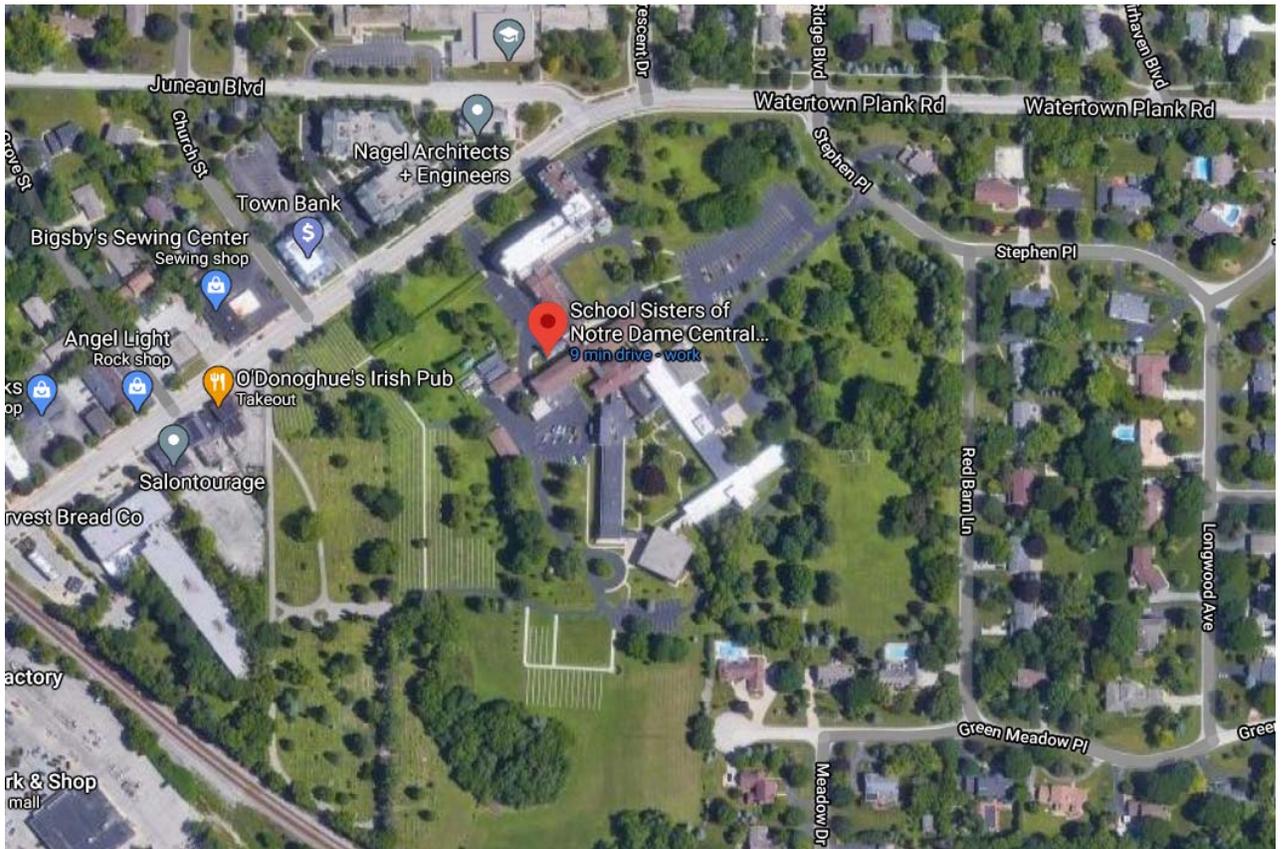


3636 N. 124th Street
Wauwatosa, WI 53222

Conceptual Storm Water Management Report School Sisters of Notre Dame Apartment Development



Submitted To:
Mr. Thomas Harrigan
Village of Elm Grove

CONCEPTUAL STORMWATER MANAGEMENT REPORT

SCHOOL SISTERS OF NOTRE DAME DEVELOPMENT
ELM GROVE, WI

December 21, 2020

PREPARED BY

K. SINGH & ASSOCIATES, INC.
ENGINEERS, SCIENTISTS, AND ENVIRONMENTAL CONSULTANTS
3636 N. 124th STREET, SUITE 100
WAUWATOSA, WI 53222
(262) 821-1171
(262) 821-1174 FACSIMILE
www.ksinghengineering.com

PROJECT #40380



TABLE OF CONTENTS

List of Appendices.....	2
Section I. Introduction.....	3
1.1 Project Overview.....	3
1.2 Code Compliance	3
1.3 Legal Description of the Property and Owner Information	4
1.4 Report Organization	4
1.5 Limitations of Assessment	4
Section II. Project Narrative	5
2.1 Pre-development Conditions	5
2.1.1 Pre-development Watershed Description	5
2.1.2 Topography and Surface Water Drainage	5
2.1.3 Site Geology and Hydrogeology	5
2.1.4 Wetlands & Floodplain	5
2.2 Post-development Conditions	6
2.2.1 Post-development Watershed Description.....	6
2.2.2 Method of Analysis.....	6
2.2.3 Topography and Surface Water Drainage	6
2.2.4 Proposed Drainage Patterns.....	6
2.3 Site Hydrologic and Hydraulic Characteristics.....	7
2.3.1 Proposed Condition Peak Flows & Infiltration	8
2.4 Storm Water Quality Analysis.....	10
2.5 Pipe Capacities.....	11
2.6 Maintenance Agreement & Easements	11
Section III. Certification of Plans, Designs, Computations, and Drawings	12
3.1 Certification of Report.....	12
Section IV. References.....	13

