SCHLAGEL & ASSOCIATES, P.A.

Engineers • Planners • Surveyors • Landscape Architects

December 17, 2018

Mr. Mike Sylvester, P.E., City Engineer
City of Olathe, Engineering Services Dept.
100 East Santa Fe
Olathe, Kansas 66061

RE: CONCEPTUAL STORMWATER REVIEW
OAK LAWN MEMORIAL CEMETERY – CHAPLE ADDITION
SPECIAL USE PERMIT/PRELIMINARY PLAN

Dear Mike:

We are currently working with D.W. Necomer's and Sons, Inc. as owners/operators of the existing Oak Lawn Memorial Cemetery at 13901 S. Blackbob Road, and as a perspective developer of a centrally located funeral home/memorial chapel on the property in submitting the project for a Special-Use permit and Preliminary Plan approvals thru the City of Olathe planning processes. We are submitting this conceptual storm water review in support of that application. The proposed application, if approved, will allow the development funeral home/chapel via a special user permit within the Agricultural (AG) Zoning District that the cemetery currently operates under. Please note this review is considered to be conceptual with this initial phase of planning and the final details of the detention configuration and grading, outlet structures and BMP design will be incorporated into the final design of the project and submitted for final approvals with future development and permit submittals thru the City of Olathe processes.

The existing Oak Lawn Cemetery property is an approximate 27 acre, rectangular shaped property, located at the above referenced address, along the East side of Blackbob Road. The property is bounded on the West by Blackbob Road and on the South, East and North by fully developed residential developments (Single Family R-1 on the South and East and Low-Density, R-2, multi-family on the North). The cemetery is made up of 2 sub-watersheds with approximately 7 acres draining Westerly, via overland flow conditions to the public storm sewers along Blackbob Road and the Eastern, approximate 20 acres draining east/southeasterly via overland flow conditions thru an existing wet-bottom detention facility that has been developed as part of the adjacent Meadowridge Subdivision and associated infrastructure. The funeral home/chapel facility and associated improvements are proposed to fully occur within the Eastern, 20 acre sub-watershed, so we have only reviewed and accommodated the proposed improvements within that area of the development. There are no changes for the Western 7+/- acres of the site in terms of redevelopment and/or change in cover conditions in comparing the existing and proposed conditions.

In regards to the Eastern sub-watershed, drainage from the overall development area has been accommodated thru an existing wet-pond detention basin that has been developed on Tract D, Meadowridge, First Plat as part of the subdivision infrastructure and a small portion of the pond extends Northerly into a previously platted portion of the Oak Lawn Cemetery site. The platted area within the cemetery near the southeast corner, accommodating the existing Northern portion of the pond, is identified as Block 8 on the plat of Oak Lawn Memorial Gardens. In reviewing the public infrastructure plans for Meadowridge, First Plat (City Project No. 32501D), it appears that the eastern 20+/- acres of the cemetery are accounted for to be draining thru the existing pond as part of a 22.11 acre watershed that is proposed to drain to Drainage Point "U" on the Drainage Map for the referenced subdivision (See attached Sheet 2 of 13, City Project No. 32501D). The Coefficient of Runoff (c-value) for the proposed watershed, from the calculations on the referenced sheet, is identified to be a 0.50. With the proposed improvements, the majority of the eastern sub-watershed will remain, open cemetery, grave sites, however, the project will slightly increase the impervious areas (roof, pavement/drives, and sidewalks) over the existing conditions. The proposed impervious area after development will make up approximately 12% of the eastern sub-watershed. That 12% impervious area would result in a coefficient of runoff (c-value) for the re-developed area to be 0.37, which is lower than the designed runoff coefficient of 0.50. So the redeveloped property should result in a less runoff than originally planned with the design of the downstream public storm sewer system.

