



City of Fitchburg
 Planning/Zoning Department
 5520 Lacy Road
 Fitchburg, WI 53711
 (608-270-4200)

ARCHITECTURAL & DESIGN REVIEW APPLICATION

Applicant/Contact Person: Dan Leeder

Address: 2835 Commerce Park Dr **Phone Number of Contact Person:** 262-374-1018

City, State, Zip Code: Fitchburg, WI 53719 **Email of Contact Person:** dan@nobleknight.com

Project Address: 2835 Commerce Park Dr **Lot:** 2 **Subdivision:** CSM #8736

Project Type: Multi-Family Commercial Industrial Other
 New Addition

Impervious Surface Ratio (ISR): 67.2% (City Standard: maximum 65% ISR)

All items listed below must be included with the application to be considered complete. If an item is not included with the application, the applicant must provide in writing the basis for not including it. Building and site plans submitted to the Fitchburg Plan Commission for architectural and design review shall contain the following information:

Site Data:

- 1. Lot or property dimensions.
- 2. Orientation (to north).
- 3. Adjacent highways, roads, drive, etc.
- 4. Existing natural features (rivers, ponds, wetlands).
- 5. Existing buildings and/or improvements.
- 6. Existing and proposed site drainage.
- 7. Utility plans, including main/lateral sizes and existing fire hydrants on site or within 300 feet of the site
- 8. ISR shall be indicated on all plans.
- 9. Stormwater management plans and details, including grading plan.
- 10. Lighting plan in footcandles and light fixture cut sheets.

Building:

- 1. Building size, configuration and orientation.
- 2. Distance from lot lines.
- 3. Distance from other buildings, improvements and natural features.
- 4. Location of well, septic tank, drainfield, etc. (if applicable)
- 5. Additional proposed additions or new structures, including trash/recycling enclosure(s).
- 6. Construction type (wood frame, structural steel, etc.).
- 7. Foundation type (full basement, slab on grade, etc.).
- 8. Number of levels.
- 9. Siding/exterior covering type, color, texture, etc.
- 10. Roof type (gable, hip, shed, flat, etc.) and pitch.
- 11. Roofing material type, color, texture, etc.
- 12. Exterior door and window location, size, type, etc.
- 13. Fire protection sprinklers or fire alarm systems.

Ingress, Egress, Parking:

- 1. Location of highway and road access points.
- 2. Location, size, configuration of drivers and walks.
- 3. Number, size, location of parking spaces.
- 4. Location of handicapped parking and accessible building entrances.
- 5. Bicycle rack(s).

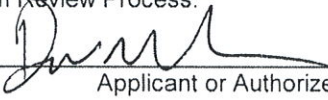
Landscaping:

- 1. Location, species, size of existing trees, shrubs, and plantings.
- 2. Location, species, size of proposed plantings.
- 3. Location and size of all paved, seeded/sodded and gravelled areas.
- 4. Location of all retaining walls, fences, berms and other landscape features.

***It is highly recommended that an applicant hold at least one neighborhood meeting prior to submitting an ADR application to identify any concerns or issues of surrounding residents.**

The preceding information is considered to be the minimum information for submission, and the City may require additional information for its review. Any interpretations provided by city officials as the result of submitting the attached information are based on the submitted plans, and any plan changes, may affect the interpretations.

It is the responsibility of the owner/applicant to insure compliance with all local and state requirements. The below signed applicant acknowledges the above information and hereby submits the attached information for the City's Architectural and Design Review Process.

Signed:  Date: 7/12/21
Applicant or Authorized Agent

*** Application shall be accompanied by one (1) sets of full-size plans, two (2) sets no larger than 11"x17", and one (1) pdf document of the complete submittal to planning@fitchburgwi.gov. Applications are due at least 4 weeks prior to the desired Plan Commission Meeting. The time frame assumes a complete set of plans is provided, and if it is not provided the Plan Commission date will be adjusted.

FOR CITY USE ONLY

Date Received: _____ Plan Commission Date: _____

Comments:

PROJECT NARRATIVE

The Owner of Noble Knight Games is looking to expand their parking lot area to accommodate employee parking concerns. The new parking lot will take the place of the future 12,000 square foot building that was originally planned. The new parking lot will add an additional 45 parking stalls. This parking lot expansion, along with a future 17,000 square foot building addition will put the Impervious Surface Ratio (ISR) at 67.2%. The parking lot expansion area will drain to an existing bioretention basin. This basin was designed to include the future development of the 17,000 square foot addition and 12,000 square foot secondary building. All stormwater requirements will still be met with the additional impervious area of this project.