List of Appendices

Appendix A – Project Overview, Site Map & Plat of Survey, NRCS Soil Survey Map, FEMA & DNR Mapping

Appendix B – Existing SWMP-1 and Hydrologic & Hydraulic Output

Appendix C – Proposed SWMP-2 and Hydrologic & Hydraulic Output

Appendix D – WinSLAMM Input & Output

Appendix E – Geotechnical Investigation Report & Proposed Infiltration Test Locations

Section I. Introduction

1.1 Project Overview

K. Singh & Associates, Inc. (KSingh) was retained to provide Civil Engineering design services for the planned School Sisters of Notre Dame development located off Watertown Plank Road in the Village of Elm Grove. The site is currently used by the School Sisters of Notre. Please refer to Appendix A for a project overview, proposed site plan and Plat of Survey.

The development includes razing of eleven structures, remodeling of the Notre Dame and Maria Halls, and construction of three new buildings with below grade parking. The project also includes a central courtyard with amenities surrounded by a roadway loop. The cemetery grounds to the west of the site will remain in place. The land along the east side of the site adjacent to Stephen Place and Red Barn Lane are planned for single family home lots. Land at the south end abutting the railroad right of way is planned as a single family home neighborhood. Connections to Watertown Plank Road and Green Meadow serve as vehicle access points for the site.

This report is being prepared for review during the plan commission process. This is a conceptual storm water report and a final report will be submitted based on review and feedback from the Village of Elm Grove on this initial concept submittal.

1.2 Code Compliance

This project is a new development of a vacant site. Please see below for a summary of the proposed site activities:

- Total area of property(once certified survey map is recorded) = 29.56 acres
- Total area of stormwater analysis = 29.05 acres
- Impervious area before construction = 6.14 acres
- Impervious after construction = 8.95 acres

The following storm water-related permits / requirements are triggered:

- Village of Elm Grove Review
- MMSD Chapter 13 (via Village of Elm Grove)
- WDNR WRAPP (43.76% TSS Reduction Goal)
- DSPS Review of Private Exterior Site Plumbing
- Within 5 miles of Timmerman Airport (dry ponds designed to drain within 24-hours)

The Village Review technical requirements are as follows:

- Peak Discharge
 - MMSD Chapter 13 Requirements
- Total Suspended Solids
 - Pending feedback from Village Consultant on MS4 Permit Requirements for TSS Removal

Please refer to the **attachments** for SWMP-1 to view the existing conditions drainage areas. Please refer to **attachments** for SWMP-2 which includes the proposed conditions drainage areas. Appendix D includes the WinSLAMM results.

1.3 Legal Description of the Property and Owner Information

- A Plat of Survey with legal description by Chaput Land Surveys can be found in Appendix A
- The Owner for this development is SSND Apartments, LLC

1.4 Report Organization

The following information presented in this report details the design assumptions, computations, conclusions, and recommendations for the proposed development. This report is organized into three sections. Section I provides an introduction for the proposed development. Section II provides a narrative of the stormwater management methodology for the development. Section III provides a certification of the site investigation, plans, designs, computations, and drawings.

1.5 Limitations of Assessment

The existing conditions were developed using a Plat of Survey dated May 4, 2020 by Chaput Land Surveys. Please refer to Appendix A for the Plat.

The analysis and report were prepared using data from the Geotechnical Engineering Report dated June 3, 2020 by GZA GeoEnvironmental, Inc. Please refer to Appendix E for the report.

Section II. Project Narrative

2.1 Pre-development Conditions

2.1.1 Pre-development Watershed Description

The existing site is currently a partially developed site used by the School Sisters of Notre Dame for residential purposes. The remainder of the site is comprised of cemetery grounds, wooded/landscaped areas, parking lots, and walking paths. Offsite flows onto the property were considered bringing the total watershed area to 29.05 acres. Please refer to the attached SWMP-1 for more details on the breakdown of the existing drainage areas.

2.1.2 Topography and Surface Water Drainage

The existing surface elevation of the site ranges from 775' in the northeastern portion of the site to 730 on the south end of the property. The overall topography of the site has a relatively significant relief from north to south. Drainage patterns are predominantly north to south and the outlet points are two existing depressed areas on the southwest and southeast corners of the site. These depressed areas are noted in NRCS Soil Survey Maps as "Gravel Pits". It is assumed that these areas were excavated for gravel previously and were never reclaimed or filled back to adjacent grade. Please refer to Appendix A for the NRCS Soil Survey Map, the Plat of Survey and refer to attachments for SWMP-1 showing the existing drainage areas.

