



Meijer Outlot Franklin, Johnson County, Indiana Drainage Report

Prepared For:
Southern Rock Restaurants, LLC
1881 General George Patton Dr, Suite 107
Franklin, TN 37067

Prepared By:
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Original Submittal – March 7, 2019

Kimley»Horn



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1.0. Project Summary

Project Name:	Meijer Outlot
Location:	2378 North Morton Street, Franklin, Johnson County, Indiana
Type:	Drainage Report
Reviewing Agency:	City of Franklin
Detention Policy:	City of Franklin – master planned
Water Quality:	City of Franklin – master planned
Storm Sewer Modeling:	Rational Method

Design:

Water Quality:	The master planned wet detention pond will treat stormwater runoff before discharging.
Receiving Body:	The site drains to the master planned pond.

2.0. Introduction

Kimley-Horn and Associates, Inc. has been retained by Southern Rock Restaurants, LLC to prepare construction documents and provide civil engineering services for the proposed Meijer Outlot “Project” in Franklin, Indiana. The Project includes one building with a 4,000-SF footprint and surrounding infrastructure. Infrastructure improvements will include the surrounding parking lot and utility connections.

This Drainage Report focuses on capturing the runoff from the site and tying into the master planned storm network based on the *City of Franklin Stormwater Management Ordinance*. The existing detention pond and storm sewer network were sized appropriately for the anticipated future development, which includes this Project. All necessary detention and stormwater quality design was taken into consideration in master planning. Refer to the Meijer FRK Stormwater Management Report for details.

3.0. Existing Conditions

The existing site is undeveloped and is the northern most outlot parcel in front of the Meijer store in Franklin, IN. The site is fully vegetated and multiple mature trees exist. Most of the site drains to the south and east. However, the site was masterplanned to convey stormwater to the storm sewer network on the west side of the site. There are two storm sewer structures that were both designed to convey the developed site. A runoff coefficient of 0.75 and a time of concentration of 10 minutes was assumed in the sizing of the storm sewer. The existing storm sewers convey water to the wet detention pond located to the west of the Meijer building. The wet detention pond was designed to provide detention and stormwater quality for the Meijer store lot and this project site. A curve number of 94 was used in the sizing of the detention pond.

Existing drainage areas can be seen on the Existing Conditions Map in **Appendix D**.

Aerial Photograph

An aerial photograph of the Project Site has been included in **Appendix A** for reference.

FEMA

The Project Site is located on the Flood Insurance Rate Map number 18081C0139D and resides within Zone “X”, indicating it lies outside of the 500-year flood limits. See **Appendix B** for the FEMA FIRMette.

Soil Characteristics

The Natural Resources Conservation Service (NRCS) Web Soil Survey of Johnson County, Indiana, indicates Crosby silt loam (CrA) on site. A soil map can be found in **Appendix C**.

4.0. Proposed Conditions

General Storm Routing

The developed site will meet the assumptions set forth in the master drainage report. The master drainage report states that the site must have a developed curve number of 94 or less to meet the detention requirements. The developed site will have an overall curve number of 92, which is below the designed requirement. The proposed storm network will convey the extents of this project to the west to the existing storm structures. The two storm sewers tie into the storm network in the Meijer parking lot and convey runoff to the wet detention pond. A drainage area map has been included in **Appendix E**.

Proposed Hydraulics

The proposed storm sewer systems onsite were sized and analyzed using the Rational Method and the Hydraflow modeling software for the 10-year storm event in accordance with the City of Franklin Stormwater Management Ordinance. Rational C coefficients, 10-year storm event rainfall intensity based on 5-minute times of concentration, and individual basin areas were entered into the software program and resulting hydraulic grade lines were generated. The onsite storm sewer system has been designed to adequately convey the 10-year design storm event of the developed conditions. The system includes 0.1 foot drops at each structure and has a minimum velocity of 2.5 feet per second. As can be seen in the results of the Hydraflow model, found in **Appendix F**, the proposed flow rates of the two site discharge points fall within the allowable capacity values of the master drainage report. Inlet capacity calculations assuming 50% clogging can also be found in **Appendix F**. Since the proposed project conforms with the master planned storm sewer and detention design, no adverse impacts are anticipated.

Water Quality

Water Quality measures for the site were accounted for in the master planning of the Meijer FRK project. The master planned pond was designed to act as the water quality treatment measure for the development. As such, additional post-construction water quality measures will not be added as a part of this project.

