STORM WATER DRAINAGE REPORT

LOT 1B

DOUGLAS CORNERS

LEE'S SUMMIT, MISSOURI

100 NE TUDOR ROAD

PREPARED FOR

ROBERT THOMPSON

PREPARED BY

HG CONSULT, INC.

July 5, 2018

Project Overview

The proposed project is a speculative retail/apartment building. The building will be contained in a 7,972 square foot building footprint with retail on the bottom floor and 4,496 square foot apartments on the second floor. This project is contained on a 1.73 acre site. The site is construction ready. The storm sewer system and detention pond will need additional improvements to allow for proper drainage from site.

The topography of the site is a gentle slope north west to the east. The existing storm sewer detention system is in place on the east side of the site on the east side of NE Douglas Street and the north side of Tudor Road. The overall existing storm sewer system serves all of Douglas Corners. An additional amount of detention will be required to accommodate the entire developed area which is provided with this project.

Drainage Assessment of the Project Site

Due to the slope of the site and the need for a flat slab, the bench and fill grading method was used for the site along with the need to have positive drainage away from the building, drainage areas directing storm water into new storm sewer catchments that forces storm water into the detention pond. The remainder of the site grading directs pervious areas and impervious areas away from the building and drainage to the proposed detention pond. Design requirements call for a piping system with a minimum capacity for the 10 year event, with the 100 year storm event being routed overland in an above grade manner such as swales and gutters. To insure that higher frequency storms would not cause any ponding problems or inundation of parked vehicles, the structures and piping system have been designed to the 100 year event flows. With the relatively small drainage areas, these flows are low and pipe sizes are 18 inch draining to the detention pond and a18" discharge pipe from the detention pond to an existing catch basin off-site.

Conveyance Design

As shown on the Drainage plan for the site, all areas drain to the detention pond by sheet flow over the parking and drive aisle area and by existing piping system. This system generates a 10 year flow of 38.69 cfs and a 100 year flow of 59.35 cfs pre-developed. After development and routing through the detention pond, 10 year flows have been reduced to 11.18 cfs and 100 year flows have been reduced to 15.28 cfs.
All areas within drainage area drain towards the proposed detention pond.

Temporary Erosion and Sediment Control

During construction and prior to paving, it will be necessary to control erosion and sediment from the site during storms with in the construction timeframe. To insure that sediment does not enter the existing storm system or runs off to the existing street, perimeter containment is controlled by silt fence installation, inlet protection and an engineered detention release structure. To keep construction traffic from tracking mud onto the adjacent city street, a stabilized rock construction entrance will need to be installed. These erosion control devices, and their maintenance throughout the construction timeframe, are required by ordinance and the details for them are referenced by the City's Design and Construction Manual and shown on Detail Sheets 9 thru 12.

Post development water quality will be addressed through the use a water quality detention release structure. The owner will need to have a routine maintenance policy for the cleaning, repair and replacement of the detention release structure.

Design Calculations

See the attached for drainage area calculations, flows, pipe sizing, inlet sizing and water quality calculations as requested.

DOUGLAS

Project Summary	
Title	DOUGLAS
Engineer	Kellen Huffman
Company	Hg Consult, Inc
Date	6/18/2018

Notes

DOUGLAS

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
Area 1	Pre-Development Water Quality	1	0.245	11.930	4.48
Area 1	Post-Development Water Quality	1	0.292	11.930	5.45
Area 1	Pre-Development 2 year	2	1.146	11.920	21.51
Area 1	Post-Development 2 year	2	1.238	11.920	23.04
Area 1	Pre-Development 10 year	10	2.022	11.920	37.16
Area 1	Post-Development 10 year	10	2.131	11.920	38.69
Area 1	Pre-Development 100 year	100	3.233	11.920	57.94
Area 1	Post-Development 100 year	100	3.356	11.920	59.35

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
Field Inlet	Pre-Development Water Quality	1	0.245	11.930	4.48
Field Inlet	Post-Development Water Quality	1	0.292	18.630	0.10
Field Inlet	Pre-Development 2 year	2	1.146	11.920	21.51
Field Inlet	Post-Development 2 year	2	1.233	12.240	3.13
Field Inlet	Pre-Development 10 year	10	2.022	11.920	37.16
Field Inlet	Post-Development 10 year	10	2.124	12.090	11.18
Field Inlet	Pre-Development 100 year	100	3.233	11.920	57.94
Field Inlet	Post-Development 100 year	100	3.346	12.100	15.28

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)