In addition to the existing depressed areas on the south portion of the site, there is a gravel infiltration area in the southeast corner of the site that receives a large sheet flow area and a 12-inch CMP from the northern campus area. This gravel area was installed to prevent conveyance of storm water from the SSND site to existing ditches between homes north of Green Meadow Place. This is a key drainage pattern that has been adjusted in the proposed plan. The proposed plan has a berm and a pipe to convey upstream run-off from the northern areas to the dry ponds on the interior of the site.

2.1.3 Site Geology and Hydrogeology

The subsurface soil conditions of the site are described using geologic data gathered from twenty-one soil borings performed at the site. The Geotechnical Engineering Report can be found in Appendix E. Based on the report Type C soils were used when selecting curve numbers. Based on the report, ground water was reported at an elevation of 17-18 feet below ground surface (bgs).

Infiltration tests have been requested and the Geotechnical Engineering Consultant is in the process of scheduling the field tests (double ring infiltrometer testing). Please refer to Appendix E for the planned locations of the infiltration tests.

2.1.4 Wetlands & Floodplain

There are no floodplains present on site indicated by research on FEMA FIRM Panel Mapping. There are no mapped wetlands on site based on the WDNR Surface Water Data Viewer; however, there are wetland indicator soils on-site. Please refer to Appendix A for more information.

2.2 Post-development Conditions

2.2.1 Post-development Watershed Description

The total analysis area for the site is 29.05 acres. Of that, 12.26 acres are impervious leaving 16.79 acres of pervious area. Of the total analysis area, only 1.17 acres are flowing off-site and this is primarily due to the feasibility of match slope conditions to the surrounding land. Please refer to the attached SWMP-2, for a visual representation and breakdown of the proposed site impervious and open space areas.

2.2.2 Method of Analysis

The analysis of the pre and post-developed site was performed utilizing HydroCAD® Storm Water Analysis version 10.00. The analysis uses TR-55 methodology for hydrologic and hydraulic analysis. Please refer to Appendix C for the detailed hydrologic output for sizing the swales & ponds.

2.2.3 Topography and Surface Water Drainage

The onsite overall drainage patterns flow from north to south. Within the courtyard there is underground storage. On the west end of the site there is also underground storage. The underground storage is used to reduce peak flows from the buildings and roadways. The underground storage is also being used for TSS reduction. The dead storage/permanent pool within the underground systems for TSS reduction is accounted for in the HydroCAD Model and is not considered for live storage.

Throughout the site, storm water is conveyed using storm piping and overland flow to swales located on the eastern and western edges of the site. The swales convey the stormwater to the ponds south of the buildings. The ponds outlet to different locations. Please refer to SWMP-2 for the outlet locations. The capacity of the swales exceeds the 100-year inflows. The majority of the pipes will be sized for the 10-year, 24-hour event; however, there are instances where pipes will be sized for the 100-year event. The 100-year pipes are identified on SWMP-2 and are oversized based on restrictions in overland flow paths based on adjacent land constraints.

2.2.4 Proposed Drainage Patterns

The details of where each catchment drains can be found in a table on SWMP-2 for proposed drainage patterns. Below is a summary of the drainage patterns proposed for the development:

- Major Catchment Area Routing
 - Portion of Building Roofs and Interior Courtyard Drain to Underground Storage 1 located in the courtyard
 - Building 1 Roof not captured by Underground Storage 1 is detained by Underground Storage 2
 - Building 2 Roof not captured by Underground Storage 1 is conveyed to the eastern swale
 - Building 3 Roof not captured by Underground Storage 1 is conveyed to Dry Pond 1
 - Eastern Single Family Lots conveyed to eastern swale
 - Existing Cemetery Grounds and Expanded Parking Lot conveyed to Infiltration Basin 1 via Oversized Pipes
 - Future Neighborhood on South end of Site conveyed to Existing Southeast Basin
- BMP Routing
 - Underground Storage 1 outlet is one pipe over the parking garage between Buildings 1 and 3 ultimately to oversized pipe releasing to Green Meadow Place

- Underground Storage 2 outlets to eastern pipe which is conveyed to Infiltration Basin 1
- Infiltration Basin 1 is outletted to a swale along the west and southern boundaries of the site which outlets to Existing Southeast Basin for events larger than the 100-Yr.
- Dry Pond 1 outlets to oversized pipe releasing to Green Meadow Place
- Dry Pond 2 outlets to pipe which discharges to oversized pipe releasing to Green Meadow Place

A summary of existing and proposed discharges to the site outlets is provided in the Table below:

Table 1 – Ultimate Discharge Points Existing vs Proposed Flows at 100-Yr

Site Discharge Point	Existing Flow (cfs)	Proposed Flow (cfs)
Existing Southeast Basin	29.50	22.95
Ditch Green Meadow Place	19.51	13.95
Off-site Untreated	35.58	7.33

Please note an analysis of the existing swale on the south side of Green Meadow Place was performed using field measurement data and LiDAR data. The ditch has a capacity of 23.31 cfs. The ditch was analyzed from the cul de sac to the nearest drive where the ditch turns south. The water surface elevations at the 1, 10, and 100 year event are contained in the swale in the proposed conditions. This analysis takes into account off-site flows to the ditch in addition to the flows from the site in both existing and proposed conditions. The ditch calculations can be referenced in Appendix B for Existing Conditions and Appendix C for Proposed conditions.