The addition of new parking puts the total number of parking stalls at 109. This number of stalls requires a total of 5 handicap stalls, with one being van accessible. The existing parking stalls contain 3 handicap stalls with 2 of them being van accessible. The parking expansion will require 2 new handicap stalls which are shown in the expansion area on the site plan.

The existing ISR for the project site as it exists today is 48.5%. With the addition of the parking lot expansion, the ISR increases to 56.9%. However, when the 17,000 square foot building addition is completed, the ISR will be at 67.2% which is over the allowable 65%. The Owner is looking for approval of an increased ISR at this time, prior to beginning design and construction of the building addition.

STOMRWATER RUNOFF INFORMATION

The parking lot expansion along with increases in impervious area during the construction of the existing building and parking lot increases the total impervious area for the fully developed site by about 3,584 square feet. All of this increased impervious area will drain to the North bioretention basin which is located directly north of the parking lot expansion. This basin was designed to meet the stormwater requirements for a majority of the site based on full development. With this additional impervious area the basin and the total site will still meet the requirements for storm water runoff rate, suspended solids removal, and infiltration.

A summary of runoffs are as follows:

Peak Discharge (cfs)				
	1 year	2 year	10 year	100 year
Undeveloped Site	2.41	3.78	9.11	17.76
Fully Developed Site	1.92	3.00	4.93	11.73

The table above shows that peak discharge does not increase once the site is fully developed for the 1, 2, 10, and 100 year storm events. HydroCAD modeling was used for modeling runoff. WinSLAMM was used to estimate TSS removal. Modeling shows a 99% reduction in TSS for the North basin. Total TSS reduction for the site is 98%, which exceeds the

80% requirement. RECARGA was used to estimate infiltration for the site. The site will infiltrate about 92.7% of the pre-development infiltration. This exceeds the 90% requirement.

Computer generated worksheets are attached.

CONSTRUCTION SITE EROSION CONTROL

The purpose of the erosion control plan is to provide a study which complies with the local requirements, and makes recommendations regarding erosion control. This plan will help minimize the impact of development, as well as protecting the local environment by applying best management practices for erosion control.

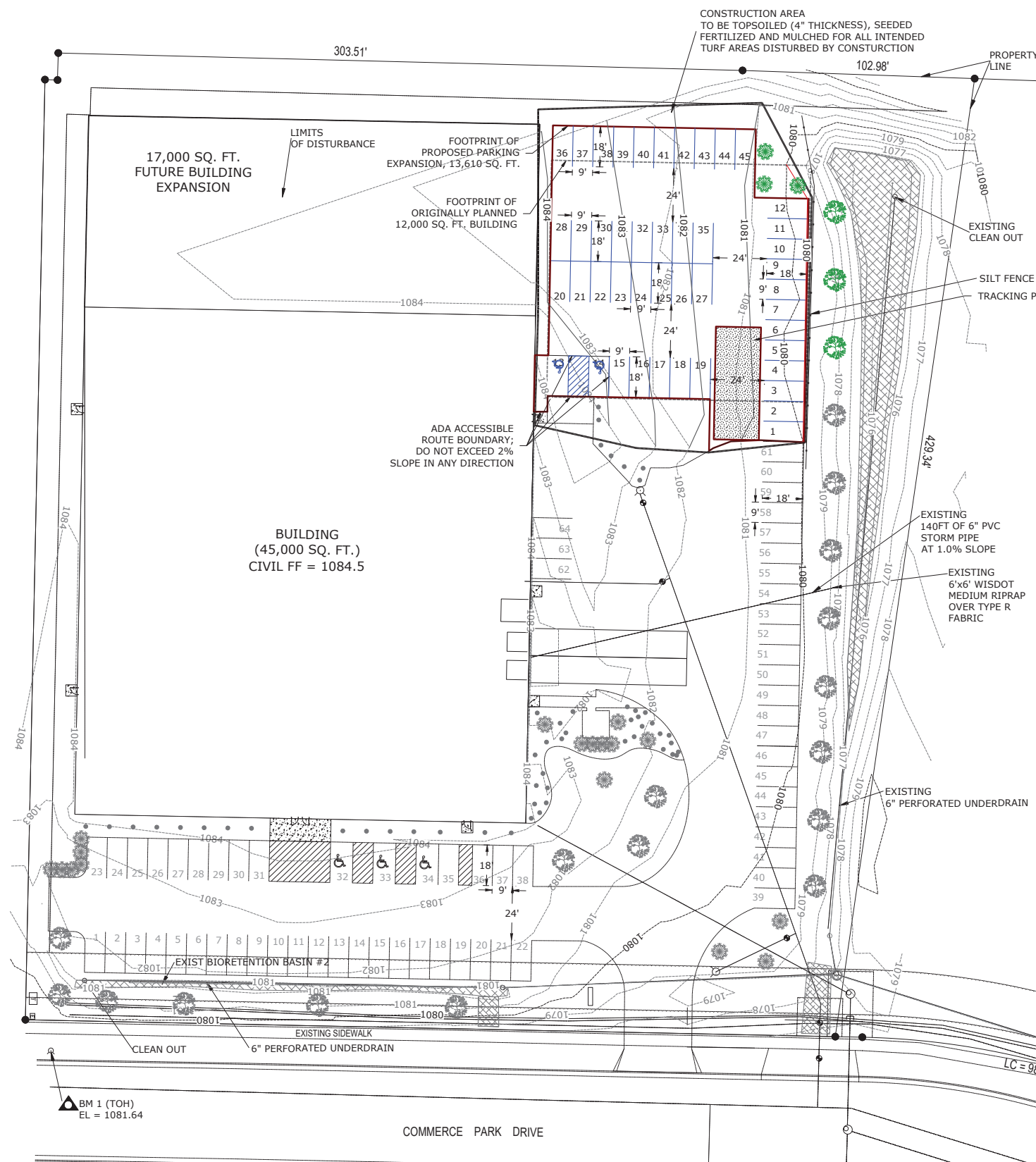
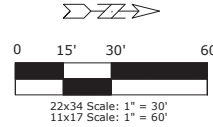
Construction of the parking lot expansion will begin in the late summer of 2021. All disturbed areas are expected to be stabilized by spring, 2022. See following schedule:

