

Poths General Development SWMP MEMO

S 76th Steet and Rawson Avenue
Franklin, Wisconsin

PREPARED FOR

Land By Label
7044 South Ballpark Drive, Suite 305
Franklin, WI 53132

PREPARED BY



Project Number – 21774
10/13/2023

Christopher Carr, PE
Vice President

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Project Engineer

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1. Introduction

This Storm Water Management memo presents the preliminary design calculations and considerations for the proposed development located at the intersection of S 76th Street and Rawson Avenue in the City of Franklin, WI. The proposed site encompasses approximately 24.52 acres. The site is bounded by residential developments to the south and east, 76th Street to the west, and by commercial developments, as well as Rawson Avenue, to the north. The western half of the existing site currently consists of commercial developments that will be redeveloped for the proposed project. The eastern half of the existing site consists of natural features such as woodland, grassland, and wetlands. The proposed site will consist of new development for this half of the site. This storm water management memo serves as a summary of calculations showing the proposed development meets all applicable ordinances.

2. Design Criteria

City of Franklin, Wisconsin

Water Quality

- Total Suspended Solids. BMPs shall be designed, installed, and maintained to control total suspended solids carried in runoff from the post-construction site as follows:
 - For new and in-fill developments, by design, reduce to the maximum extent practicable, the total suspended solids load by 80%, based on the average annual rainfall, as compared to no runoff management controls. No person shall be required to exceed an 80% total suspended solids reduction to meet the requirements of this subdivision.
 - For redevelopment, by design, reduce to the maximum extent practicable, the total suspended solids load from parking areas and roads by 40%, based on the average annual rainfall, as compared to no runoff management controls. No person shall be required to exceed a 40% total suspended solids reduction to meet the requirements of this subdivision.
 - Maximum Extent Practicable. If the design cannot meet a total suspended solids reduction performance standard of subs. 1. to 2, the storm water management plan shall include a written, site-specific explanation of why the total suspended solids reduction performance standard cannot be met and why the total suspended solids load will be reduced only to the maximum extent practicable.
 - Off-Site Drainage. When designing BMPs, runoff draining to the BMP from offsite shall be taken into account in determining the treatment efficiency of the practice. Any impact on the efficiency shall be compensated for by increasing the size of the BMP accordingly.

Note: Pollutant loading models such as DETPOND, WinSLAMM, P8, or equivalent methodology may be used to evaluate the efficiency of the design in reducing total suspended solids. Use the most recent version of the model and the rainfall files and other parameter files identified for Wisconsin users unless directed otherwise.

Water Quantity and Management of Peak Runoff

- By design, BMPs shall be employed to maintain or reduce the 1-year, 24-hour post-construction peak runoff discharge rate to the 1-year, 24-hour pre-development peak runoff discharge rate, or to the maximum extent practicable.
- By design, BMPs shall be employed to meet both of the following for the 2-year, 24-hour storm:

- Maintain or reduce the 2-year, 24-hour post-construction peak runoff discharge rate to the 2-year, twenty-four-hour pre-development peak runoff discharge rate, or to the maximum extent practicable (per City of Franklin), and
- Achieve a maximum runoff release rate of 0.15 cubic feet per second per acre or utilize the volumetric design procedure to limit post-development runoff volumes to existing condition runoff volumes during the critical time period (per MMSD).
- By design, BMPs shall be employed to maintain or reduce the 10-year, 24-hour post-construction peak runoff discharge rate to the 10-year, 24-hour pre-development peak runoff discharge rate, or to the maximum extent practicable.
- By design, BMPs shall be employed to meet the both of the following for the 100-year, 24-hour storm:
 - Maintain or reduce the 100-year, 24-hour post-construction peak runoff discharge rate to the 100-year, 24 hour pre-development peak runoff discharge rate, or to the maximum extent practicable (per City of Franklin), and
 - The stricter of the following (per MMSD):
 - Achieve a maximum runoff release rate of 0.5 cubic feet per second per acre or utilize the volumetric design procedure to limit post- development runoff volumes to existing condition runoff volumes during the critical time period, or
 - A rate determined for the individual site that distributes runoff over the critical time sufficient to comply with sub. 1.

