

EXISTING SANITARY BASIS OF DESIGN

Unit Type	Unit	Unit Factor	REU	Flow Rate	Total Flow (gpd)	Total Flow (cfs)
Grocery - Kroger	48,849 sf	1.10 per 1,000 sf	53.7	350 gal/day	18,807	0.0290
Restaurant - Papa Romano's	1,200 sf	3.00 per 1,000 sf	3.6	350 gal/day	1,260	0.0019
Retail - D Tobacco	1,200 sf	0.30 per 1,000 sf	0.4	350 gal/day	126	0.0002
Retail - Vacant Unit	1,200 sf	0.30 per 1,000 sf	0.4	350 gal/day	126	0.0002
Sports Center - Burn Fitness	18,242 sf	1.00 per 1,000 sf	18.2	350 gal/day	6,385	0.0099
Restaurant - Subway	1,320 sf	3.00 per 1,000 sf	4.0	350 gal/day	1,386	0.0021
Retail - Bath Fitter	1,320 sf	0.30 per 1,000 sf	0.4	350 gal/day	139	0.0002
Office - Allstate	1,320 sf	0.30 per 1,000 sf	0.4	350 gal/day	139	0.0002
Restaurant - Dynasty of Livonia	1,320 sf	3.00 per 1,000 sf	4.0	350 gal/day	1,386	0.0021
Restaurant - Coney Island	1,600 sf	3.00 per 1,000 sf	4.8	350 gal/day	1,680	0.0026
Beauty Shop - Q Nail	12 stations	0.15 per station + 1	2.8	350 gal/day	980	0.0015
Barber Shop - Mane Connection	08 stations	0.10 per chair + 1	1.8	350 gal/day	630	0.0010
Retail - Scrappy Chick	4,967 sf	0.30 per 1,000 sf	1.5	350 gal/day	522	0.0008
Retail - Vacant Unit	8,280 sf	0.30 per 1,000 sf	2.5	350 gal/day	869	0.0013
Retail - Vacant Unit	1,453 sf	0.30 per 1,000 sf	0.4	350 gal/day	153	0.0002
Retail - Vacant Unit	8,934 sf	0.30 per 1,000 sf	2.7	350 gal/day	938	0.0014
Retail - Vacant Unit	3,967 sf	0.30 per 1,000 sf	1.2	350 gal/day	417	0.0006
Barber Shop - Hair Mechanix	07 stations	0.10 per chair + 1	1.7	350 gal/day	595	0.0009
Doctors Office - Trupp Transformation	1 exam room	0.50 per room + 1	1.5	350 gal/day	525	0.0008
Doctors Office - Ascension Health	30 exam room	0.50 per room + 1	16.0	350 gal/day	5,600	0.0086
Total					42,661	0.0658

Total Flow	
Total million gallons per day (MGD) =	0.04266
Total REUs (assume 1 REU = 350 gpd) =	121.89
Total cubic feet per second (cfs) =	0.0658


Peak Flow	
Peaking Factor =	$\frac{18 + \sqrt{(P/1000)}^{0.5}}{4 + \sqrt{(P/1000)}}$
Population per REU =	3.5
Total Population =	427
Peaking Factor =	4.01
Peak gallons per day (gpd) =	171,015
Peak million gallons per day (mgd) =	0.1710
Peak cubic feet per second (cfs) =	0.2639

PROPOSED SANITARY BASIS OF DESIGN

Unit Type	Unit	Unit Factor	REU	Flow Rate	Total Flow (gpd)	Total Flow (cfs)
Grocery - Kroger	75,349 sf	1.10 per 1,000 sf	82.9	350 gal/day	29,009	0.0448
Restaurant - Papa Romano's	1,200 sf	3.00 per 1,000 sf	3.6	350 gal/day	1,260	0.0019
Retail - D Tobacco	1,200 sf	0.30 per 1,000 sf	0.4	350 gal/day	126	0.0002
Retail - Vacant Unit	1,200 sf	0.30 per 1,000 sf	0.4	350 gal/day	126	0.0002
Sports Center - Burn Fitness	18,242 sf	1.00 per 1,000 sf	18.2	350 gal/day	6,385	0.0099
Restaurant - Subway	1,320 sf	3.00 per 1,000 sf	4.0	350 gal/day	1,386	0.0021
Retail - Bath Fitter	1,320 sf	0.30 per 1,000 sf	0.4	350 gal/day	139	0.0002
Office - Allstate	1,320 sf	0.30 per 1,000 sf	0.4	350 gal/day	139	0.0002
Restaurant - Dynasty of Livonia	1,320 sf	3.00 per 1,000 sf	4.0	350 gal/day	1,386	0.0021
Beauty Shop - Q Nail	12 stations	0.15 per station + 1	2.8	350 gal/day	980	0.0015
Barber Shop - Mane Connection	08 stations	0.10 per chair + 1	1.8	350 gal/day	630	0.0010
Retail - Scrappy Chick	4,967 sf	0.30 per 1,000 sf	1.5	350 gal/day	522	0.0008
Barber Shop - Hair Mechanix	07 stations	0.10 per chair + 1	1.7	350 gal/day	595	0.0009
Doctors Office - Trupp Transformation	1 exam room	0.50 per room + 1	1.5	350 gal/day	525	0.0008
Doctors Office - Ascension Health	30 exam room	0.50 per room + 1	16.0	350 gal/day	5,600	0.0086
Total					48,807	0.0753

Total Flow	
Total million gallons per day (MGD) =	0.04881
Total REUs (assume 1 REU = 350 gpd) =	139.45
Total cubic feet per second (cfs) =	0.0753

Peak Flow	
Peaking Factor =	$\frac{18 + \sqrt{(P/1000)}^{0.5}}{4 + \sqrt{(P/1000)}}$
Population per REU =	3.5
Total Population =	488
Peaking Factor =	3.98
Peak gallons per day (gpd) =	194,231
Peak million gallons per day (mgd) =	0.1942
Peak cubic feet per second (cfs) =	0.2997




Know what's below.
Call before you dig.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NOTICE: CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK, OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.

COPYRIGHT © 2021 ATWELL LLC NO REPRODUCTION SHALL BE MADE WITHOUT THE PRIOR WRITTEN CONSENT OF ATWELL LLC



ATWELL
866.850.4200 www.atwell-group.com
12745 23 MILE ROAD | SUITE 200
SHELBY TOWNSHIP, MI 48315
(586) 786-9600

CITY OF LIVONIA

WAYNE COUNTY, MICHIGAN

THE KROGER COMPANY

STORE D-615 EXPANSION
SITE PLANS

SANITARY BASIS OF DESIGN

DATE
JULY 13, 2021

REVISIONS/SUBMITTALS


07-13-2021 SUBMIT TO CITY

10-27-2021 OTB

02-01-2022 REV PER CITY

03-25-2022 REV PER CITY

05-10-2022 BULLETIN 1



DRAWN BY: EM

CHECKED BY: EM

PROJECT MANAGER: MMc

JOB #: 18003949

SHEET NO.

C1.6.3

CAD FILE: X:\18003949\DWG\PLAN SETS\CONSTRUCTION PLANS\18003949-1P-BASIS