2.3 Site Hydrologic and Hydraulic Characteristics

Hydrologic and hydraulic analyses were required to determine peak storm water runoff rates from the site for existing and proposed post-developed conditions.

The following tables summarize the results of the analysis:

**Table 2 – Storm Event Rainfall
Depths**

Storm Event (year)	Rainfall (inches) *
1	2.40
2	2.70
10	3.81
100	6.18

*Rainfall data is based on NRCS runoff modeling methodology volume 8 of Atlas 14, published by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, 2013 per City of Oconomowoc Standards.

Table 3 – Existing Drainage Areas

Sub-Basin	Drainage Area (acres)
Existing Detained Onsite	20.45
Existing Offsite	12.43
Total Existing Areas	32.88

* TR-55 used for methodology.

** Refer to HydroCAD® Model SWMP 1, Appendix B for details.

***Existing detained on site in two depressed areas in SW and SE corners of site

Table 4 – Proposed Drainage Areas

Sub-Basin	Drainage Area (acres)
Proposed Infiltration Onsite	14.52
Proposed Offsite	18.36
Total Proposed Areas	32.88

* TR-55 used for methodology.

** Refer to HydroCAD® Model SWMP-2, Appendix C for details.

***See section 2.2.1 for a breakdown of this number

****Proposed Offsite includes both treated and untreated areas

Table 5 – Overall Site Existing vs. Proposed Peak Flows*

Storm Event (Year)	Existing (cfs)**	Proposed – With Detention (cfs)***
1	17.17	1.40
2	22.17	1.93
10	39.77	4.25
100	80.70	14.69

*includes all sub-basins in Table 3

**Peak flows shown take into account infiltration prior to flowing offsite. Shown are to total quantities of water flowing offsite after infiltration (cfs-cubic feet per second).

***Peak flows shown are from un-detained areas flowing offsite and detained areas releasing at Green Meadow Rd. Detained areas going to infiltration basins are fully infiltrated at the 100-year storm event.

The unit release rate method is being utilized for the site and a breakdown of that is below:

Table 6 – Unit Release Rate Results

Storm Event (Year)	Required Release Rate (cfs)	Proposed – Release Rates (cfs)
2	1.93	4.44
100	14.78	14.69

*Unit release rate requirement determined by multiplying total site area by MMSD requirements (0.15 cfs/acre for 2 year, and 0.5 cfs/acre)

2.3.1 Proposed Condition Peak Flows & Infiltration

The proposed land slopes for the site will be 0.5% to 33%. The sizing of the ponds, two swales and infiltration basin were modeled using direct routing in HydroCAD. Reach modeling requires sizing for the 100-year storm event in order to allow all inflow to pass through each reach. Please note for infiltration, a rate of 8 inches/hour was used based on review of the boring logs, consultation with the Geotechnical Engineer, and review of the infiltration table

in NR 151. Currently, the Geotechnical Engineer is scheduling field visits to perform double-ring infiltrometer testing in several locations on the site. The locations of the tests can be referenced in Appendix E. The locations are in the dry ponds, the infiltration basin, and the existing low area in the southeast portion of the site.

Please refer to Appendix B for existing hydrologic inputs and output and Appendix C for the proposed hydrologic inputs and output. Tables 7-14 summarize the pond, infiltration basin and swale storage data:

Table 7 – Underground Storage 1

Storm Event	Discharge Rate (cfs)	Water Surface Elevation	BMP Top Elev.
1	0.25	753.32	755
2	0.40	753.43	
10	1.60	753.90	
100	7.86	754.86	

*Concrete flume to Dry Basin 1 activates after the 100-yr storm over the parking structure at 756.50.

Table 8 – Underground Storage 2

Storm Event	Discharge Rate (cfs)	Water Surface Elevation	BMP Top Elev.
1	0.41	749.10	753
2	0.46	749.39	
10	0.98	750.39	
100	2.31	752.55	

*Weir to the infiltration basin activates after the 100-yr storm via oversized pipes and swale.

Table 9 – Dry Pond 1

Storm Event	Outflow (cfs)	Water Surface Elevation	BMP Top Elev.
1	0.72	751.83	755
2	0.84	752.05	
10	1.22	752.91	
100	3.21	754.62	

*Weir to the infiltration basin activates after the 100-yr storm.

Table 10 – Dry Pond 2

Storm Event	Outflow (cfs)	Water Surface Elevation	BMP Top Elev.
1	0.37	751.40	753
2	0.48	751.51	
10	0.81	751.99	
100	4.60	752.80	

*Weir to the infiltration basin activates after the 100-yr storm.