Site Excavation	- Commence September 1, 2021
Topsoil, Seed and Mulch Disturbed Areas	- Completed October 1, 2021
Site Stabilized,	- Completed June 1, 2022

The USLE worksheet was used to determine that soil loss per acre will be about 0.7 tons per acre, which is below the allowable 5 tons per acre. The erosion control plan for this site include the following practices as shown on the final site grading plan: stone tracking pad, silt fence, and bioretention basin.

LEGEND

- IRON BAR
- TP# SOIL BORINGS
- EXISTING ELECTRIC PEDESTAL
- EXISTING UTILITY POLE AND LINES
- EXISTING STORM INLET
- EXISTING MANHOLE
- EXISTING WATER VALVE
- EXISTING CURB AND GUTTER
- EXISTING FIRE HYDRANT
- EASEMENT
- BUILDING SETBACK
- PROPOSED FIRE HYDRANT
- PROPOSED STORM SEWER
- PROPOSED WATER SERVICE
- PROPOSED SANITARY
- EXISTING STORM SEWER & SIZE
- EXISTING GAS
- EXISTING FIBER OPTICS
- EXISTING TELEPHONE
- EXISTING WATER MAIN & SIZE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- PROPOSED SILT FENCE
- PROPERTY LINES

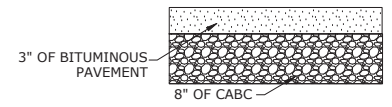


EROSION CONTROL NOTES:

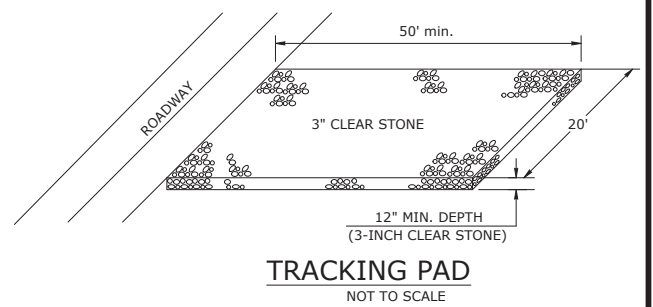
- CONTRACTOR SHALL HAVE ALL EROSION CONTROL MEASURES IN PLACE AND APPROVED BY THE ENGINEER PRIOR TO COMMENCEMENT OF EXCAVATION AND ACTIVITIES.
- EROSION CONTROL MEASURES SHALL COMPLY WITH WISCONSIN ADMINISTRATIVE CODE, COMM CHAPTER 21, UNIFORM DWELLING CODE, AND CHAPTER 65 COMMERCIAL CONSTRUCTION.
- ALL SILT FENCES SHALL BE INSPECTED DAILY. CLEANING, ADJUSTING AND REPLACING EROSION CONTROL MEASURES SHALL BE DONE AS NECESSARY THROUGHOUT CONSTRUCTION. ALL EROSION CONTROL MEASURES SHALL BE IN WORKING CONDITION AT THE END OF EACH WORK DAY.
- EROSION CONTROL MEASURES SHALL BE INSTALLED PER THE DETAILS IN LOCATIONS DESIGNATED ON THE PLANS, OR AS MAY OTHERWISE BE DIRECTED BY THE ENGINEER.
- SEDIMENT FROM OVERLAND FLOW SHALL BE PREVENTED FROM LEAVING THE WORK SITE BY INSTALLING SILT FENCING PARALLEL TO THE CONTOURS LOCATED DOWNHILL OF THE WORK SITE.
- EXISTING VEGETATION SHALL BE REMOVED ONLY TO THE EXTENT NECESSARY TO PERFORM CONSTRUCTION ACTIVITIES. CLEARING OF AREAS THAT ARE CLEARLY OUTSIDE THE LIMITS OF CONSTRUCTION SHALL NOT BE PERMITTED.
- MAINTAIN ALL EROSION CONTROL MEASURES UNTIL ALL DISTURBANCE IS COMPLETED. DO NOT REMOVE EROSION CONTROL MEASURES UNTIL AT LEAST 70% OF THE AREA SERVED HAS ESTABLISHED A UNIFORM, VIGOROUS VEGETATED COVER.
- STONE MATS SHALL BE INSTALLED AT ALL CONSTRUCTION SITE EXITS TO PREVENT TRACKING OF SOIL ONTO PUBLIC ROADWAYS. ANY TRACKED SOIL SHALL BE REMOVED BY MECHANICAL STREET CLEANING AT THE END OF EACH DAY. ADD NEW STONE TO THE TOP IF OLD STONE BECOMES DIRT COVERED.
- ALL DISTURBED AREAS SHALL BE RESTORED AND VEGETATED AS SOON AS POSSIBLE AFTER DISTURBANCE. IN GENERAL, STABILIZATION OF DISTURBED AREAS SHALL BE COMPLETED WITHIN 30 DAYS OF THE INITIAL DISTURBANCE, OR WITHIN 7 DAYS OF FINAL GRADING AND TOPSOIL PLACEMENT.
- REFER TO THE DNR TECHNICAL STANDARDS AVAILABLE AT [HTTP://WWW.DNR.STATE.WI.US/ORG/WATER/WM/NPS/STORMWATER/TECHSTDS.HTM](http://www.dnr.state.wi.us/org/water/wm/nps/stormwater/TECHSTDS.HTM).
- CONTRACTOR SHALL WATER NEWLY SEEDED AREAS IF 7 DAYS PASS WITHOUT A RAINFALL DURING THE FIRST 6 WEEKS AFTER INITIAL STABILIZATION.
- MULCHING OF DISTURBED AREAS SHALL BE AT A RATE OF 2 TONS PER ACRE. MULCH SHALL BE ANCHORED INTO THE SOIL BY DISCING.
- AFTER ATTEMPTS TO STABILIZE DISTURBED AREAS WITH SEEDING AND MULCH FAIL, THOSE AREAS SHALL BE TEMPORARILY STABILIZED USING POLYACRYLAMIDE UNDER DIRECTION OF THE ENGINEER.
- A MINIMUM OF ONE EROSION CONTROL INSPECTION SHALL BE PERFORMED EACH WEEK, AND ONE INSPECTION SHALL BE PERFORMED AFTER ANY RAINFALL EVENT OF 0.5" OR GREATER. ALL REPAIRS OR MODIFICATIONS SHALL BE COMPLETED WITHIN 24 HOURS OF THE INSPECTION.

SITE RESTORATION CONSTRUCTION NOTES:

- WORK SHALL CONFORM TO THE "STANDARD SPECIFICATIONS FOR HIGHWAY AND STRUCTURE CONSTRUCTION", OF STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION, 2021 EDITION.
- FERTILIZER SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR AND SHALL CONFORM TO THE REQUIREMENTS SPECIFIED; FERTILIZER SHALL HAVE A 20-10-10 RATIO OF NITROGEN, PHOSPHORIC ACID AND POTASH.
- STRAW MULCH OVER NEW SEEDING SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR AT A RATE OF 2 TONS/ACRE AND SHALL CONFORM TO THE REQUIREMENTS SPECIFIED IN SECTION 627 OF THE STATE SPECIFICATIONS. ALL MULCH SHALL BE STABILIZED BY ANCHORING. THIS CAN BE ACHIEVED BY LIGHT DISCING.
- ENGINEER WILL MAKE PERIODIC ON-SITE OBSERVATIONS OF THE WORK IN PROGRESS.