5.0 Appendices

Appendix A: Aerial Photograph

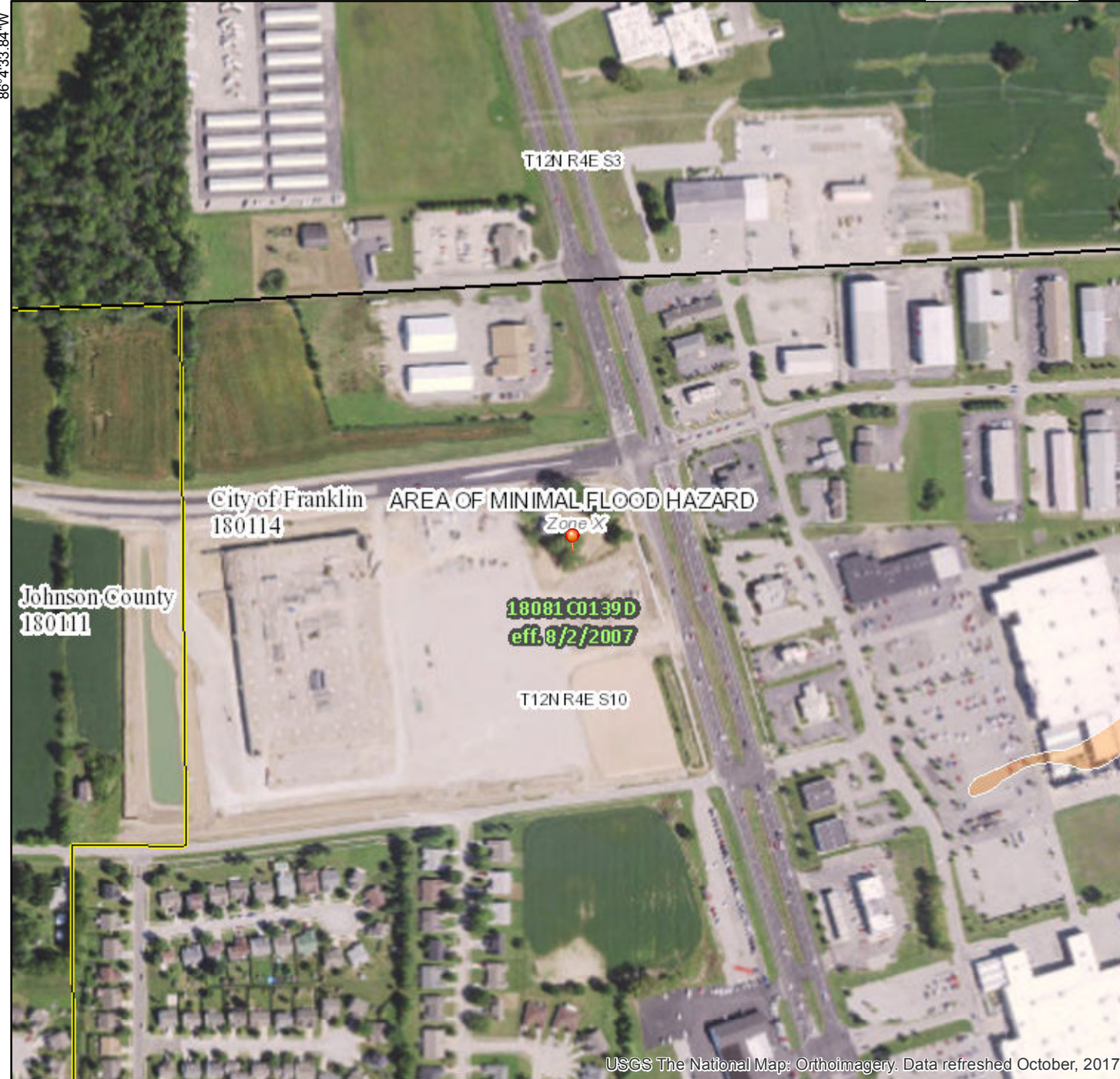


Appendix B: FEMA Flood Insurance Rate Map

National Flood Hazard Layer FIRMette



39°30'36.21"N



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

1:6,000

39°30'8.45"N

USGS The National Map: Orthoimagery. Data refreshed October, 2017.