Note: § 13.11(3)(b)(2), MMSD Rules, permits an individual site exemption from the 0.5 cfs release rate if an analysis shows that the runoff will be distributed over the critical time (a defined term) so as not to reduce the level of protection downstream.

- All storm sewers shall at a minimum be designed to carry the peak flows from a 10-year, 24-hour design storm using planned land use for the entire contributing watershed. All storm sewers shall be designed in accordance with applicable City standards and specifications. The City Engineer may require conveyance of a larger recurrence interval storm for heavily traveled roadways and areas where the City Engineer determines that an added level of protection is needed.

Wisconsin Department of Natural Resources

- WDNR – Technical Standards (NR151 and NR216)

3. Design Analysis

- Stormwater Detention basins – were designed to meet relevant standards per WDNR Technical Standard 1001.
- Rainfall data used in the hydrologic analysis were obtained from the NOAA Atlas 14 precipitation depths, and the appropriate NRCS Wisconsin MSE3 precipitation distribution for 24 hour duration (1-yr, 2-yr, 10-yr, and 100-yr storm events).

1 year	2 year	10 year	100 year
2.36"	2.66"	3.74"	5.98"

- Curve numbers for the soils within the analysis region were selected from the values published in TR-55. Native soil types were determined from NRCS maps and borings.
- Time of concentration values were calculated based on the standard TR-55 method.
- The hydraulic calculations and analysis presented in this memo were performed using HydroCad Watershed Modeling software which utilizes the methodologies of TR-55 for a hydrograph based analysis of watershed conditions. Hydrographs were developed using a standard MSE-3 24 hour hydrograph for the various 24-hr storm events.

- Sediment reduction characteristics for the proposed water quality facilities were determined using WinSLAMM (Version 10.3.4) Source Loading and Management Model.

4. Existing Condition Analysis

The existing site consists of an already developed area on the western half of the site, and an undeveloped area on the eastern half. Most of the developed area of the site generally drains from south to north. The far southern side of the developed area drains from east to west towards the southwest corner of the site. The undeveloped eastern side of the site generally drains from southwest to northeast. This area currently consists of woodland and open green space where several wetlands are located. Most of these wetlands have been deemed artificial by the WDNR, with the exception of the wetland located at the northeast corner of the site. This wetland will not be disturbed as part of the proposed project. The WDNR Artificial Wetland Exemption for the artificial wetlands on site was received on October 13th, 2022.

5. Proposed Developed Conditions Description

The proposed development will include 8 proposed commercial buildings, 1 existing commercial building, and associated parking, drive aisles and sidewalks. The site will primarily maintain existing drainage patterns and outfall locations through implementation of storm sewer, bio-filtration basins and a wet detention basin. A private road will be constructed crossing a wetland and culverts will be installed to allow the existing offsite drainage to bypass the development and continue to flow to the wetland.

The total disturbance area for the project site is approximately 22.40 acres. Prior to development, the site had 8.54 ac of impervious surfaces. Post construction, the development area will contain approximately 13.90 acres of impervious surface.

6. Storm Water Quantity Modeling

A summary of results can be viewed in the table below:

Peak Flow Reduction Summary (To Northwest)		
Storm Frequency (yr)	Existing Site Conditions Peak Runoff Discharge Rate on site (cfs)	Post-Development Site Conditions Peak Runoff Discharge Rate (cfs)
1	24.44	15.32
2	28.59	17.91
10	43.55	27.16
100	74.22	68.65

Peak Flow Reduction Summary (To Northeast)		
Storm Frequency (yr)	Existing Site Conditions Peak Runoff Discharge Rate on site (cfs)	Post-Development Site Conditions Peak Runoff Discharge Rate (cfs)
1	5.61	2.85
2	7.75	4.25
10	16.76	12.96
100	38.71	35.19
Peak Flow Reduction Summary (To South)		
Storm Frequency (yr)	Existing Site Conditions Peak Runoff Discharge Rate on site (cfs)	Post-Development Site Conditions Peak Runoff Discharge Rate (cfs)
1	1.82	1.43
2	2.25	1.72
10	3.87	2.81
100	7.36	5.09

