOSED BOLLARD (TYPICAL)
11 ADDITIONAL GREEN SPACE
12 RELOCATED DRIVE LANE
13 REVISED STRIPING IN EXISTING LOT
14 10' ACCESS ASPHALT LANE FOR TRANSFORMER
15 PROPOSED PLANTERS
16 PROPOSED CONCRETE ISLAND

SITE DATA						
	PRE CONSTRUCTION			POST CONSTRUCTION		
	TOTAL	LIB	SC	TOTAL	LIB	SC
SITE AREA (AC) - ZONING CP-2						
DISTURBED AREA:	2.6	1.6	0.9	2.6	1.7	0.9
IMPERVIOUS:	1.8	1.2	0.5	1.7	1.2	0.5
PERVIOUS:	0.8	0.4	0.4	0.9	0.5	0.4
% IMPERVIOUS:	69%	76%	58%	66%	72%	56%
% PERVIOUS	31%	24%	42%	34%	28%	44%
BUILDING AREA (SF)						
BUILDING AREA	16500	16500	0	22600	22600	0
FAR (0.55 MAX):	23%			31%		
PARKING						
PARKING SPACES	83	53	30*	96	68**	28
ADA	3	3	0	4	4***	0
NOTES: (LIB - LIBRARY PROPERTY, SC - SHOPPING CENTER PROPERTY)						
* 30 SPACES REMOVED WEST OF EXISTING LIBRARY, 28 SPACES WILL BE						
** 3 PER 1000 SF = 66						
** 3 ADA SPACES ARE REQUIRED PER CITY TABLE						

SAPP DESIGN ARCHITECTS
3750 S. Fremont Ave.
Springfield, MO 65804 417.877.9600
Sapp Design Associates Architects, P.C.
Missouri State Certificate of Authority #000607

helix.
1629 Walnut
Kansas City, MO 64108 816.300.0300
Helix Architecture + Design
Missouri State Certificate of Authority #000720

SPECIAL NOTICES

Mid-Continent Public Library
PRELIMINARY DEVELOPMENT PLAN

LEE'S SUMMIT LIBRARY

150 NW Oldham Parkway
LEE'S SUMMIT, MO 64081
JACKSON COUNTY

PACKAGE 15

Engineer of Record

Terry M Parsons, Engineer MO PE-2018010505

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Olsson
Missouri State Certificate of Authority #001592