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 Water Surface Elevation
		17.5
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



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 **2/21/2019 at 12:32:24 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.

86°3'56.39"W

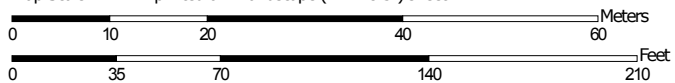
Appendix C: Soil Map

Hydrologic Soil Group—Johnson County, Indiana



Soil Map may not be valid at this scale.

Map Scale: 1:774 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84




**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

2/21/2019
Page 1 of 4

MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines


 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points






 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

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 1:15,800.

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: Johnson County, Indiana
 Survey Area Data: Version 26, Sep 7, 2018

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

Date(s) aerial images were photographed: Sep 24, 2014—Mar 20, 2017

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CrA	Crosby silt loam, fine-loamy subsoil, 0 to 2 percent slopes	C/D	1.8	100.0%
Totals for Area of Interest			1.8	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

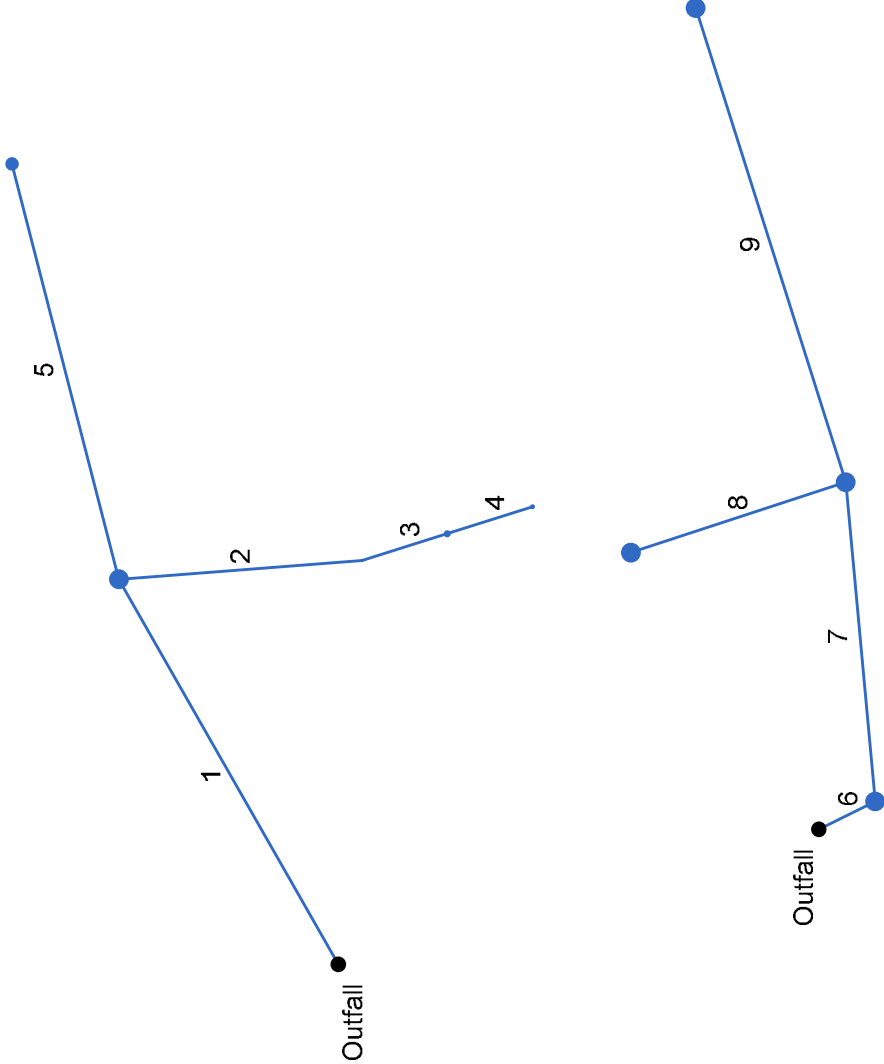
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix D: Existing Conditions Map