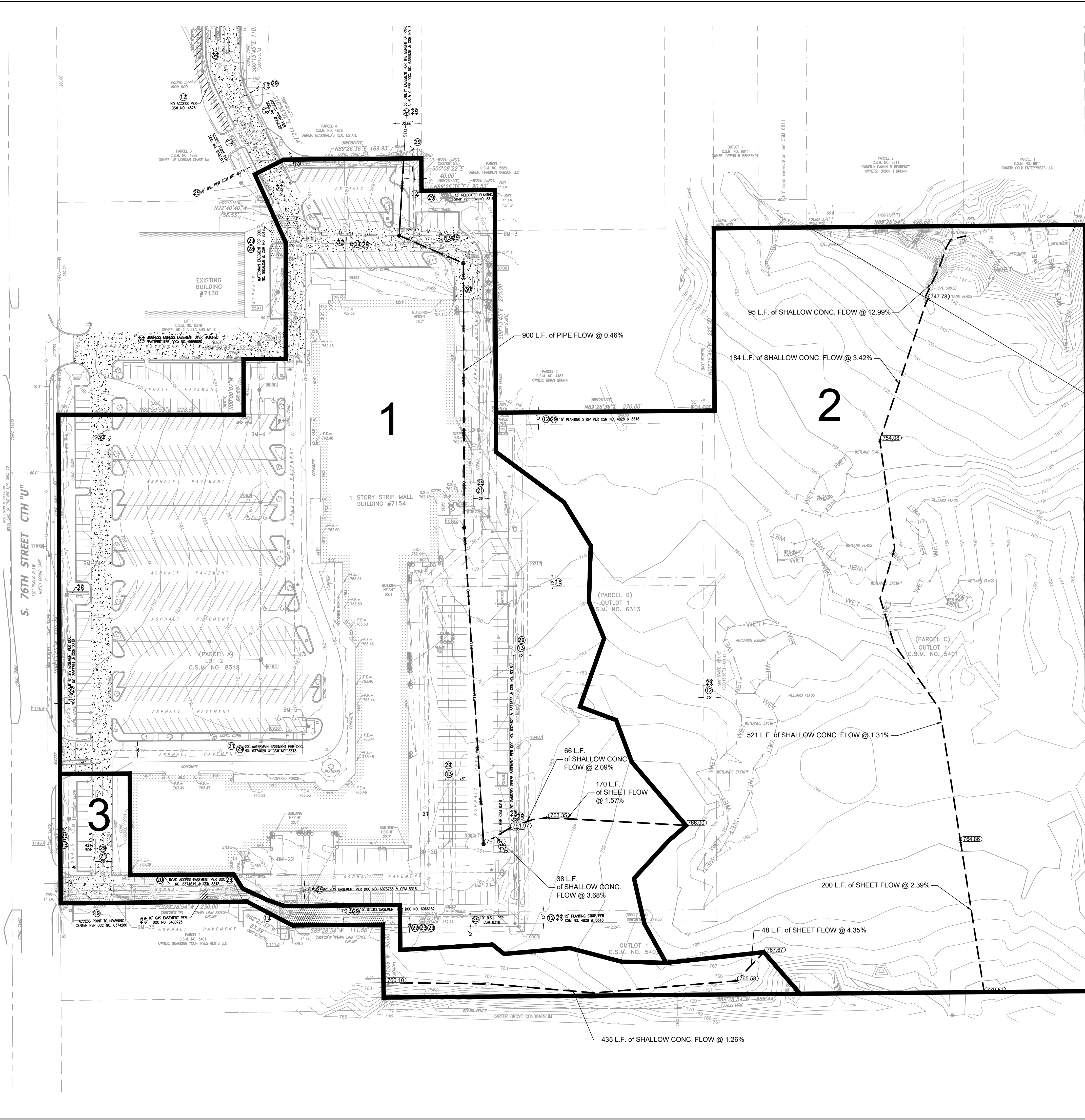
Volume Reduction Summary for Critical Time: Root River – 7.75 hours – 11.75-19.50		
Storm Frequency (yr)	Existing Site Condition Runoff Volume (acre-feet)	Proposed Site Condition Runoff Volume (acre-feet)
2	2.206	2.141
100	6.936	6.445

7. Storm Water Quality Modeling

NR 151 regulations require that the project employ BMPs to reduce sediment load leaving the site by 80% compared to no controls for new developments, and 40% for redevelopments.