From a storm water quality review, the proposed improvements in the Eastern sub-watershed, will cause an increase in the curve number (CN) associated with the site from 81 (existing) to 82 (proposed). A level or service of 4.3 is required to accommodate the increase in curve number per adopted Addendum #1 of the *MARC Manual of Best Management Practices for Stormwater Quality.* To accommodate the required level of service, we are proposing to maintain the existing drainage patterns and keep the runoff from the re-developed area draining thru the existing wet pond located adjacent to and in the southeastern area of the cemetery. The area draining thru the wet detention area is assigned a value rating of 5.0, which exceeds the required 4.3. There is no proposed change in cover conditions for the Western 7+/- watershed associated with the cemetery and no proposed water quality improvements are required or proposed for that area.

We have included a reduced size copy of Sheet 2 of 13 from City Project No. 32501D and copies of the Level of Service Worksheets and Existing Coverage Conditions Map (EXC-1), Proposed Cover Conditions (PR-1) and proposed BMP Drainage Map (BMP-1) associated with the project for your reference and review.

Thank you in advance for your time and considerations. If you have any questions regarding this preliminary review or the supplemental information presented, please contact me.

Sincerely,

SCHLAGEL & ASSOCIATES, P.A.

Jeffrey T. Skidmore, P.E.
Principal/Project Engineer

STREET & STORM SEWER GENERAL NOTES

1. Development plans and drainage reports are approved initially for one (1) year, after which they automatically become void and must be updated and re-approved by the City Engineer before any construction will be permitted.

2. The City of Olathe plan review is only for general conformance with City of Olathe Design Criteria and the City Code. The City is not responsible for the accuracy and adequacy of the design, or dimensions and elevations which shall be confirmed and correlated at the job site. The City of Olathe through approval of this document assumes no responsibility other than as stated above for the completeness and/or accuracy of this document.

3. The Contractor shall have one (1) signed copy of the plans (approved by the City of Olathe) and one (1) copy of the appropriate Design and Construction Standards and Specifications at the job site at all times.

4. Construction of the improvements shown or implied by this set of drawings shall not be initiated or any part thereof undertaken until the City Engineer is notified of such intent, and all required and properly-executed bonds and contract agreements are received and approved by the City Engineer.

5. The City of Olathe Technical Specifications, latest edition, shall govern construction of this project.

6. All existing utilities indicated on the drawings are according to the best information available to the Engineer; however, all utilities actually existing may not be shown. Utilities damaged through the negligence of the Contractor to obtain the location of same shall be repaired or replaced by the Contractor at his expense.

7. All backfill shall be tamped. Backfill within the right-of-way shall be to 95% compaction at optimum moisture.

8. All excavation beneath streets for drainage pipe less than 4'-0" in diameter shall be backfilled with CA-5 rock to 4' back of curb.

9. All sidewalks shown are for information purposes only. Sidewalks shall not be built as a part of this project; however, Contractor shall be responsible for sidewalk ramp construction.

10. A minimum of one (1) Standard Proctor test and a maximum of two (2) Standard Proctor tests shall be performed by a qualified testing laboratory for every 1,000 feet of street construction. Soil samples for such tests shall be collected by laboratory technicians. All testing laboratory expenses shall be paid for by the Contractor.

11. All water required for the construction of the project shall be purchased from the City Utilities Department through the use of a fire hydrant water meter. Meters can be obtained from the Utilities Department for a nominal deposit, refundable upon the return of the meter.

12. Contractor shall not be allowed to work on Sundays. Holiday or Saturday work shall be as approved by the City Engineer.

13. Relocation of any water line, sewer line or service line thereof required for construction of this project shall be the responsibility of the Contractor and shall be at his expense.

14. The entire project area shall be left in a mowable condition.

15. All clearing and grubbing shall be subsidiary to the project and shall be disposed of according to City Regulations.

16. All excavation shall include undercut.

17. Storm sewer lengths are measured from centerline of structure to centerline of structure.

18. Valley gutters shall not exceed depth of normal crown (typical).

19. A certification from concrete supplier that all concrete to be used on this project will not contain fly ash or other pozzolans shall be submitted to the City Engineer prior to placing any concrete.

20. If precast concrete storm sewers are to be used on this project, Contractor shall submit shop drawings and have them approved by the City Engineer prior to fabrication of the structures. Failure to do so shall be cause for rejection.