Table 11 – East Swale

Storm Event	Outflow (cfs)	Average Flow Depth (ft)	Total Swale Depth
1	6.65	0.43	1-ft
2	8.36	0.50	
10	15.13	0.69	
100	30.52	1.00	

Table 12 – West Swale

Storm Event	Outflow (cfs)	Average Flow Depth (ft)	Total Swale Depth
1	0.91	0.39	1-ft
2	1.22	0.44	
10	2.54	0.58	
100	5.64	0.79	

Table 13 – Infiltration Basin 1

Storm Event	Infiltration (cfs)	Water Surface Elevation	BMP Top Elev.
1	2.34	738.42	745
2	0.81	739.04	
10	1.28	741.14	
100	2.34	744.72	

*Detained areas going to infiltration basins are fully infiltrated at the 100-year storm event.

Table 14 – Existing Southeast Basin

Storm Event	Infiltration (cfs)	Water Surface Elevation	BMP Top Elev.
1	1.50	730.92	740
2	1.72	731.14	
10	2.47	731.90	
100	3.95	733.26	

*Detained areas going to infiltration basins are fully infiltrated at the 100-year storm event.

2.4 Storm Water Quality Analysis

The existing site has a swale on the east side of the site, infiltration areas on the east side of the site, and storm sewer piping. There is also a cistern on site. On the south end of the site are two depressed areas that were formerly excavated gravel pits that were not reclaimed/filled to adjacent grades. These two low areas capture water from adjacent areas. Storm water quality was analyzed using WinSLAMM. For the proposed condition, total suspended solids were reduced 54% utilizing a combination of BMPs including underground storage, oversized manholes, and filters. Please refer to Appendix D for the WinSLAMM results.

Based on coordination with WDNR, the goal for this project is 43.76%. Please note the design team is aware that the Village in the process of adopting a new ordinance that may require the TSS removal to increase to 60%. It is anticipated that final resolution on the Village's requirement will be determined in January 2021 at which point the design team will be prepared to update the design, models, and plans accordingly.

Please note the design team coordinated with two vendors of underground storage systems and is the process of system selection. The storm water quality analysis will have to be updated once a final system is selected. For the purposes of this analysis one system was selected for this report. The system details can be found in Appendix D.

The storm water quality analysis will need to be revisited and updated based on feedback from the Village on its new ordinance and also based on final system selection.

2.5 Pipe Capacities

Pipe capacities were modeled using reaches as storm pipes during a 100-year storm event. The full storm system has not been laid out at this stage of the design. The non-100-year pipes will be sized for the 10-year, 24-hour event. The 100-year pipes are in place since they are part of the 100-year flow paths to BMPs. Please see Appendix F for the storm sewer pipe sizing HydroCAD® output. The 100-year storm pipes are shown on SWMP-2.

Table 15 – Pipe Sizing Table for 100-Yr Sized Pipes

Pipe Name	Pipe Size (in)	Slope (%)	Capacity (cfs)	100-Yr Flow (cfs)
P1	18	0.50	8.78	7.86
P2	12	0.75	3.65	2.31
P3	18	0.50	8.78	3.21
P4	12	1.50	5.16	4.60
Pipe to Green Meadow	48	0	14.18*	13.71
Dual 48" Pipes	48	0	40.77*	22.95

*Pipe names can be found in Appendix C in the SWMP 2 Exhibit.

*Analyzed with 0.1% slope for capacity calculation

2.6 Maintenance Agreement & Easements

A Maintenance Agreement will be developed for this project as the design progresses. Prior to developing it, feedback on the conceptual storm water management report is needed since feedback could impact BMP selection and sizing which would impact the associated maintenance requirements. Easements for stormwater will be displayed on the final CSM. The current CSM contains key easement information related to stormwater.