Revision No.	Description	Date

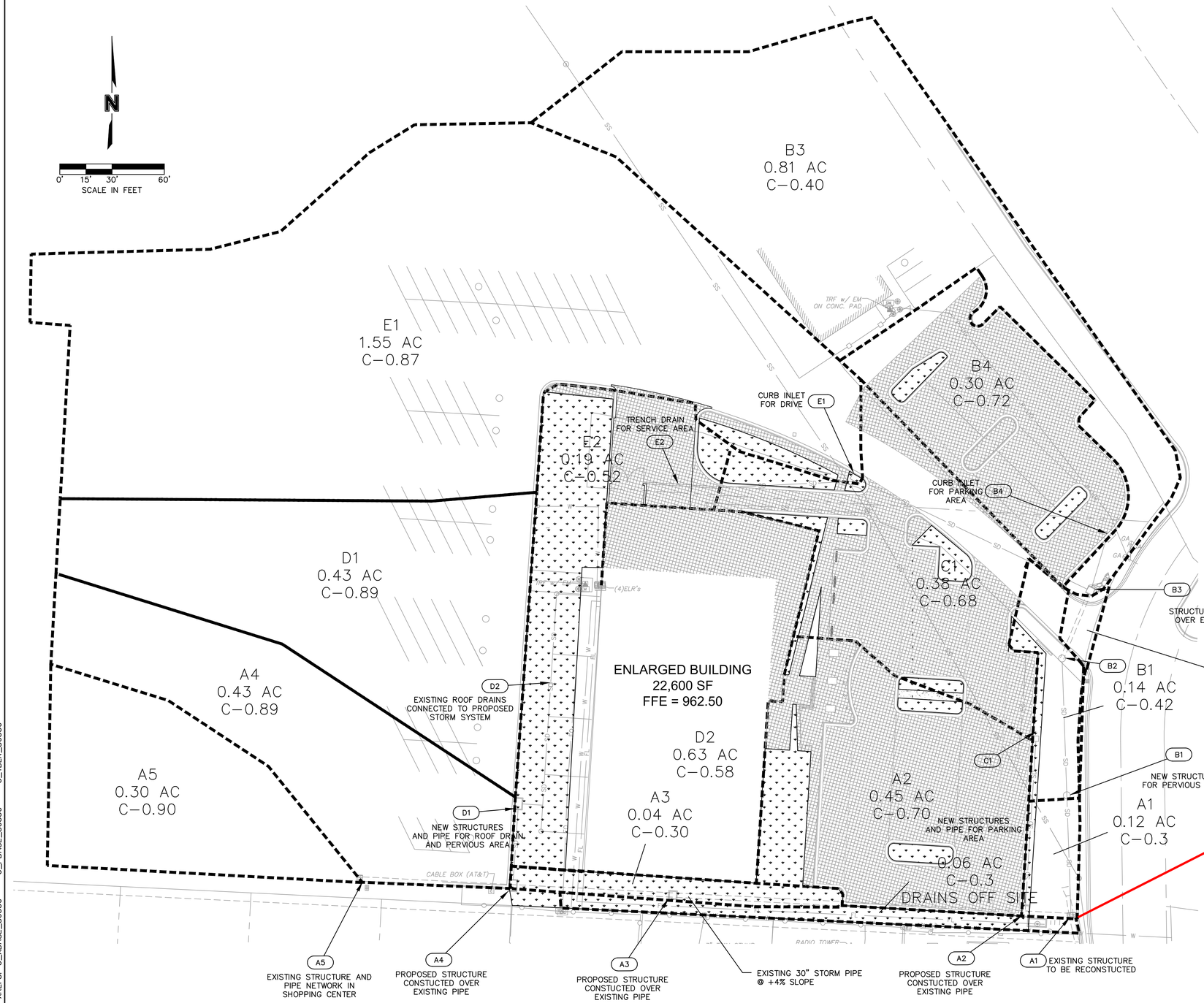
Project No.	Date	Drawn
B18-0330	10.12.2020	HMO

Drawing No.

C2.0

SITE & DIMENSION PLAN

DWG: F:\2018\0001-0500\018-0330-B\40-Design\AutoCAD\Final Plans\Sheets\GNCV\WORK PACKAGE 15\PDP Plans\C-SIT_PDP_80330.dwg USER: jfrieling
DATE: Jan 22, 2021 10:11am XREFS: C_XBASE_80330 C_PBASE_80330 C_TBLK_80330



PROPOSED IMPERVIOUS AREAS

PROPOSED PERVIOUS AREAS

PERVIOUS AREA CALCULATION IN STUDY AREA

EXISTING – 34,417 SF

PROPOSED – 37,764 SF

NET INCREASE IN PERVIOUS AREA – 3,347 SF

5.90 AC TO OUTFALL "A"
Cum "C" = 0.73

EXHIBIT 3
PROPOSED STORMWATER MANAGEMENT PLAN

DWG: F:\2018\0001-0500\018-0330-B\40-Design\AutoCAD\Final Plans\Sheets\GNCV\WORK PACKAGE 15\PDP Plans\C-STM_mgnt_80330.dwg USER: tparsons
DATE: Feb 23, 2021 6:12pm XREFS: C_XBASE_80330 C_PBASE_80330 C_TBLK_80330

SAPP DESIGN ARCHITECTS
3750 S. Fremont Ave.
Springfield, MO 65804 417.877.9600
Sapp Design Associates Architects, P.C.
Missouri State Certificate of Authority #000607

helix.
1629 Walnut
Kansas City, MO 64108 816.300.0300
Helix Architecture + Design
Missouri State Certificate of Authority #000720

SPECIAL NOTICES

Mid-Continent Public Library
PRELIMINARY DEVELOPMENT PLAN

LEE'S SUMMIT LIBRARY

150 NW Oldham Parkway
LEE'S SUMMIT, MO 64081
JACKSON COUNTY

PACKAGE 15

Engineer of Record

Terry M Parsons, Engineer MO PE-2018010505

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Missouri State Certificate of Authority #001592

Revision No.	Description	Date

Project No.	Date	Drawn
B18-0330	10.12.2020	HMO

Drawing No.