Appendix E: Proposed Drainage Map

Appendix F: Storm Sewer Design Calculations



Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (l)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr	Total	(C)	Incr	Total	Inlet	Syst	(in/hr)	(cfs)	(cfs)	(ft/s)	Size	Slope (%)	Dn	Up	Dn	Up	Dn	Up	(ft)
1	End	104.935	0.15	0.40	0.76	0.11	0.31	5.0	6.7	6.6	2.04	2.25	3.25	12	0.40	761.19	761.61	761.94	762.36	765.24	765.51	PIPE -24
2	1	57.965	0.00	0.10	0.00	0.00	0.09	0.0	5.2	7.2	0.61	0.80	4.06	6	1.73	762.71	763.71	763.04	764.11	765.51	764.26	PIPE -59
3	2	21.237	0.00	0.10	0.00	0.00	0.09	0.0	5.1	7.2	0.61	0.80	3.67	6	1.74	763.71	764.08	764.11	764.48	764.26	766.85	PIPE -51
4	3	21.258	0.10	0.10	0.85	0.09	0.09	5.0	5.0	7.3	0.62	0.80	3.68	6	1.74	764.08	764.45	764.48	764.85	766.85	766.69	PIPE -52
5	1	101.373	0.15	0.15	0.73	0.11	0.11	5.0	5.0	7.3	0.79	1.58	1.30	12	0.20	761.71	761.91	762.52	762.58	765.51	765.36	PIPE -24 (2)
6	End	14.850	0.00	0.48	0.00	0.00	0.36	0.0	8.6	6.0	2.17	2.26	3.28	12	0.40	761.70	761.76	762.48	762.54	765.79	765.38	PIPE -27
7	6	75.779	0.20	0.48	0.78	0.16	0.36	5.0	8.2	6.1	2.21	2.20	2.92	12	0.38	761.76	762.05	762.70	762.95	765.38	764.75	PIPE -48
8	7	53.667	0.06	0.06	0.50	0.03	0.03	5.0	5.0	7.3	0.22	3.26	0.37	12	0.84	762.05	762.50	763.09	763.09	764.75	765.85	PIPE -45
9	7	117.600	0.22	0.22	0.79	0.17	0.17	5.0	5.0	7.3	1.26	1.35	1.61	12	0.14	762.05	762.22	763.09	763.22	764.75	764.96	PIPE -46
Project File: Storm Sizing.stm																						Run Date: 3/6/2019
Number of lines: 9																						
NOTES: Intensity = 55.91 / (Inlet time + 8.50) ^ 0.78; Return period = Yrs. 10 ; c = cir e = ellip b = box																						

Kimley»Horn

PROJECT:	MEIJER OUTLOT
BY:	MJT
DATE:	7-Mar-19

Impervious Factor	0.82
Pervious Factor	0.16
	Inputs
	Outputs

Catchment Area D1	
area	0.15
pervious	0.02
impervious	0.13
coefficient	0.72

Catchment Area D2	
area	0.15
pervious	0.01
impervious	0.14
coefficient	0.76

Catchment Area D3	
area	0.15
pervious	0.02
impervious	0.13
coefficient	0.73

Catchment Area D5	
area	0.20
pervious	0.01
impervious	0.19
coefficient	0.78

Catchment Area D6	
area	0.22
pervious	0.01
impervious	0.21
coefficient	0.79

Catchment Area D7	
area	0.06
pervious	0.03
impervious	0.03
coefficient	0.49

Total Catchment Area	
area	1.37
pervious	0.42
impervious	0.95
curve number	92



INLET CALCULATION COMPUTATION

Date: 7-Mar-19
Designed By: MJT
Project: McAlister's Franklin

$$Q = CA\sqrt{2gh}$$

Location: Fishers, Hamilton County, IN

Storm Event: 10 Year

Structure No.	Runoff Coefficient (C)	Rainfall Intensity (i)	Clear Opening Area (A) (in ²)	Orifice Coefficient (C)	Drainage Area (ac)	Depth of Water over Grate (h) (in)	Gravity (g) (ft/s ²)	Q Allowable (cfs)		Q Calculated (cfs)	CASTING TYPE
D1	0.72	6.12	93.6	0.67	0.15	6	32.2	2.48	>	0.66	R-2502-G
D2	0.76	6.12	93.6	0.67	0.15	6	32.2	2.48	>	0.70	R-2502-G
D3	0.73	6.12	79.2	0.67	0.15	6	32.2	2.10	>	0.67	R-3010
D5	0.78	6.12	79.2	0.67	0.2	6	32.2	2.10	>	0.95	R-3010
D6	0.79	6.12	79.2	0.67	0.22	6	32.2	2.10	>	1.06	R-3010
D7	0.49	6.12	79.2	0.67	0.06	6	32.2	2.10	>	0.18	R-3010

Appendix G: Meijer FRK Drainage Report



**STORMWATER
MANAGEMENT REPORT**

**MEIJER FRK
CITY OF FRANKLIN, IN**

Woolpert Project No. 074485

Submitted: June 29, 2015

STORMWATER MANAGEMENT REPORT

MEIJER FRK CITY OF FRANKLIN, IN

PREPARED FOR:

MEIJER, INC.