NOTE: COMPACT TO 95% MODIFIED PROCTOR
BITUMINOUS PAVEMENT SECTION



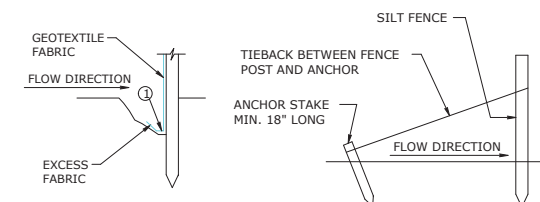
TRACKING PAD
NOT TO SCALE

SITE DETAILS:

- ORIGINALLY PLANNED IMPERVIOUS SURFACE AREA = 107,250 SQ.FT. OR 65.0%
- CURRENT IMPERVIOUS SURFACE AREA = 79,946 SQ. FT. OR 48.5%
- ORIGINALLY PLANNED 2ND BUILDING IMPERVIOUS AREA = 12,000 SQ.FT.
- NEW PARKING LOT EXPANSION IMPERVIOUS AREA = 13,888 SQ.FT.
- TOTAL IMPERVIOUS AFTER PARKING LOT EXPANSION = 56.9%
- NEW TOTAL IMPERVIOUS AREA W/ FUTURE BUILDING ADDITION AREA = 110,834 SQ. FT. OR 67.2%
- TOTAL EXISTING PARKING STALLS = 64 W/ 3 ADA ACCESSIBLE
- TOTAL NEW PARKING STALLS = 45 W/2 ADA ACCESSIBLE

GENERAL NOTES

- TRENCH SHALL BE MINIMUM OF 4" WIDE & 6" DEEP TO BURY AND ANCHOR THE GEOTEXTILE FABRIC. FOLD MATERIAL TO FIT TRENCH AND BACKFILL & COMPACT TRENCH WITH EXCAVATED SOIL.
- WOOD POSTS SHALL BE A MINIMUM SIZE OF 1 1/8" x 1 1/8" OF OAK OR HICKORY.



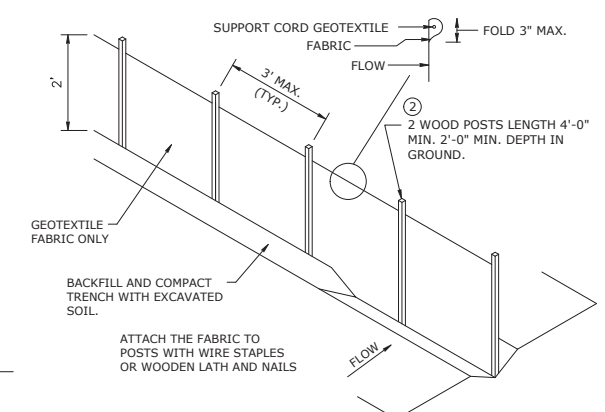
TRENCH DETAIL

NOTE:
8' SPACING ALLOWED IF A WOVEN GEOTEXTILE FABRIC IS USED.

SILT FENCE DETAIL



SILT FENCE TIE BACK
(WHEN REQUIRED BY ENGINEER)



SILT FENCE DETAIL
NOT TO SCALE

NOTE:
ADDITIONAL POST DEPTH OR TIE BACKS MAY BE REQUIRED IN UNSTABLE SOILS.