EX 3
STORMWATER MANAGEMENT PLAN

STORM SEWER PIPE AND STRUCTURE TABLE

STORM SEWER PIPE AND STRUCTURE TABLE
TITLE: LEES SUMMIT LIBRARY
JOB #: B18-0330

DESIGN CONDITIONS: 10 YEAR STORM EVENT

STRUCTURES		RUNOFF CALCULATIONS									PIPE DESIGN						
FROM	TO	DIRECT AREA (ACRES)	TOTAL AREA (ACRES)	C	KC (K=1.00)	Tc (MIN)	FLOW TIME (MIN)	INTENSITY (IN/HR)	DESIGN Q (CFS)	DESCRIPTION	PIPE LENGTH (L.F.)	PIPE SLOPE (%)	PIPE DIA (IN)	Q FULL (CFS)	PIPE AREA (SQ.FT.)	V FULL (F/S)	DESIGN V (F/S)
A5		0.30		0.90	0.90	5.0	-	7.35	1.98	EXISTING STRUCTURE							
	A4		1.36	0.75	0.75	5.0	-	7.35	7.50	30 in. HDPE	81.00	4.00	30	82.26	4.91	16.76	10.41
A4		0.43		0.89	0.89	5.0	-	7.35	2.81	6X4 CURB INLET OF EX. PIPE							
	A3		1.79	0.78	0.78	5.0	-	7.35	10.26	30 in. HDPE	92.00	4.00	30	82.26	4.91	16.76	11.41
A3		0.04		0.30	0.30	5.0	-	7.35	0.09	4X4 AREA INLET OF EX. PIPE							
	A2		2.21	0.75	0.75	5.0	-	7.35	12.18	30 in. HDPE	202.00	4.00	30	82.26	4.91	16.76	11.99
A2		0.45		0.70	0.70	5.0	-	7.35	2.32	6X4 CURB INLET OF EX. PIPE							
	A1		5.65	0.70	0.70	5.0	-	7.35	29.07	30 in. HDPE	27.00	4.00	30	82.26	4.91	16.76	15.28
A1		0.12		0.30	0.30	5.0	-	7.35	0.26	RECONS EX. AREA INLET							
	A0		5.77	0.67	0.67	5.0	-	7.35	28.41	36 in. HDPE	118.00	1.60	36	84.59	7.07	11.97	10.77
B4		0.30		0.72	0.72	5.0	-	7.35	1.59	6x4 CURB INLET							
	B3		0.30	0.72	0.72	5.0	-	7.35	1.59	15 in. HDPE	110.00	1.00	15	6.48	1.23	5.28	4.36
B3		0.81		0.40	0.40	5.0	-	7.35	2.38	RECONS EX. AREA INLET							
	B3		1.11	0.42	0.42	5.0	-	7.35	3.43	24 in. HDPE	55.00	1.50	24	27.78	3.14	8.84	6.00
B2		0.00		0.30	0.30	5.0	-	7.35	0.00	JUNCTION BOX							
	B1		2.85	0.67	0.67	5.0	-	7.35	14.03	30 in. HDPE	67.00	2.40	30	63.71	4.91	12.98	10.40
B1		0.14		0.42	0.42	5.0	-	7.35	0.43	5x5 AREA INLET							
	A1		2.99	0.67	0.67	5.0	-	7.35	14.72	36 in. HDPE	69.00	2.40	36	103.61	7.07	14.66	10.36
C1		0.38		0.68	0.68	5.0	-	7.35	1.90	6x4 CURB INLET							
	A2		0.38	0.68	0.68	5.0	-	7.35	1.90	15 in. HDPE	98.00	1.00	15	6.48	1.23	5.28	4.58
D2		0.63		0.58	0.58	5.0	-	7.35	2.69	4x4 AREA INLET							
	D2		0.63	0.58	0.58	5.0	-	7.35	2.69	15 in. HDPE	71.00	1.00	15	6.48	1.23	5.28	5.02
D1		0.43		0.89	0.89	5.0	-	7.35	2.81	6x4 CURB INLET							
	A4		1.06	0.71	0.71	5.0	-	7.35	5.53	15 in. HDPE	47.00	1.00	15	6.48	1.23	5.28	5.92
E2		0.19		0.52	0.52	5.0	-	7.35	0.73	TRENCH DRAIN							
	E1		0.19	0.33	0.33	5.0	-	7.35	0.46	15 in. HDPE	79.00	1.50	15	7.93	1.23	6.46	3.55
E1		1.55		0.87	0.87	5.0	-	7.35	9.91	6x4 CURB INLET							
	B2		1.74	0.83	0.83	5.0	-	7.35	10.61	18 in. HDPE	148.00	1.50	18	12.90	1.77	7.30	8.14