2929 WALKER AVE NW

GRAND RAPIDS, MI 49504

PREPARED BY:

WOOLPERT

7635 INTERACTIVE WAY, SUITE 100

INDIANAPOLIS, IN 46278

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- Proposed Drainage Exhibit
- Storm Sewer Basin Map

Section 3 – Detention Calculations

Section 4 – Storm Sewer Sizing Calculations

Section 1 – Storm Water Management Report

STORMWATER MANAGEMENT REPORT

Meijer FRK City of Franklin, IN

Pre-Developed Conditions

Meijer, Inc. plans to develop a 24-acre parcel located at the southwest corner of US 31 and Commerce Drive in the City of Franklin, IN. The site will consist of a 192,940 SF Meijer main store and a 2,509 SF convenience store and gas station, parking areas, truck docks and other infrastructure improvements. The remaining areas of the parcel will be subdivided into outlots for future development.

Under the existing conditions, the site consists of undeveloped farmland with a ridge extending from the northeast to the southwest corners of the parcel. From the ridge, the ground is sloped to drain generally to the southeast and the northwest.

The existing parcel is composed of 5 watershed areas that all drain via overland flow. They are:

EX N = 8.20 ac. – Drains north to an existing storm sewer (N OUT) running west along the south side of Commerce Drive.

EX S = 16.64 ac. – Drains southeast (S OUT) to the existing INDOT R/W ditch along US 31 just north of Simon Road.

EX Off-site = 1.20 ac. – Drains east (S OUT) to the existing INDOT R/W ditch along US 31 just north of Simon Road, similarly to EX S.

EX SW = 0.40 ac. – Drains southwest to the Simon Rd. roadside ditch to the west.

EX NE = 0.33 ac. – Drains northeast to a storm sewer in Commerce Rd. running northeast through the US 31 intersection.

The existing soils onsite are Brookston silty clay loam (Br), Crosby silt loam, fine-loamy subsoil, 0 to 2 percent slopes (CrA), Miami silt loam, 2 to 6 percent slopes, eroded (MnB2), Miami silt loam, 6 to 12 percent slopes, eroded (MnC2).

Per FIRM Map number 18081C0139D, effective date August 2, 2007 the site is not located in any floodplain areas.

Post-Developed Conditions

The developed conditions for the overall property will include a 192,940 SF Meijer Store, a 2,509 SF convenience store and gas station, internal access drives, parking areas and associated utility, detention and water quality improvements.

The proposed Meijer improvements and increases in imperviousness will be detained in a proposed wet detention pond. This includes the Meijer store lot and the outlot at the northeast corner (developed condition). The southeast corner of the project, which includes an access drive and a lot to be developed by others, the gas station, and South Direct Discharge Basin will both outlet directly to the INDOT R/W ditch along US 31 at the southeast corner of the site. The calculations consider the southeast lot in the fully developed condition.

Per the City of Franklin and INDOT drainage requirements, the following are the allowable release rates for the proposed conditions are:

2yr. pre \leq 10 yr. post (City of Franklin)
10yr. pre \leq 100 yr. post (City of Franklin)
10yr. pre \leq 50 yr. post (INDOT)

Therefore the allowable release rates for the detention pond discharge points are as shown in Table 1.

Table 1:

RAINFALL EVENT	N OUT	S OUT
2yr. pre	1.80 cfs	N/A
10yr. pre	5.41 cfs	36.32 cfs

The proposed wet detention pond has been designed in accordance with City of Franklin drainage requirements to provide the required storage volume. The proposed runoff from the direct discharge area at the southeast corner of the site remains under the allowable discharge rate in the developed condition. The proposed peak release rates as they relate to the allowable are as shown in Tables 2 and 3:

Table 2 – Wet Detention Pond to N OUT:

RAINFALL EVENT	Allowable Release Rates	Proposed Release Rates
10yr. post	1.80 cfs	1.56 cfs
100yr. post	5.41 cfs	4.04 cfs

Table 3 – Direct Discharge to S OUT:

RAINFALL EVENT	Allowable Release Rates	Proposed Release Rates
50yr. post	36.32 cfs	28.18 cfs

Results: The proposed release rates are less than the allowable.