21. Where a new street is to connect to an existing street, all deteriorated or cracked asphalt within five (5) feet of the connection point shall be removed to a depth where sound material is found. If full-depth pavement removal is required, the subgrade shall be recompacted to 95% standard density.

22. All excavations which extend to within 6" or less of the back-of-curb shall be backfilled with CA-5.

23. All areas that are disturbed by construction operations either by grading, parking of equipment, temporary roads, or any other operation that has destroyed the existing grasses of the original site, will be seeded and mulched according to the construction standards and specifications for public improvements as soon as erosion controls are removed.

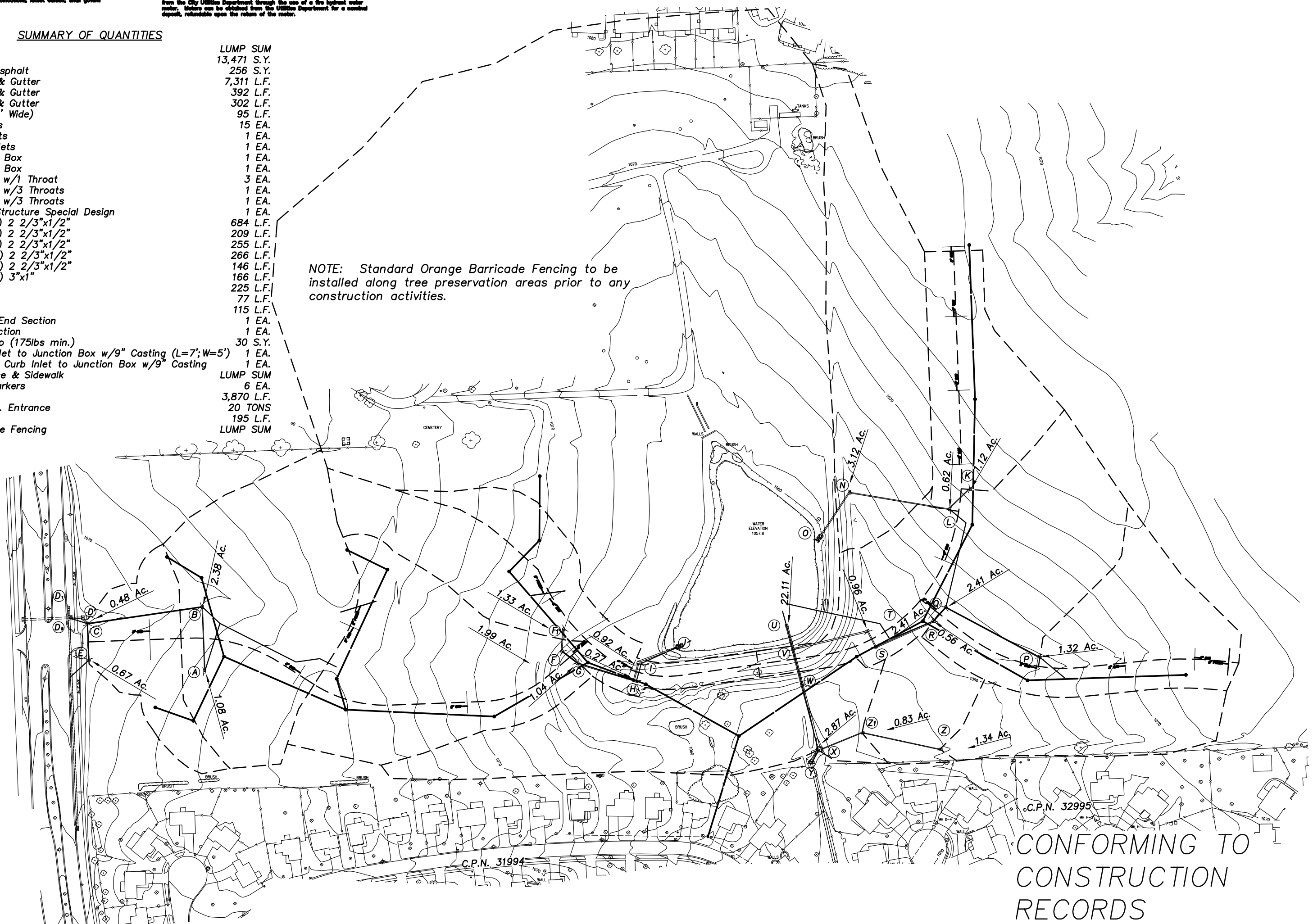
By use of these plans the Contractor agrees that he shall be solely responsible for the safety of the construction workers and of the public.