Quality Summary Table

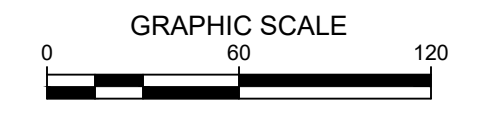
Total Suspended Solids Loading (Re-Development Area / West Side of Site)	
Total TSS prior to controls/treatment	3958 lbs
Total TSS After controls/treatment	2215 lbs
Total Percent TSS Reduction	44.04%
Total Suspended Solids Loading (New Development Area / East Side of Site)	
Total TSS prior to controls/treatment	3139 lbs
Total TSS After controls/treatment	570 lbs
Total Percent TSS Reduction	81.83%



EXISTING AREA 1			
Tc = 12.1 min.	SF	ACRE	CN
PROPOSED			
GREENSPACE	113084	2.60	74
PAVEMENT	265471	6.09	98
ROOF	106300	2.44	98
TOTAL	484855	11.13	92

EXISTING AREA 2			
Tc = 26.4 min.	SF	ACRE	CN
PROPOSED			
GREENSPACE	523851.40	12.03	74
TOTAL	523851.40	12.03	74

EXISTING AREA 3			
Tc = 8.7 min.	SF	ACRE	CN
PROPOSED			
GREENSPACE	28350	0.65	74
PAVEMENT	20567	0.47	98
TOTAL	48917	1.12	84