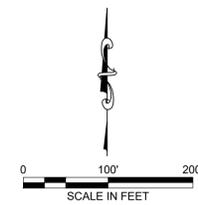
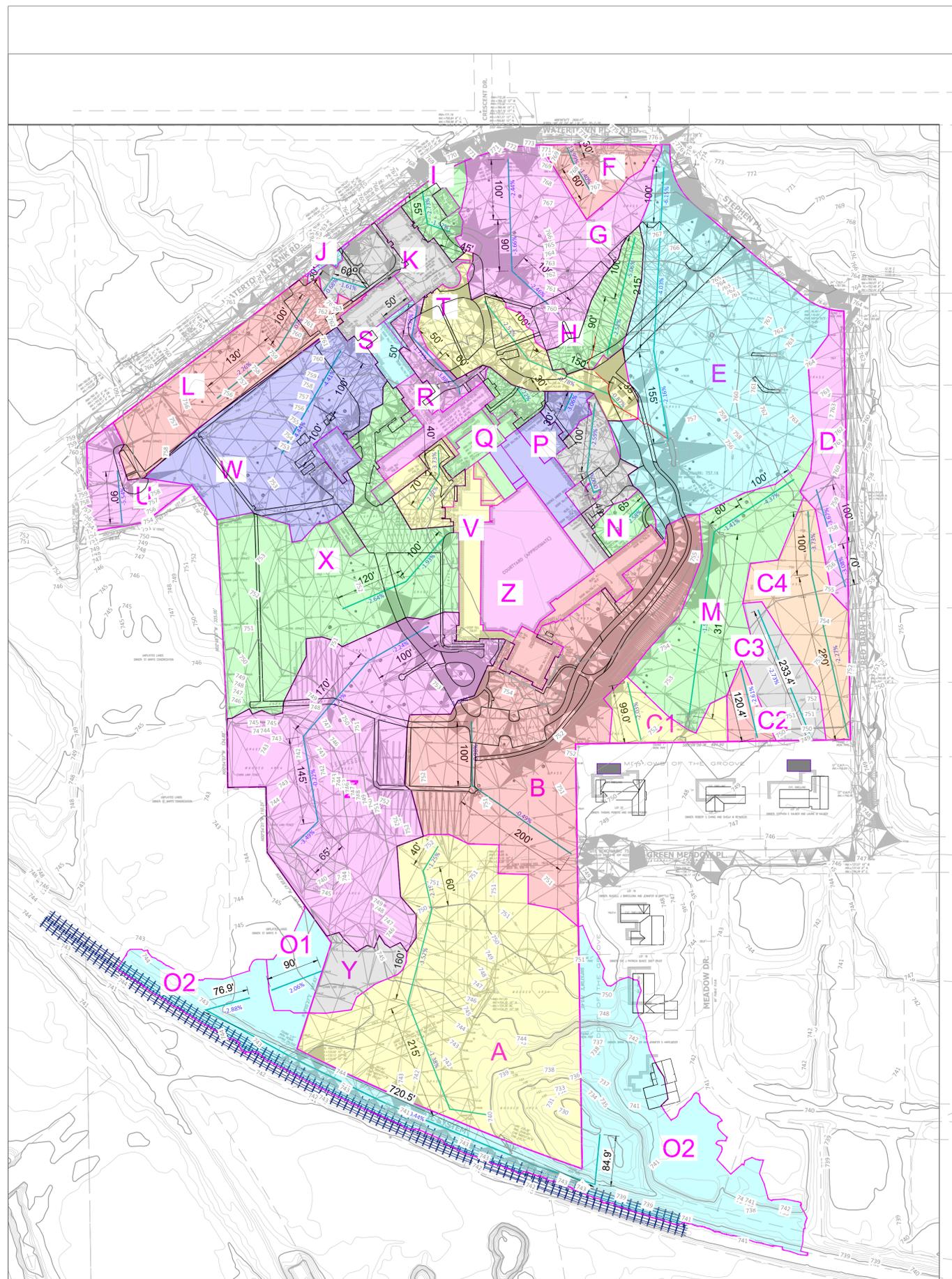
Section III. Certification of Plans, Designs, Computations, and Drawings

3.1 Certification of Report

All plans, designs, computations, and drawings are certified by a Wisconsin-licensed professional engineer prepared in accordance with accepted engineering practice and requirements of the ordinance.

Section IV. References

1. Web Page: <http://hdsc.nws.noaa.gov/hdsc/pfds/> Location of "Precipitation Frequency Data Server"



LEGEND

- CATCHMENT AREA BOUNDARY
- TC PATH
- 1.00% SLOPE OF TC PATH SEGMENT
- EXISTING GRADING CONTOUR

NOTE: TC PATH EXHIBITS SHEET FLOW FIRST APPROX. 100', THEN SHALLOW CONCENTRATED FLOW (FLOW DEPTH 0.1' - 0.5')