STORM SEWER PIPE AND STRUCTURE TABLE
TITLE: LEES SUMMIT LIBRARY
JOB #: B18-0330

DESIGN CONDITIONS: 100 YEAR STORM EVENT

STRUCTURES		RUNOFF CALCULATIONS									PIPE DESIGN						
FROM	TO	DIRECT AREA (ACRES)	TOTAL AREA (ACRES)	C	KC (K=1.25)	Tc (MIN)	FLOW TIME (MIN)	INTENSITY (IN/HR)	DESIGN Q (CFS)	DESCRIPTION	PIPE LENGTH (L.F.)	PIPE SLOPE (%)	PIPE DIA (IN)	Q FULL (CFS)	PIPE AREA (SQ.FT.)	V FULL (F/S)	DESIGN V (F/S)
A5		0.30		0.90	1.00	5.0	-	10.32	3.10	EXISTING STRUCTURE							
	A4		1.36	0.75	0.94	5.0	-	10.32	13.16	30 in. HDPE	81.00	4.00	30	82.26	4.91	16.76	12.26
A4		0.43		0.89	1.11	5.0	-	10.32	4.94	6X4 CURB INLET OF EX. PIPE							
	A3		1.79	0.78	0.98	5.0	-	10.32	18.01	30 in. HDPE	92.00	4.00	30	82.26	4.91	16.76	13.40
A3		0.04		0.30	0.38	5.0	-	10.32	0.15	4X4 AREA INLET OF EX. PIPE							
	A2		2.21	0.75	0.94	5.0	-	10.32	21.38	30 in. HDPE	202.00	4.00	30	82.26	4.91	16.76	14.06
A2		0.45		0.70	0.88	5.0	-	10.32	4.06	6X4 CURB INLET OF EX. PIPE							
	A1		5.65	0.70	0.88	5.0	-	10.32	51.02	30 in. HDPE	27.00	4.00	30	82.26	4.91	16.76	17.62
A1		0.12		0.30	0.38	5.0	-	10.32	0.46	RECONS EX. AREA INLET							
	A0		5.77	0.67	0.84	5.0	-	10.32	49.87	36 in. HDPE	118.00	1.60	36	84.59	7.07	11.97	12.43
B4		0.30		0.72	0.90	5.0	-	10.32	2.79	6x4 CURB INLET							
	B3		0.30	0.72	0.90	5.0	-	10.32	2.79	15 in. HDPE	110.00	1.00	15	6.48	1.23	5.28	5.07
B3		0.81		0.40	0.50	5.0	-	10.32	4.18	RECONS EX. AREA INLET							
	B3		1.11	0.42	0.53	5.0	-	10.32	6.01	24 in. HDPE	55.00	1.50	24	27.78	3.14	8.84	7.05
B2		0.00		0.30	0.38	5.0	-	10.32	0.00	JUNCTION BOX							
	B1		2.85	0.67	0.84	5.0	-	10.32	24.63	30 in. HDPE	67.00	2.40	30	63.71	4.91	12.98	12.13
B1		0.14		0.42	0.53	5.0	-	10.32	0.76	CURB INLET							
	A1		2.99	0.67	0.84	5.0	-	10.32	25.84	36 in. HDPE	69.00	2.40	36	103.61	7.07	14.66	12.16
C1		0.38		0.68	0.85	5.0	-	10.32	3.33	6x4 CURB INLET							
	A2		0.38	0.68	0.85	5.0	-	10.32	3.33	15 in. HDPE	98.00	1.00	15	6.48	1.23	5.28	5.31
D2		0.63		0.58	0.73	5.0	-	10.32	4.71	4x4 AREA INLET							
	D2		0.63	0.58	0.73	5.0	-	10.32	4.71	15 in. HDPE	71.00	1.00	15	6.48	1.23	5.28	5.75
D1		0.43		0.89	1.00	5.0	-	10.32	4.44	6x4 CURB INLET							
	A4		1.06	0.71	0.89	5.0	-	10.32	9.71	18 in. HDPE	47.00	1.00	18	10.53	1.77	5.96	6.75
E2		0.19		0.52	0.65	5.0	-	10.32	1.27	TRENCH DRAIN							
	E1		0.19	0.33	0.41	5.0	-	10.32	0.81	15 in. HDPE	79.00	1.50	15	7.93	1.23	6.46	4.16
E1		1.55		0.87	1.00	5.0	-	10.32	16.00	6x4 CURB INLET							
	B2		1.74	0.83	1.00	5.0	-	10.32	17.96	24 in. HDPE	148.00	1.50	24	27.78	3.14	8.84	9.38