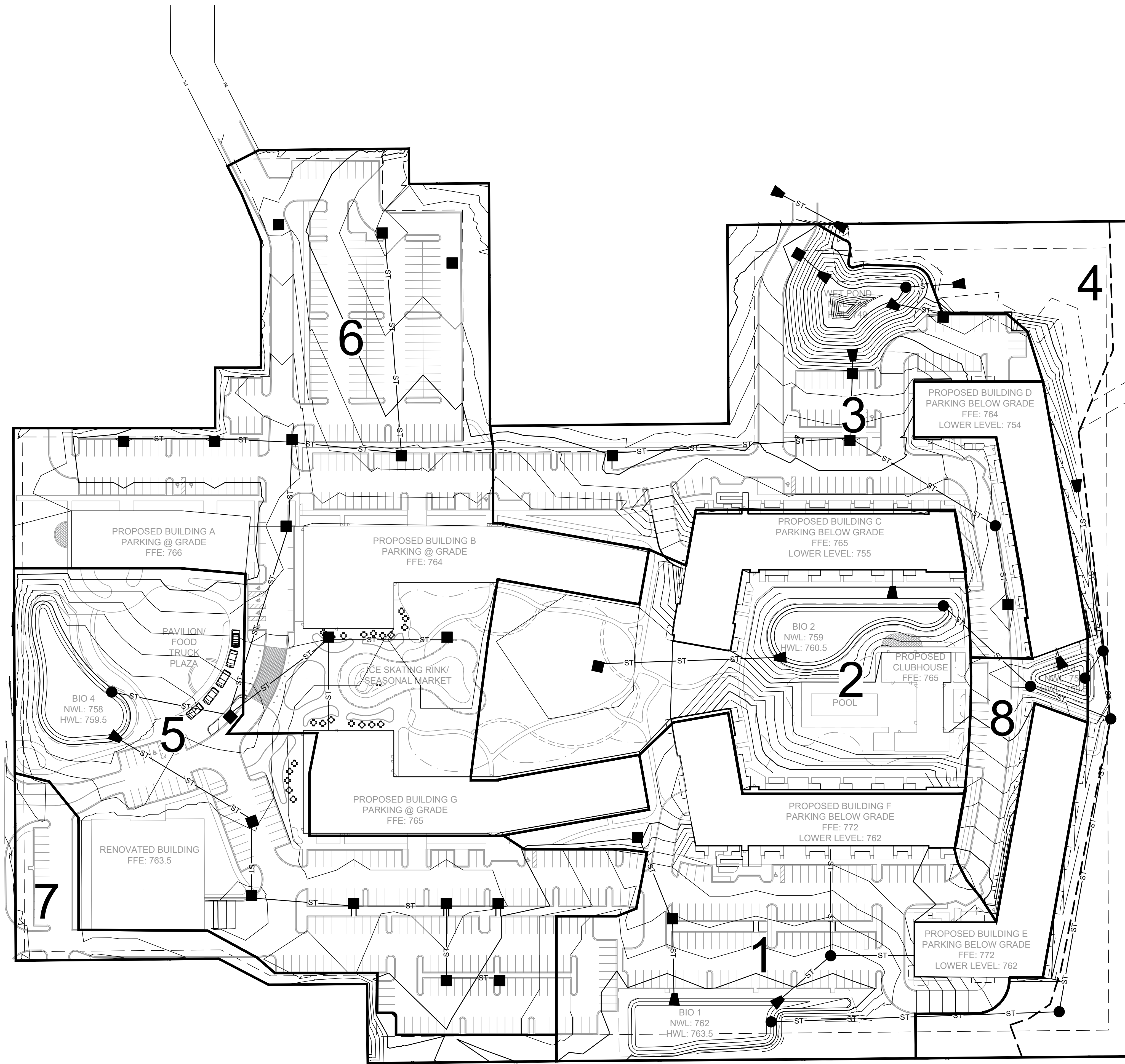


POTHS GENERAL DEVELOPMENT
76TH AND RAWSON
FRANKLIN, WI 53132
EXISTING CONDITIONS

PRELIMINARY
NOT FOR
CONSTRUCTION

SCALE:	1"=60'
PROJECT NO:	21775
DESIGN DATE:	---
PLOT DATE:	9/8/2023
DRAWN BY:	MJK
CHECKED BY:	JL
APPROVED BY:	CTC
SHEET NO:	

SW 1.0



AREA 1 (TO BIO 1)			
Tc = 6.0 min.	SF	ACRE	CN
PROPOSED			
GREENSPACE	49465	1.14	74
PAVEMENT	54393	1.25	98
SIDEWALK	6354	0.15	98
ROOF	48902	1.12	98
TOTAL	159114	3.65	91

AREA 2 (TO BIO 2)			
Tc = 6.0 min.	SF	ACRE	CN
PROPOSED			
GREENSPACE	88847	2.04	74
PAVEMENT	204	0.00	98
SIDEWALK	19141	0.44	98
ROOF	34832	0.80	98
TOTAL	143024	3.28	83

AREA 3 (TO POND)			
Tc = 6.0 min.	SF	ACRE	CN
PROPOSED			
GREENSPACE	55324	1.27	74
PAVEMENT	60620	1.39	98
SIDEWALK	11461	0.26	98
ROOF	811	0.02	98
TOTAL	128216	2.94	88

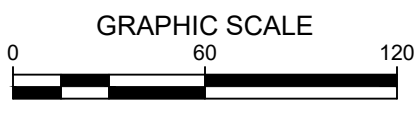
AREA 4 (UNDETAINED TO NORTHEAST)			
Tc = 6.0 min.	SF	ACRE	CN
PROPOSED			
GREENSPACE	104569	2.40	74
PAVEMENT	1	0.00	98
SIDEWALK	678	0.02	98
ROOF	584	0.01	98
TOTAL	105832	2.43	74

AREA 5 (TO BIO 4)			
Tc = 6.0 min.	SF	ACRE	CN
PROPOSED			
GREENSPACE	59419	1.36	74
PAVEMENT	78982	1.81	98
SIDEWALK	23142	0.53	98
ROOF	16941	0.39	98
TOTAL	178484	4.10	90

AREA 6 (TO NORTHWEST)			
Tc = 6.0 min.	SF	ACRE	CN
PROPOSED			
GREENSPACE	66833	1.53	74
PAVEMENT	101556	2.33	98
SIDEWALK	27071	0.62	98
ROOF	70914	1.63	98
TOTAL	266374	6.12	92

AREA 7 (TO SOUTH)			
Tc = 6.0 min.	SF	ACRE	CN
PROPOSED			
GREENSPACE	13927	0.32	74
PAVEMENT	15139	0.35	98
SIDEWALK	854	0.02	98
ROOF	0	0.00	98
TOTAL	29920	0.69	87

AREA 8 (TO BIO 3)			
Tc = 6.0 min.	SF	ACRE	CN
PROPOSED			
GREENSPACE	9303	0.21	74
PAVEMENT	8522	0.20	98
SIDEWALK	3104	0.07	98
ROOF	25542	0.59	98
TOTAL	46471	1.07	93



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SCALE:	1"=60'
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SW 2.0