EXISTING DRAINAGE AREAS								
DRAINAGE AREA	AREA PERVIOUS (SF)	AREA IMPERVIOUS (SF)	AREA ROOF (SF)	AREA TOTAL (SF)	AREA TOTAL (ACRES)	CN (WEIGHTED)	T _c (MIN)	DRAINAGE DIRECTION
A	156,438	-	-	156,438	3.59	74	15.6	SOUTHWEST INFILTRATION BASIN GREEN MEADOW PL CUL DE SAC
B	104,065	22,056	15,016	141,137	3.24	80	9.6	
C1	12,661	-	-	12,661	0.29	74	11.4	SWALE BETWEEN LOTS 21 & 22
C2	6,618	-	-	6,618	0.15	74	10.4	SWALE BETWEEN LOTS 20 & 21
C3	18,962	-	-	18,962	0.44	74	11.8	SWALE ON LOT 20
C4	33,221	-	-	33,221	0.76	74	13.6	SWALE ALONG RED BARN LN.
D	24,345	-	-	24,345	0.56	74	10.2	RED BARN LANE
E	117,151	21,607	-	138,758	3.19	78	10.6	DEPRESSION IN TREELINE (SOUTH OF EAST PARKING LOT)
F	13,305	-	-	13,305	0.31	74	7.4	DEPRESSION IN TREELINE (NORTH OF EAST PARKING LOT)
G	56,727	10,244	-	66,971	1.54	78	12.7	MIDDLE OF PARKING LOT
H	1,084	15,063	-	16,147	0.37	96	6.0	SOUTH OF PARKING LOT
I	4,275	5,059	1,148	10,482	0.24	88	6.0	LOWSPOT TO NORTHEAST OF BUILDING
J	798	40	-	838	0.02	75	6.0	WATERTOWN PLANK ROAD BRICK PATH NORTH OF BUILDING
K	9,600	1,816	17,190	28,606	0.66	90	9.8	
L	36,454	7,269	-	43,723	1.00	78	11.4	DEPRESSION NORTHWEST OF BUILDING
M	53,002	-	-	53,002	1.22	74	15.2	GRAVEL PIT
N	6,111	505	-	6,616	0.15	76	6.4	INLET EAST OF BUILDING
O	9,468	4,653	4,584	18,705	0.43	86	10.4	INLET EAST OF BUILDING
P	3,636	878	13,877	18,391	0.42	93	6.0	INLET EAST OF BUILDING
Q	6,396	1,162	7,365	14,923	0.34	88	6.0	INLET EAST OF BUILDING
R	4,279	5,420	11,025	20,724	0.48	93	10.5	INLET EAST OF BUILDING
S	-	808	4,491	5,299	0.12	88	6.0	INLET EAST OF BUILDING
T	21,454	14,191	-	35,645	0.82	84	11.4	DEPRESSION EAST OF INLETS
U	14,032	1,519	-	15,551	0.36	76	7.0	WATERTOWN PLANK ROAD/ O'DONOHUE'S
V	2,290	7,676	16,533	26,499	0.61	96	6.0	INLET WEST OF BUILDING
W	54,767	17,055	3,625	75,447	1.73	81	9.3	DEPRESSION WEST OF BUILDING
X	79,699	21,341	3,130	104,170	2.39	80	13.0	DEPRESSION WEST OF BUILDING
Y	12,489	-	-	12,489	0.29	74	6.0	LOW SPOT SOUTH OF TREE LINE
Z	157,056	11,071	-	168,127	3.86	76	15.8	SOUTHWEST INFILTRATION BASIN
O1*	11,697	-	-	11,697	0.27	74	6.0	SOUTHWEST INFILTRATION BASIN
O2*	129,638	-	3,040	132,678	3.05	75	12.2	SOUTHEAST INFILTRATION BASIN
TOTAL (SITE)	1,020,383	169,433	97,984	1,287,800	29.564			

NOTE: *DENOTES OFFSITE FLOW COMING ONSITE

PROJECT TITLE: SCHOOL SISTERS OF NOTRE DAME DEVELOPMENT
PRELIMINARY DESIGN, NOT FOR CONSTRUCTION

CLIENT: MANDEL GROUP, INC.

PROJECT LOCATION: 13105 WATERTOWN PLANK RD.
ELM GROVE, WI 53122

REVISIONS	DATE	DESCRIPTION

DRAWN BY JLA	DATE 12/14/2020
CHECKED BY APS	DATE 12/14/2020

SITE TITLE
STORM WATER MANAGEMENT PLAN
EXISTING CONDITIONS

SWMP - 1

SUB CATCHMENT	BMP	TOTAL AREA (SF)	TOTAL AREA (AC)	WALKS (SF)	WALKS (AC)	PARKING/ROADS (SF)	PARKING/ROADS (AC)	ROOFS (SF)	ROOFS (AC)	LANDSCAPE (SF)	LANDSCAPE (AC)	OUTLET
A	UG#1	236,575	5.431	42,739	0.981	43,419	0.997	31,880	0.732	118,537	2.721	CUL-DE-SAC ON GREEN MEADOW PL
B	UG#2	115,772	2.658	7,286	0.167	-	-	46,533	1.068	61,953	1.422	INFILTRATION POND #1
C	DRY POND #1	319,575	7.336	16,344	0.375	11,423	0.262	80,470	1.847	211,338	4.852	SOUTH DEPRESSED GRAVEL PIT
D	DRY POND #2	71,468	1.641	4,225	0.097	3,636	0.083	5,124	0.118	58,483	1.343	CUL-DE-SAC ON GREEN MEADOW PL
E1	INFILTRATION BASIN #1	48,251	1.108	3,813	0.088	-	-	-	-	44,438	1.020	OVERSIZED PIPE TO INFILTRATION BASIN 1
E2	INFILTRATION BASIN #1	34,604	0.794	600	0.014	7,571	0.174	7,668	0.176	18,765	0.431	OVERSIZED PIPE TO INFILTRATION BASIN 1
E3	INFILTRATION BASIN #1	37,892	0.870	2,700	0.062	-	-	-	-	35,192	0.808	OVERSIZED PIPE TO INFILTRATION BASIN 1
E4	INFILTRATION BASIN #1	58,681	1.347	2,541	0.058	-	-	-	-	56,140	1.289	SHEET FLOW TO SOUTHEAST BASIN
F1	EXISTING SOUTHEAST BASIN	122,015	2.801	7,479	0.172	25,116	0.577	15,963	0.366	73,457	1.686	OVERFLOWS TO SWALE NORTH OF RAILROAD
F2	EXISTING SOUTHEAST BASIN	52,518	1.206	-	-	-	-	-	-	52,518	1.206	OVERFLOWS TO SWALE NORTH OF RAILROAD
G	INFILTRATION BASIN #1	18,263	0.419	1,000	0.023	6,880	0.158	-	-	10,383	0.238	OVERSIZED PIPE TO INFILTRATION BASIN 1
H	DRY POND #2	64,655	1.484	-	-	4,492	0.103	7,898	0.181	52,265	1.200	CUL-DE-SAC ON GREEN MEADOW PL
I*	DRY POND #1	34,180	0.785	1,698	0.039	-	-	-	-	32,482	0.746	SOUTH DEPRESSED GRAVEL PIT
J*	UNTREATED	22,296	0.512	990	0.023	1,420	0.033	-	-	19,886	0.457	WESTERN PROPERTY
GOING OFFSITE UNTREATED	UNTREATED	51,055	1.172	-	-	1,140	0.026	-	-	49,915	1.146	RED BARN LANE/SOUTH PROPERTY SWALES
O1**	INFILTRATION BASIN #1	11,697	0.269	-	-	-	-	-	-	11,697	0.269	SWALE INTO EXISTING SOUTHEAST BASIN
O2**	EXISTING SOUTHEAST BASIN	132,678	3.046	-	-	-	-	3,040	0.070	129,638	2.976	OVERFLOWS TO SWALE NORTH OF RAILROAD
TOTAL SITE DISTURBED		1,287,800	28.267	88,727	2.037	103,677	2.380	195,536	4.489	843,384	19.361	