REVISIONS			
NO.	DATE	DESCRIPTION	BY
1	4/30/01	City Comments	WLM
2	5/30/01	City Comments	WLM
3	6/11/01	Rev. Table @ Structure Y	WLM
4	6/26/01	Correct Quantities	DWS
5.	7/12/01	Correct Quantities	JWD

SUMMARY OF QUANTITIES

1.	Grading	LUMP SUM
2.	8" Asphalt	13,471 S.Y.
3.	6" Temporary Asphalt	256 S.Y.
4.	Type "A" Curb & Gutter	7,311 L.F.
5.	Type "B" Curb & Gutter	392 L.F.
6.	Type "E" Curb & Gutter	302 L.F.
7.	Valley Gutter (6' Wide)	95 L.F.
8.	6'x4' Curb Inlets	15 EA.
9.	10'x4' Curb Inlets	1 EA.
10.	11.5'x4' Curb Inlets	1 EA.
11.	5'x5.5' Junction Box	1 EA.
12.	5.5'x4' Junction Box	1 EA.
13.	4'x4' Area Inlet w/1 Throat	3 EA.
14.	6'x4' Area Inlet w/3 Throats	1 EA.
15.	8'x6' Area Inlet w/3 Throats	1 EA.
16.	7'x5' Overflow Structure Special Design	1 EA.
17.	15" CMP (16ga.) 2 2/3"x1/2"	684 L.F.
18.	18" CMP (16ga.) 2 2/3"x1/2"	209 L.F.
19.	21" CMP (16ga.) 2 2/3"x1/2"	255 L.F.
20.	24" CMP (16ga.) 2 2/3"x1/2"	266 L.F.
21.	30" CMP (16ga.) 2 2/3"x1/2"	146 L.F.
22.	48" CMP (16ga.) 3"x1"	166 L.F.
23.	13.5"x22" RCAP	225 L.F.
24.	18"x28.5" RCAP	77 L.F.
25.	48" RCP	115 L.F.
26.	18"x28.5" RCA End Section	1 EA.
27.	24" CM End Section	1 EA.
28.	Grouted Rip-Rap (175lbs min.)	30 S.Y.
29.	Convert Area Inlet to Junction Box w/9" Casting (L=7'; W=5')	1 EA.
30.	Reconstruct Ex. Curb Inlet to Junction Box w/9" Casting	1 EA.
31.	Remove Entrance & Sidewalk	LUMP SUM
32.	End of Road Markers	6 EA.
33.	Silt Fence	3,870 L.F.
34.	Stabilized Const. Entrance	20 TONS
35.	2" R.G.S.	195 L.F.
36.	Orange Barricade Fencing	LUMP SUM

NOTE: Standard Orange Barricade Fencing to be installed along tree preservation areas prior to any construction activities.