**NOBLE KNIGHT GAMES
PARKING LOT EXPANSION
CITY OF FITCHBURG, DANE COUNTY, WISCONSIN
SITE PLAN**

**ENGINEERING
SURVEYING
ENVIRONMENTAL
(608) 835-3310**

**ENGINEERING
CONSULTANTS, INC.
2600 C.T.H. Y - DODGEVILLE, WI 53533**

DATE: 07/07/2021

DESIGNED: KD

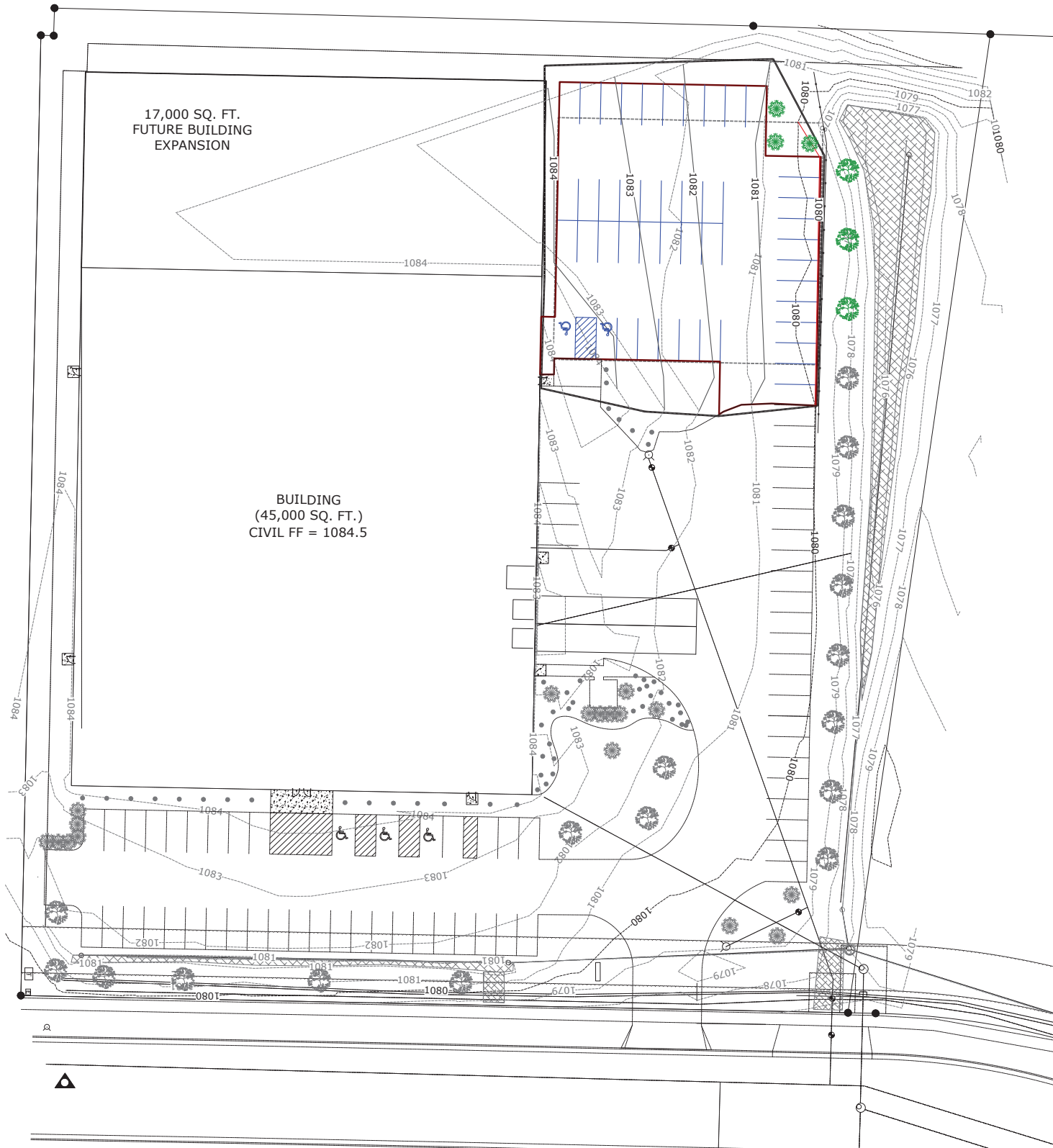
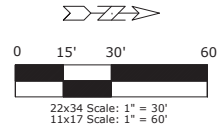
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PROJECT #: 21-014

Sheet 1 of 1

LEGEND

- IRON BAR
- ⊙ TP# SOIL BORINGS
- ⊠ EXISTING ELECTRIC PEDESTAL
- ⊡ EXISTING UTILITY POLE AND LINES
- ▨ EXISTING STORM INLET
- ⊙ EXISTING MANHOLE
- ⊙ EXISTING WATER VALVE
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- ▬ EXISTING GAS
- ▬ EXISTING FIBER OPTICS
- ▬ EXISTING TELEPHONE
- ▬ EXISTING WATER MAIN & SIZE
- ▬ EXISTING SANITARY MAIN
- 1081 EXISTING CONTOUR
- 1081 PROPOSED CONTOUR
- ▬ PROPOSED SILT FENCE
- ▬ PROPERTY LINES



- PROPOSED LANDSCAPE PLAN**
- American Arborvitae
 - Sugar Maple or Equivalent
 - Spirea, Barberry or Equivalent
- EXISTING LANDSCAPE PLAN**
- American Arborvitae
 - Sugar Maple or Equivalent
 - Spirea, Barberry or Equivalent