EXHIBIT 4
STORM SEWER
CALCULATIONS

SAPP DESIGN ARCHITECTS
3750 S. Fremont Ave.
Springfield, MO 65804 417.877.9600
Sapp Design Associates Architects, P.C.
Missouri State Certificate of Authority #000607

helix.
1629 Walnut
Kansas City, MO 64108 816.300.0300
Helix Architecture + Design
Missouri State Certificate of Authority #000720

SPECIAL NOTICES

Mid-Continent Public Library
PRELIMINARY DEVELOPMENT PLAN
LEE'S SUMMIT LIBRARY
150 NW Oldham Parkway
LEE'S SUMMIT, MO 64081
JACKSON COUNTY

PACKAGE 15

Engineer of Record

Terry M Parsons, Engineer MO PE-2018010505

olsson
7301 West 133rd Street, Suite 200
Overland Park, KS 66213
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www.olsson.com
Olsson
Missouri State Certificate of Authority #001592

Revision No.	Description	Date

Project No.	Date	Drawn
B18-0330	10.12.2020	HMO

Drawing No.
C5.1
STORM SEWER CALCULATIONS

DWG: F:\2018\0001-0500\0018-0330-B\40-Design\AutoCAD\Final Plans\Sheets\GNCV\WORK PACKAGE 15\PDP Plans\C_STM_PDP_80330.dwg
DATE: Jan 22, 2021 6:53am XREFS: C_XBASE_80330 C_PBASE_80330 C_TBLK_80330 USER: tparsons