STORM DRAINAGE STUDY

For: Meadowridge 1st Plat

DESIGN CRITERIA (CMP) n = 0.023 (RCP) n = 0.013 K = 1.49

Storm Frequency 10 years

Structure	Area (acres) A	Runoff Coef. c	Acres x "c"	Accum Acres x "c"	Time of Concentration t_c	Rainfall Rate (in./hour) I_{10} / I_{100}	Total Flow (cfs) Q_{10} / Q_{100}	From	To	Diameter (in.) d	Length (ft.) l	Slope (%) S	Design Flow (cfs) Q_D	Velocity (fps) V_D	Time of Flow (minutes) T	Normal Depth (in.) Y	Flow Full (cfs) Q_F	Velocity Full (fps) V_F
RUNOFF DISCHARGE								PIPE DESIGN										
A	1.08	0.5	0.5	0.5	15.00	5.1 / 7.4	2.8 / 5.0	A	B	15	122	1.00	2.8	3.2	0.6	9.8	3.7	3.0
B	2.38	0.5	1.2	1.7	15.63	5.1 / 7.3	8.7 / 15.7	B	C	21	220	2.40	8.7	6.2	0.6	12.0	13.9	5.8
C	0.48	0.5	0.2	2.3	16.22	5.0 / 7.2	11.5 / 20.6	C	D	24	14	4.04	11.5	8.0	0.0	11.2	25.8	8.2
D																		
E	0.67	0.5	0.3	0.3	15.00	5.1 / 7.4	1.7 / 3.1	E	C	15	69	1.00	1.7	2.9	0.4	7.2	3.7	3.0
C																		
F1	1.33	0.5	0.7	0.7	15.00	5.1 / 7.4	3.4 / 6.1	F1	F	18	42	0.50	3.4	4.1	0.2	8.5	8.5	4.8
F	1.99	0.5	1.0	1.0	15.17	5.1 / 7.4	5.1 / 9.2	F	G	18	36	0.50	5.1	4.5	0.1	11.0	8.5	4.8
G	1.04	0.5	0.5	1.5	15.30	5.1 / 7.3	7.7 / 13.8	G	H	18	112	0.50	7.7	5.8	0.3	12.7	11.2	6.3
H	0.27	0.5	0.1	1.7	15.63	5.1 / 7.3	8.3 / 15.0	H	I	18	35	0.50	8.3	6.0	0.1	13.1	11.9	6.7
I	0.92	0.5	0.5	2.1	15.72	5.0 / 7.2	14.1 / 25.3	I	J	24	77	0.50	10.6	4.5	0.3	17.0	14.2	4.5
J																		
K	1.12	0.5	0.6	0.6	15.00	5.1 / 7.4	2.9 / 5.2	K	L	15	55	1.96	2.9	4.2	0.2	8.1	5.1	4.2
L	0.62	0.5	0.3	0.9	15.22	5.1 / 7.3	4.4 / 8.0	L	N	18	191	0.76	4.4	3.3	1.0	12.7	5.2	2.9
N	3.12	0.5	1.6	2.4	16.17	5.0 / 7.2	12.1 / 21.8	N	O	24	97	1.04	12.1	4.7	0.3	18.2	13.1	4.2
O																		
P	1.32	0.5	0.7	0.7	15.00	5.1 / 7.4	3.4 / 6.1	P	Q	15	201	1.02	3.4	5.3	0.6	7.7	3.8	3.0
Q	2.41	0.5	1.2	1.9	15.97	5.1 / 7.3	9.4 / 16.9	Q	R	21	35	1.00	9.4	4.2	0.1	18.3	9.4	3.9
R	0.56	0.5	0.3	2.1	16.10	5.0 / 7.2	10.8 / 19.4	R	S	24	120	1.00	10.8	4.6	0.4	16.9	12.8	4.1
S	0.28	0.5	0.1	2.3	16.45	5.0 / 7.2	11.4 / 20.5	S	T	24	35	0.80	11.4	4.2	0.1	19.3	11.5	3.7
T	0.96	0.5	0.5	2.8	16.34	5.0 / 7.1	13.7 / 24.7	T	V	30	146	0.72	13.7	4.4	0.6	18.4	19.7	4.0
V																		
U	22.11	0.5	11.1	11.1	15.00	5.1 / 7.4	56.4 / 101.7	U	V	48	46	2.60	56.4	15.3	0.1	16.1	232.2	18.5
V	0.00	0.5	0.0	11.1	15.05	5.1 / 7.3	56.7 / 101.5	V	W	48	69	2.99	56.7	16.1	0.1	15.5	251.0	20.0
W	0.00	0.5	0.0	11.1	15.12	5.1 / 7.3	56.6 / 101.4	W	X	48	128	1.92	56.6	9.0	0.2	24.1	112.8	9.0
X	2.87	0.5	1.4	12.9	15.38	5.1 / 7.3	65.6 / 117.7	X	Y	48	29	4.10	65.7	12.3	0.0	21.1	164.8	13.1
Y																		
D1	2.0	0.4	0.8	0.80	15.00	5.1 / 7.4	4.1 / 7.4	D1	D2	15	18	1.00	4.1	3.6	0.1	11.0	6.0	3.4
D2																		
Z	1.34	0.5	0.7	0.7	15.00	5.1 / 7.4	3.4 / 6.2	Z	Z1	15	151	1.08	3.4	5.5	0.7	11.1	3.8	3.1
Z1	0.83	0.5	0.4	1.1	15.71	5.1 / 7.4	5.5 / 10.0	Z1	X	15	86	1.76	5.5	9.0	0.2	7.5	11.1	9.0
X																		