**NOBLE KNIGHT GAMES
 PARKING LOT EXPANSION
 CITY OF FITCHBURG, DANE COUNTY, WISCONSIN
 LANDSCAPE PLAN**

ENGINEERING
 SURVEYING
 ENVIRONMENTAL
 (608) 935-3310

**ENGINEERING
 CONSULTANTS, INC.**
 2600 C.T.H. Y - DODGEVILLE, WI 53533

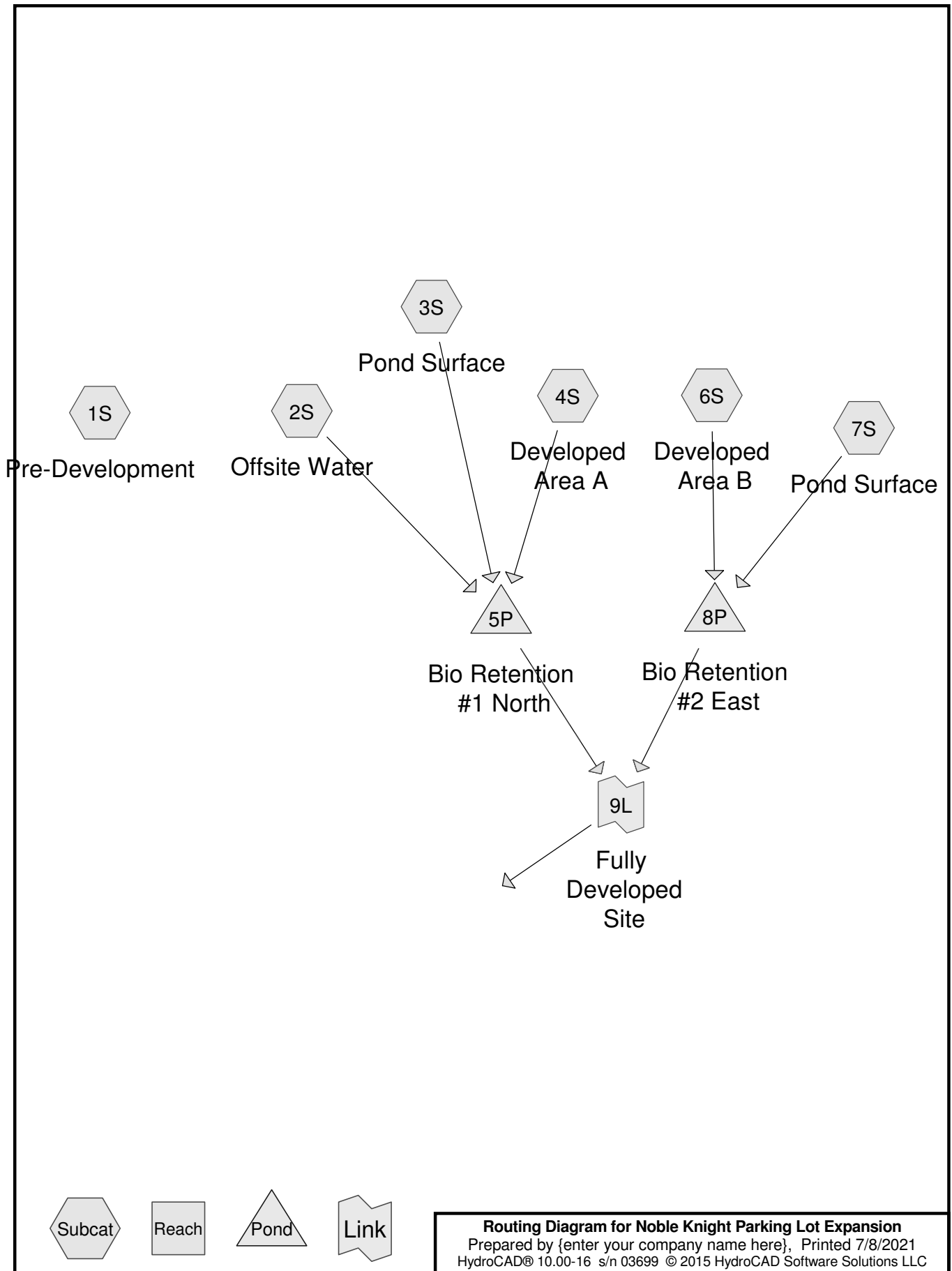
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PROJECT #: 21-014

Sheet 1
of 1



Noble Knight Parking Lot Expansion

MSE 24-hr 4 1 yr Rainfall=2.50"

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Printed 7/8/2021

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Page 2

Summary for Subcatchment 1S: Pre-Development

Runoff = 2.41 cfs @ 12.17 hrs, Volume= 0.161 af, Depth> 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1 yr Rainfall=2.50"

Area (ac)	CN	Description
* 4.247	70	HSG C Grassland
4.247		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0					Direct Entry,

Summary for Subcatchment 2S: Offsite Water

Runoff = 0.41 cfs @ 12.11 hrs, Volume= 0.019 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1 yr Rainfall=2.50"

Area (sf)	CN	Description
* 20,000	71	HSG C Landscaped
20,000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					Direct Entry,

Summary for Subcatchment 3S: Pond Surface

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.32 cfs @ 12.02 hrs, Volume= 0.018 af, Depth> 2.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1 yr Rainfall=2.50"

Area (sf)	CN	Description
* 3,799	100	
3,799		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					Direct Entry,

Noble Knight Parking Lot Expansion

MSE 24-hr 4 1 yr Rainfall=2.50"

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Page 3

Summary for Subcatchment 4S: Developed Area A

Runoff = 8.24 cfs @ 12.10 hrs, Volume= 0.386 af, Depth> 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1 yr Rainfall=2.50"