EX SW and EX NE were merged into proposed basins, therefore, allowable release rates were not determined as any flow going there pre-developed does not go there in the post-developed condition.

Proposed drainage calculations are located in Section 3 of this report. The Storm sewers were sized for a 10-year storm. Inlet capacity calculations are provided for the inlets receiving medium to high flow rates. Calculations are located in Section 4 of this report.

Water Quality

Water quality has been provided in accordance with City of Franklin requirements to provide the appropriate level of TSS removal. The wet detention will provide the appropriate amount of water quality for the Meijer Store lot per the ordinance. Water quality has been provided in accordance with City of Franklin requirements to provide the appropriate level of TSS removal. An Aqua-Swirl will provide the appropriate amount of water quality for the gas station lot per the ordinance. Calculations are as shown below:

Wet Pond

1.25" Rainfall Event Volume – 20% = 0.35 acre-ft

½" Direct Runoff Volume = 0.70 acre-ft

2" orifice invert: 756.00'

6" orifice invert: 756.58'

At 756.58', the wet detention pond provides 0.71 acre-ft of storage to be released through a proposed 2" orifice, thereby meeting the requirements of the ordinance.

Aqua-Swirl

Release rate to be treated: 1.14 cfs

Aqua-Swirl Treatment Rate for AS-3: 1.80 cfs

The AS-3 is capable of treating the water quality treatment rate, thereby meeting the requirements of the ordinance.

In the future, when the southeast outlot is developed, the owner/developer will need to provide water quality to the extent of the ordinance.

Conclusion

The proposed development has been designed to provide the sufficient storage volume in the detention pond to accommodate the proposed Meijer development. The future developed outlots at the southeast corner of the site are able to direct discharge into the INDOT ditch within the allowable release rate. The storm sewer has been designed for the 10 yr. rainfall event. Water quality is being provided in accordance with City of Franklin requirements. Therefore, no adverse impacts are anticipated with this development.

Section 2 – Drainage Exhibits

POND BASIN
A = 20.79 AC.
T_c = 23 MIN.
CN = 94
meijer
 192,940 SFT
 F.F.E. = 767.00

SE BASIN
A = 4.10 AC.
T_c = 10 MIN.
CN = 91

SOUTH DIRECT DISCHARGE
A = 1.80 AC.
T_c = 18 MIN.
CN = 80

DETENTION POND & WATER QUALITY

OUTDOOR GARDEN CENTER

COMMERCE DRIVE

SIMON ROAD

GALAXY DRIVE

MEADOW GLEN BOULEVARD


U.S. HIGHWAY 31

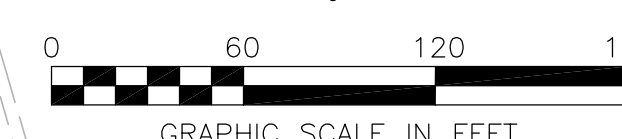
TC PATH

GRAPHIC SCALE IN FEET

0 60 120 180

N

SHEET NO.	PR-1	MEIJER FRK		<div>7635 Interactive Way Suite 100 Indianapolis, IN 46278 317.299.7500 FAX: 317.291.5805</div> <div> WOOLPERT</div>	PROJECT No: 74485 DATE 06/29/15 DES. KAC DR. KAC CKD. JRN	No.	DATE	REVISION	SEAL
		PROPOSED DRAINAGE MAP							



**MEADOW GLEN
BOULEVARD**

meijer

SIMON ROAD

GALAXY DRIVE

<div>ST-1</div>	<div>MEIJER FRK</div> <div>FRANKLIN, INDIANA</div> <div>INLET AREA MAP</div>	<div><div><div><div>W</div><div>W</div></div><div>WOOLPERT</div></div><div>7635 Interactive Way Suite 100 Indianapolis, IN 46278 317.299.7500 FAX: 317.291.5805</div></div>	PROJECT No:	No.	DATE	REVISION
			74485			
			DATE	05/14/15		
			DES.	KAC		
			DR.	KAC		
			CKD.	JRS		