CONFORMING TO CONSTRUCTION RECORDS

SMM 10/11/2001
By Date

JMF 10/11/2001
Checked By Date

1"=100'

General Layout

1454 PROJECT NO. 32501D

Meadowridge 1st Plat
Street and Storm Sewer Plans

PAYNE & BROCKWAY P.A.
426 SOUTH KANSAS AVE.
OLATHE, KANSAS 66061
TELE: (913)782-4800
www.Payne-Brockway.com

DATE	SCALE	SHEET	OF
3/27/01	HOR: 1"= 100' VERT: 1"= N/A	SHEET 2	OF 13

A. Predevelopment CN

Cover Description	Soil HSG	CN	Area (ac.)	CN x Area
Open Space - Turf - Good Conditions	D	80	18.710	1496.8
Impervious Building Areas	N/A	98	0.010	0.98
Impervious Drive Area	N/A	98	1.060	103.88
		Totals:	19.78	80.97
Area-Weighted CN = total product/total area =				81

EXISTING EAST WATERSHED
D.A. = 19.78 AC.
HSG SOIL TYPE D
EXTG. CN = 81

PROPOSED WEST WATERSHED
D.A. = 7.28 AC.
HSG SOIL TYPE D
EXTG. CN = 82

S. BLACKBOB RD

W 140TH TER

N BARNELL CT

S ALDERLEAF

0 120' 240'
SCALE: 1" = 120'

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Kansas State Certificates of Authority
#E-296 #LA-29 #LS-54

OAK LAWN MEMORIAL CEMETERY
FUNERAL HOME ADDITION

13901 S. Blackbob Road, Olathe, Kansas

DRAWN BY:	DATE PREPARED:	PROJ. NUMBER:
JTS	12-18-18	18-094

Existing Site Runoff/Cover Conditions

SHEET
EXC-1
OF

B. Post Development CN

Cover Description	Soil HSG[1]	CN	Area (ac.)	CN x Area
Building Area	N/A	98	0.250	24.5
Parking/Pavement Areas	N/A	98	2.120	207.76
Open Space Turf/Landscape Areas - Good	D	80	17.410	1392.8
		Totals:	19.78	82

EXISTING WEST WATERSHED
D.A. = 7.28 AC.
HSG SOIL TYPE D
EXTG. CN = 82

PROPOSED EAST WATERSHED
D.A. = 19.78 AC.
HSG SOIL TYPE D
PROPOSED CN = 82

S. BLACKBOB RD

W. 140TH TER

S. SHARNELL CT.

S. ALDEN CT.

N

0 120' 240'

SCALE: 1" = 120'

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OAK LAWN MEMORIAL CEMETERY
FUNERAL HOME ADDITION

13901 S. Blackbob Road, Olathe, Kansas

DRAWN BY:	DATE PREPARED:	PROJ. NUMBER:
JTS	12-18-18	18-094

Proposed Site Runoff/Cover Conditions

SHEET
PR-1
OF

ENTIRE SITE
WORKSHEET 2: DEVELOP MITIAGTION PACKAGE(S) THAT MEET THE REQUIRED LS

Project:	Oak Lawn Memorial Gardens - East Watershed	WORK BY:	JTS
Location:	13901 S. Blackbob Rd.	DATE:	12/12/2018

