

**COSTCO PRELIMINARY STORMWATER
DETENTION REPORT**

LEE'S SUMMIT, MO

Prepared For:

**COSTCO WHOLESALE
1955 Raymond Dr., Suite 119
Northbrook, IL**

Prepared By:

**CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
St. Louis, MO**

CEC Project 353-308

OCTOBER 2025



Civil & Environmental Consultants, Inc.

TABLE OF CONTENTS

1.0	INTRODUCTION AND METHODOLOGY.....	1
1.1	introduction	1
1.2	methodology	2
2.0	DESIGN ASSUMPTIONS	3
3.0	CONCLUSIONS	4
4.0	DESIGN ASSUMPTIONS	5

APPENDICES

APPENDIX A.....NCRS SOILS REPORT

APPENDIX B.....AUTOCAD HYDRAFLOW ® HYDROGRAPHS EXTENSION, 2025

APPENDIX C.....40 YEAR WATER QUALITY CALCULATIONS

1.0 INTRODUCTION AND METHODOLOGY

1.1 INTRODUCTION

Costco Wholesale is proposing to develop approximately 23.9-acres located at the southeast corner of Highway 50 and State Route 291 in Lee's Summit, Missouri. This 23.9-acres site is also part of the larger development of OLDHAM EAST is known as a tract of land being part of Section 8, Township 47 North, Range 31 West.

This existing site is vacant with minimal large vegetation and the existing topography is generally sloped from the Highway 50 to the South with discharges located near the SW and SE corners of the lot.

The development of this site will require satisfaction of Lee's Summit Stormwater Detention and Water Quality Volume (WQv) Best Management Practices (BMPs) requirements.

The development of this site will include an approx. 155,410 sq. ft. warehouse and 24 pump fueling station. Along with this building, there are 895 parking stalls including 17 ADA compliant parking stalls, a storm water management basin including 2 – Dry Detention Basins and a Wet Detention Basin. Water Quality will be handled with the 40 Hour Detention as defined in APWA Section 5600

1.2 METHODOLOGY

The storm water analysis and corresponding design contained within this report was performed in accordance with the current APWA Division V, Section 5600 Stormwater Drainage Systems & Facilities.

The site storm water runoff values were calculated using the SCS method with a Type II Distribution from the USDA TR-55 for the 2yr, 10yr, and 100yr-24hr storm events with AutoCAD Civil 3D Hydraflow Hydrographs extension, 2025. The Allowable release rates for each storm event was based on the rates provided by Lee's Summit (0.5 CFS/Ac for the 2yr, 2.0 CFS/Ac for the 10yr and 3.0 CFS/Ac for the 100yr). The 100yr-24hr storm event was calculated to verify maximum basin ponding in the 100yr-24hr scenario.

The proposed development has been designed to satisfy WQv requirements via the inclusion of a 40 hour detention in all three basins. This BMP and basin have been sized for the total area proposed to be tributary to them including offsite areas.

In this proposed development, the overall drainage patterns are directed to the North, West and East existing outfall locations, and are shown to be a decrease due to the detained flows leaving the detention basin.

2.0 DESIGN ASSUMPTIONS

1. The total site area is 23.9 acres and is located within Lee's Summit MO.
2. The total disturbed area is 23.9 acres.
3. All grading, improvements, and utilities included hereon shall be constructed per plan, prior to the commencement of the construction of this basin and bmp.
4. Based on the Natural Resources Conservation Service, the site is considered to have a hydrologic soil group "C" due to existing altered soils.
5. The proposed soil type has been selected as "D" as the proposed site will have been developed.
6. The starting hydraulic grade line (HGL) was assumed to be at the normal elevation of the proposed discharge pipe at the downstream daylight location.
7. Offsite runoff systems currently in place and employed by the existing condition will continue to accept flow from the site.

****Note: Additional Calculation Assumptions Have Been Noted Throughout Report****

3.0 CONCLUSIONS

The results from this report demonstrate the following:

1. This development must include WQv and Stormwater Detention.
2. The proposed development does not change and/or increase the overland flow offsite.
3. There are very few offsite flows tributary to the site and the small areas that are passing through the basin are not considered detained.
4. The detained peak differential storm water runoff as compared to the allowable discharge is a decrease in the 2yr-24hr 10yr-24hr and 100yr-24hr frequencies.
5. The proposed development provides 1 foot of freeboard within the proposed basin for the 100yr-24hr low flow blocked scenario.

6.

DETAINED STORM WATER RUNOFF SUMMARY OF VALUES NORTH			
	EXISTING (CFS)	PROPOSED (CFS)	BASIN PONDING
2YR PEAK	3.10	2.10	
10YR PEAK	5.67	3.15	
100YR PEAK	10.55	4.96	

DETAINED STORM WATER RUNOFF SUMMARY OF VALUES WEST			
	ALLOWABLE (CFS)	PROPOSED (CFS)	BASIN PONDING NW / SW
2YR PEAK	7.88	11.80*	1044.66/1040.99
10YR PEAK	31.52	17.42*	1045.54/1042.68
100YR PEAK	47.28	33.72*	1046.16/1044.25
*This project IS required to provide detention and values shown above are detained			

DETAINED STORM WATER RUNOFF SUMMARY OF VALUES EAST			
	ALLOWABLE (CFS)	PROPOSED (CFS)	BASIN PONDING
2YR PEAK	9.20	3.40*	1042.83
100YR PEAK	36.80	4.98*	1043.85
100YR PEAK LFB	55.20	47.72*	1044.63
*This project IS required to provide detention and values shown above are detained			

4.0 DESIGN ASSUMPTIONS

1. Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov>); National Cooperative Soil Survey; USDA Natural Resources Conservation Service (NRCS).
2. AutoCAD Hydroflow® Hydrographs Extension, 2025.