DOUGLAS

Subsection: Master Network Summary

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Detention Pond (IN)	Post-Development Water Quality	1	0.292	11.930	5.45	(N/A)	(N/A)
Detention Pond (OUT)	Post-Development Water Quality	1	0.292	18.630	0.10	1,013.24	0.195
Detention Pond (IN)	Post-Development 2 year	2	1.238	11.920	23.04	(N/A)	(N/A)
Detention Pond (OUT)	Post-Development 2 year	2	1.233	12.240	3.13	1,014.51	0.641
Detention Pond (IN)	Post-Development 10 year	10	2.131	11.920	38.69	(N/A)	(N/A)
Detention Pond (OUT)	Post-Development 10 year	10	2.124	12.090	11.18	1,015.48	1.015
Detention Pond (IN)	Post-Development 100 year	100	3.356	11.920	59.35	(N/A)	(N/A)
Detention Pond (OUT)	Post-Development 100 year	100	3.346	12.100	15.28	1,016.74	1.545

DOUGLAS_SPILLWAY

Project Summary	
Title	DOUGLAS_SPILLWAY
Engineer	Kellen Huffman
Company	Hg Consult, Inc
Date	6/18/2018

Notes

DOUGLAS_SPILLWAY

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
Area 1	Post-Development 100 year	100	3.356	11.920	59.35

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
Field Inlet	Post-Development 100 year	100	3.127	11.960	51.94

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Detention Pond (IN)	Post-Development 100 year	100	3.356	11.920	59.35	(N/A)	(N/A)
Detention Pond (OUT)	Post-Development 100 year	100	3.127	11.960	51.94	1,017.93	2.092

STORM SEWER NOTES:
1. All construction shall be in accordance with the latest edition of the City of Lee's Summit "DESIGN AND CONSTRUCTION MANUAL".
2. All pipe to be HDPE with smooth interior with a minimum "n" value of 0.011
3. Contractor shall verify the exact location and depth of all existing utilities prior to construction.
4. Elevations are called out to top of curb, top of pavement, or top of structure, unless otherwise noted.
5. See Storm Water Report for pipe sizing.
6. Parking lot grading shall be performed to route storm water as directed to the storm collection system.

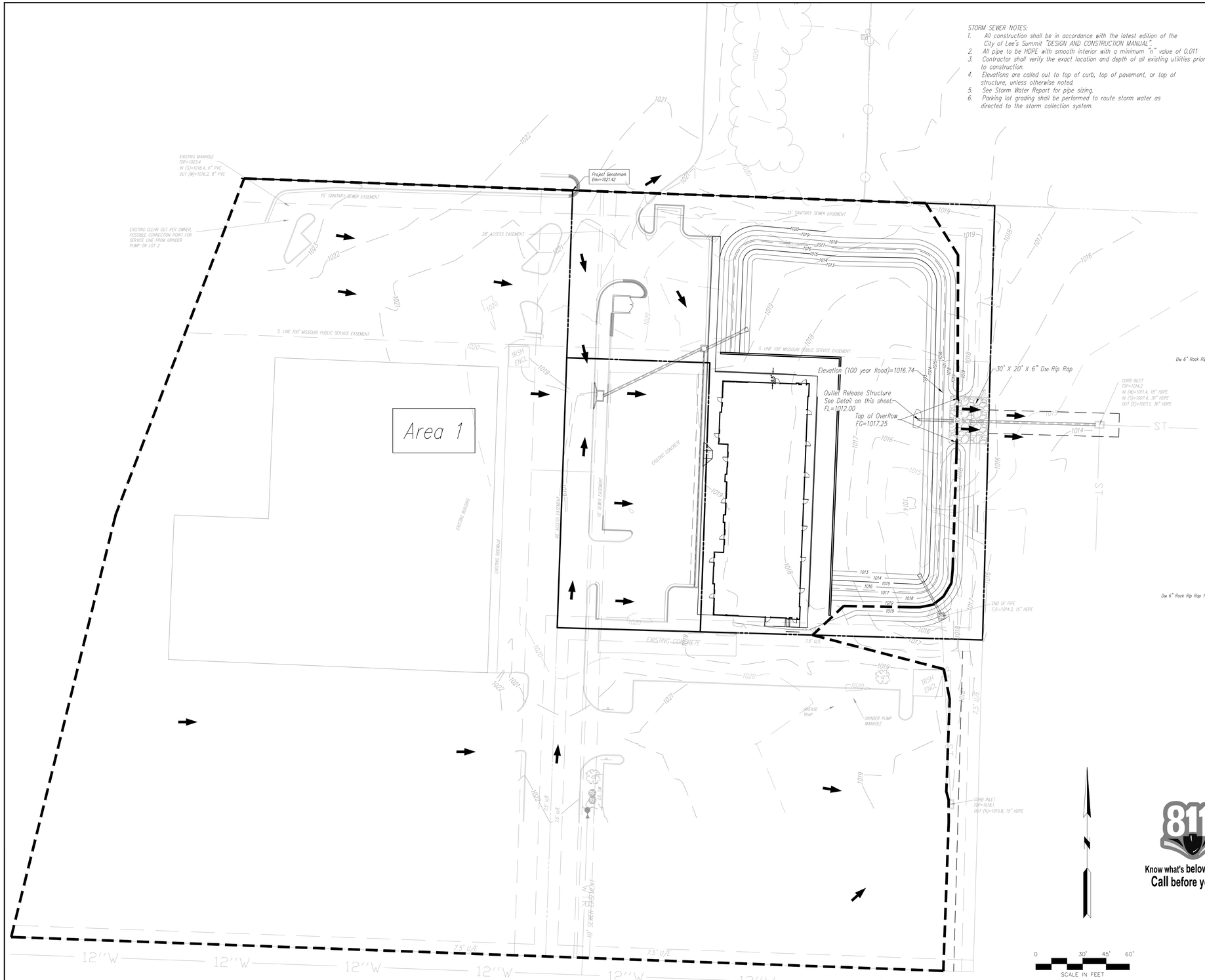
Detention Pond Details:

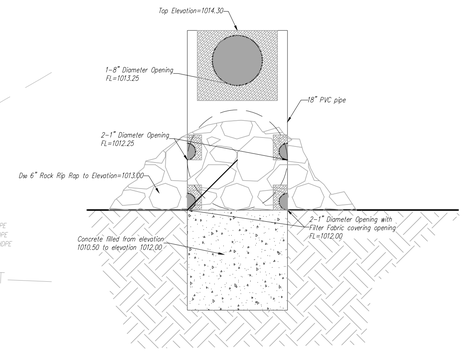
Elevation (feet)	Surf.Area (sq-ft)	Cum.Store (cubic-feet)
1012	52	0
1013	14,200	7,127
1014	15,477	21,965
1015	16,796	38,102
1016	18,158	55,580
1016.74	19,193	69,731 (100 year storage)
1017	19,577	74,448

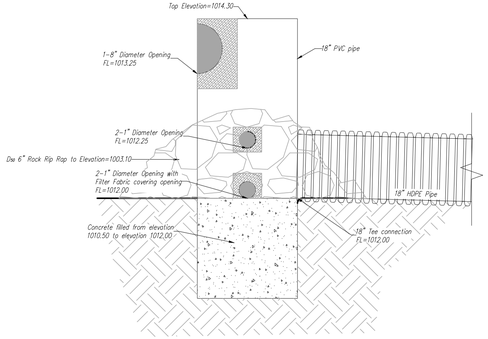
Detention release was sized by Bentley PondPACK V8i and is sized to release the 100-year storm event over the proposed rip rap lined channel.

The APWA 5600 allowable minimum releases for 6.3 acres are:

2 year - 3.15 cfs
10 year - 12.60 cfs
100 year - 18.90 cfs







Detention Release Structure
NTS

0 30' 45' 60'
SCALE IN FEET

Contractor to verify all invert elevations for existing sewer connections. Contact civil engineer if conflict arises.

811 Know what's below. Call before you dig.

PROJECT BENCHMARK:

#1 Iron bar at north west corner of property.
N 1006947.3760
E 2823375.6230
TOP ELEV. 1021.42

KEY

PROPOSED		EXISTING
979	Grades	960
	100 Year Overflow	
	Drainage Area	

Contractor to verify all invert elevations for existing sewer connections. Contact civil engineer if conflict arises.

NO.	BY	CK/APP	DATE	REVISION

STATE OF MISSOURI
R. KEVIN STERRETT
NUMBER 2006
REGISTERED PROFESSIONAL ENGINEER
7/06/18

R. KEVIN STERRETT, MO. E-26440

Consult Inc engineers planners
CORPORATE LICENSE No. E2010005873

DRAINAGE AREA MAP

DOUGLAS CORNERS BUILDING
LEE'S SUMMIT - JACKSON COUNTY - MISSOURI

X-REF NO. 181098
DRAWING NO. 18007
DATE JUNE 12, 2018
JOB NO. 18007
SHEET OF 6 12