Total Site Area = 1.97 acres

1. Required LS 4.3

2. Proposed BMP Option Package No. 1

Cover/BMP Description	Treatment Area	VR from Table 2 or Table 3	Area x VR Total Treatment Area
1. Wet Detention	19.78	5.00	5.00
2.Untreated Open Space Area	0.00	0.00	0.00
Total:	19.78	LS:	5.00

MEET S REQUIRED LS (YES/NO)? YES

EAST WATERSHED
D.A. = 19.78 AC.
Post-Construction CN = 82
Post Construction "c" Value = 0.37
TO EXTG. WET DETENTION
V.R. = 5.0

EXISTING WEST WATERSHED
D.A. = 7.28 AC.
NO CHANGE IN CN
(UNTREATED AREA)

S. BLACKBOB RD

W. 140TH TER

N SHANNEL CT

S ALDEN LN

EXTG. WET
DETENTION POND
(BLOCK 8, OAK
LAWN MEMORIAL GARDENS)

EXTG. WET
DETENTION POND
(TRACT D,
MEADOWRIDGE, FIRST PLAT)

N

0 120' 240'

SCALE: 1" = 120'

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OAK LAWN MEMORIAL CEMETERY
FUNERAL HOME ADDITION

13901 S. Blackbob Road, Olathe, Kansas

DRAWN BY:	DATE PREPARED:	PROJ. NUMBER:
JTS	12-18-18	18-094

Proposed
BMP Treatement
Plan

SHEET
BMP-1
OF

ENTIRE SITE

WORKSHEET 1: REQUIRED LEVEL OF SERVICE

Project: Oak Lawn Memorial Gardens - East Watershed WORK BY: JTS
Location: 13901 S. Blackbob Road DATE: 12/12/2018
Check one: Undeveloped [x] Developed

1. Runoff Curve Number

A. Predevelopment CN

Cover Description	Soil HSG	CN	Area (ac.)	CN x Area
Open Space - Turf - Good Conditions	D	80	18.710	1496.8
Impervious Building Areas	N/A	98	0.010	0.98
Impervious Drive Area	N/A	98	1.060	103.88
		Totals:	19.78	80.97

Area-Weighted CN = total product/total area = 81 (round to integer)

B. Post Development CN

Cover Description	Soil HSG[1]	CN	Area (ac.)	CN x Area
Building Area	N/A	98	0.250	24.5
Parking/Pavement Areas	N/A	98	2.120	207.76
Open Space Turf/Landscape Areas - Good	D	80	17.410	1392.8
		Totals:	19.78	82

[1] Postdevelopment CN is one HSG higher for all cover types except preserved vegetation, absent documentation showing how postdevelopment soil structure will be preserved.

Area-Weighted CN = total product/total area = 82 (round to integer)

C. Level of Service (LS) Calculation

		Change in CN	LS
Predevelopment CN:	81	17+	8
		7 to 16	7
Postdevelopment CN:	82	4 to 6	6
		1 to 3	5
Difference:	1	0	4
		-7 to -1	3
LS Required (see scale at right):	4.3	-8 to -17	2
		-18 to -21	1
		-21 -	0

Source: U.S. Department of Agriculture, Natural Resourse Conservation Service. *Urban Hydrology for Small Watersheds, Technical Release 55 (* TR-55). 1986.

ENTIRE SITE

WORKSHEET 2: DEVELOP MITIAGTION PACKAGE(S) THAT MEET THE REQUIRED LS

Project: Oak Lawn Memorial Gardens - East Watershed WORK BY: JTS
Location: 13901 S. Blackbob Rd. DATE: 12/12/2018

Total Site Area = 1.97 acres

1. Required LS 4.3

2. Proposed BMP Option Package No. 1

Cover/BMP Description	Treatment Area	VR from Table 2 or Table 3	Area x VR Total Treatment Area
1. Wet Detention	19.78	5.00	5.00
2 Untreated Open Space Area	0.00	0.00	0.00
Total:	19.78	LS:	5.00

MEETS REQUIRED LS (YES/NO)? YES