TOTAL PROPERTY INCLUDING UNDISTURBED AREAS = 1,287,800
 * WITHIN PROPERTY BOUNDARY BUT UNDISTURBED (NOT CONSIDERED SITE AREA)
 ** OFFSITE COMING ONSITE
 *** CONSERVATIVE Tc OF 6 MINUTES WERE USED FOR ALL AREAS ON THE PROPERTY
 **** CN VALUES OF 98 WERE USED FOR ALL IMPERVIOUS AREAS AND CN OF 74 WAS USED FOR LANDSCAPED AREA

CURB CUTS AND
 SIDEWALK GRATES WILL
 CONVEY STREET
 DRAINAGE TO AREA
 INLETS

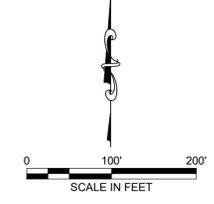
SWALE
 (SHARED DRAINAGE
 EASEMENT MAY BE
 REQUIRED)

STORM SEWER
 @ APPROX. IE OF 752.5
 TO ALLOW FOR 7' DRIVE
 CLEARANCE

SWALE OR SHEET FLOW ENTERS INLET
 AND ROUTES INTO STRUCTURE AND FLAT
 OVERSIZED PIPE TO INFILTRATION BASIN
 WITH RESTRICTING ORIFICES

250 LF-48" DIAMETER OVERSIZED STORM
 PIPE AT IE=745.25 @ 0.00% WITH OUTLET
 CONTROL STRUCTURE W/ RESTRICTOR
 PLATE FOR DETENTION

DUO 48" OVERSIZED STORM PIPES AT 0%
 SLOPE WITH OUTLET CONTROL
 STRUCTURE W/ RESTRICTOR PLATE FOR
 DETENTION



- LEGEND
- CATCHMENT AREA BOUNDARY
 - EXISTING GRADING CONTOUR
 - APPROXIMATE GRAVEL PIT LOCATIONS PER NRCS WEB SOIL SURVEY
 - WALKS
 - ROADS
 - ROOFS
 - PONDS
 - AREA LEAVING SITE UNTREATED
 - UNDERGROUND DETENTION FOOTPRINT
 - EXISTING TREES TO BE PROTECTED
 - LANDSCAPING
 - SWALE
 - STORM SEWER
 - STORM MANHOLE

PROJECT TITLE: SCHOOL SISTERS OF NOTRE DAME DEVELOPMENT
 PRELIMINARY DESIGN, NOT FOR CONSTRUCTION
 CLIENT: MANDEL GROUP, INC.
 PROJECT LOCATION: 13105 WATERTOWN PLANK RD.
 ELM GROVE, WI 53122

REVISIONS	DATE	DESCRIPTION

DRAWN BY: JLA DATE: 12/14/2020
 CHECKED BY: APS DATE: 12/14/2020
 SITE TITLE: STORM WATER MANAGEMENT PLAN
 PROPOSED CONDITIONS

SWMP - 2

Please use the link at the bottom of this page to download the following appendices. Please note this was done to conserve paper.

Appendix A Project Overview, Site Map & Plat of Survey, NRCS Soil Survey Map, FEMA & DNR Mapping

Appendix B Existing SWMP-1 and Hydrologic & Hydraulic Output

Appendix C Proposed SWMP-2 and Hydrologic & Hydraulic Output

Appendix D WinSLAMM Input & Output

Appendix E Geotechnical Investigation Report & Proposed Infiltration Test Locations

Digital Model Files (HydroCAD, WinSLAMM, Grading CAD File) can also be found at this link.

<https://ksinghassociatesinc.box.com/s/mmpdtqiu4rf1p099e4f8d4uyu9polagl>