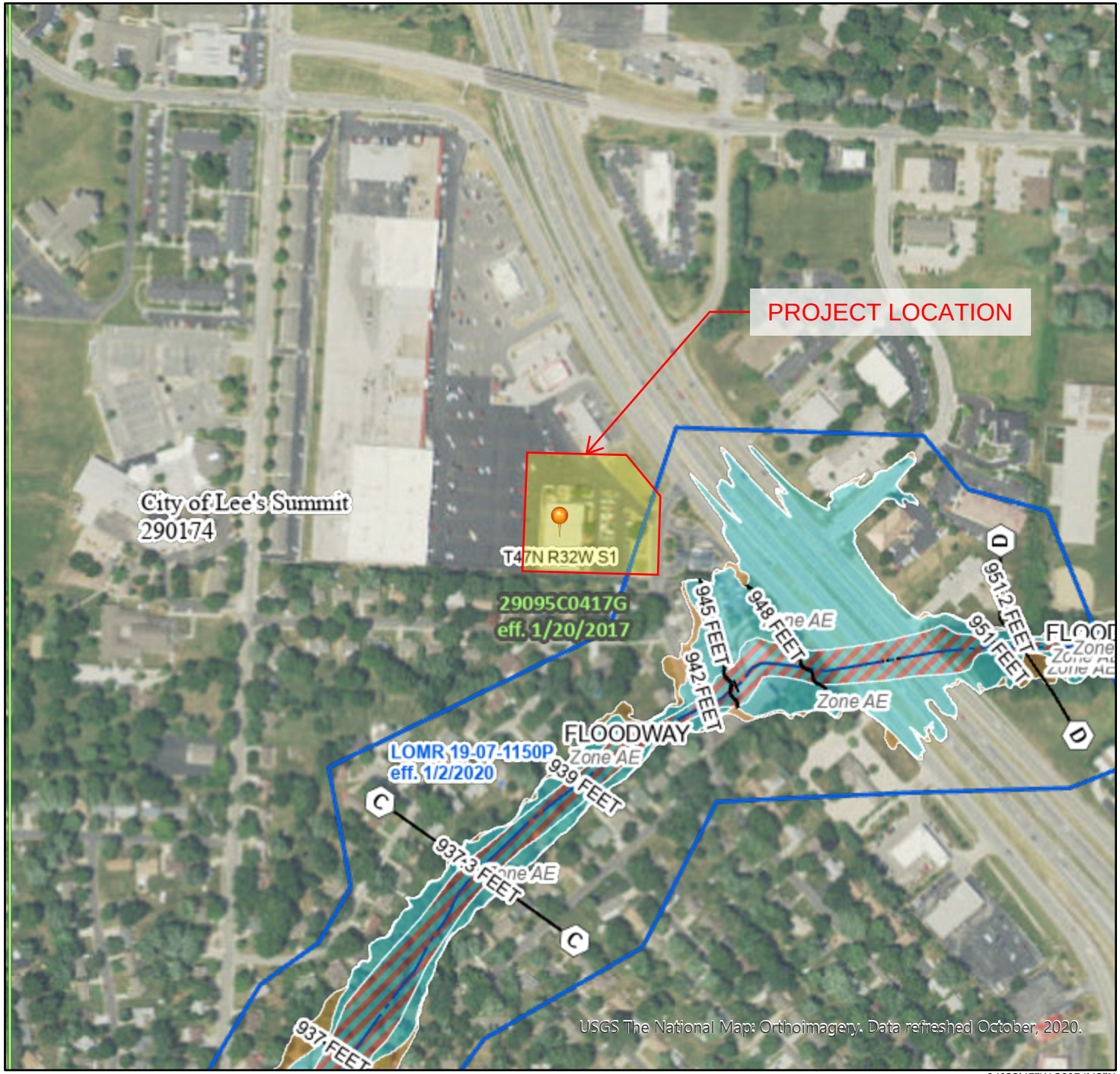
Appendix B

FEMA Flood Classification Firm

National Flood Hazard Layer FIRMette

FEMA

94°24'23"W 38°55'10"N



94°23'45"W 38°54'42"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/7/2020 at 2:52 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Appendix C

Soil Map

Soil Map—Jackson County, Missouri
(MCPL Lees Summit Branch)

Map Scale: 1:1,500 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Jackson County, Missouri
Survey Area Data: Version 22, May 29, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 6, 2019—Nov 16, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
10181	Udarents-Urban land-Sampsel complex, 5 to 9 percent slopes	8.6	100.0%
Totals for Area of Interest		**8.6**	**100.0%**