Area (sf)	CN	Description
44,000	98	Roofs, HSG C
36,276	98	Paved parking, HSG C
38,875	79	50-75% Grass cover, Fair, HSG C
119,151	92	Weighted Average
38,875		32.63% Pervious Area
80,276		67.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					Direct Entry,

Summary for Pond 5P: Bio Retention #1 North

Inflow Area = 3.282 ac, 58.81% Impervious, Inflow Depth > 1.55" for 1 yr event
 Inflow = 8.87 cfs @ 12.09 hrs, Volume= 0.423 af
 Outflow = 1.83 cfs @ 12.33 hrs, Volume= 0.423 af, Atten= 79%, Lag= 14.0 min
 Discarded = 1.83 cfs @ 12.33 hrs, Volume= 0.423 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,073.77' @ 12.33 hrs Surf.Area= 3,799 sf Storage= 5,984 cf

Plug-Flow detention time= 32.8 min calculated for 0.423 af (100% of inflow)
 Center-of-Mass det. time= 32.8 min (826.2 - 793.4)

Volume	Invert	Avail.Storage	Storage Description	
#1	1,069.00'	22,855 cf	Custom Stage Data (Prismatic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,069.00	3,799	0.0	0	0
1,069.01	3,799	33.0	13	13
1,075.99	3,799	33.0	8,751	8,763
1,076.00	3,799	100.0	38	8,801
1,077.00	6,639	100.0	5,219	14,020
1,078.00	11,031	100.0	8,835	22,855

Noble Knight Parking Lot Expansion

MSE 24-hr 4 1 yr Rainfall=2.50"

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Page 4

Device	Routing	Invert	Outlet Devices
#1	Device 4	1,074.41'	2.0" Vert. Orifice/Grate C= 0.600
#2	Device 4	1,076.99'	18.0" Horiz. Orifice/Grate C= 0.400 Limited to weir flow at low heads
#3	Secondary	1,077.90'	4.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#4	Primary	1,074.18'	12.0" Round Culvert L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,074.18' / 1,074.06' S= 0.0067 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#5	Discarded	1,069.00'	3.600 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 1,068.00'

Discarded OutFlow Max=1.83 cfs @ 12.33 hrs HW=1,073.77' (Free Discharge)
 ↳ **5=Exfiltration** (Controls 1.83 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,069.00' (Free Discharge)
 ↳ **4=Culvert** (Controls 0.00 cfs)
 ↳ **1=Orifice/Grate** (Controls 0.00 cfs)
 ↳ **2=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,069.00' (Free Discharge)
 ↳ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment 6S: Developed Area B

Runoff = 2.76 cfs @ 12.12 hrs, Volume= 0.141 af, Depth> 1.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 1 yr Rainfall=2.50"

Area (sf)	CN	Description
18,000	98	Roofs, HSG C
12,280	98	Paved parking, HSG C
11,220	79	50-75% Grass cover, Fair, HSG C
41,500	93	Weighted Average
11,220		27.04% Pervious Area
30,280		72.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Noble Knight Parking Lot Expansion

MSE 24-hr 4 1 yr Rainfall=2.50"

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Page 5

Summary for Subcatchment 7S: Pond Surface

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.05 cfs @ 12.02 hrs, Volume= 0.003 af, Depth> 2.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 1 yr Rainfall=2.50"

Area (sf)	CN	Description
* 553	100	Pond
553		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					Direct Entry,

Summary for Pond 8P: Bio Retention #2 East

Inflow Area = 0.965 ac, 73.32% Impervious, Inflow Depth > 1.79" for 1 yr event
 Inflow = 2.77 cfs @ 12.12 hrs, Volume= 0.144 af
 Outflow = 2.18 cfs @ 12.16 hrs, Volume= 0.144 af, Atten= 21%, Lag= 2.4 min
 Discarded = 0.26 cfs @ 12.16 hrs, Volume= 0.095 af
 Primary = 0.22 cfs @ 12.16 hrs, Volume= 0.034 af
 Secondary = 1.70 cfs @ 12.16 hrs, Volume= 0.015 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,081.44' @ 12.16 hrs Surf.Area= 1,566 sf Storage= 1,933 cf

Plug-Flow detention time= 56.2 min calculated for 0.144 af (100% of inflow)
 Center-of-Mass det. time= 56.2 min (846.3 - 790.1)

Volume	Invert	Avail.Storage	Storage Description
#1	1,073.00'	3,160 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,073.00	553	0.0	0	0
1,073.01	553	33.0	2	2
1,080.99	553	33.0	1,456	1,458
1,081.00	553	100.0	6	1,464
1,082.00	2,840	100.0	1,697	3,160

Device	Routing	Invert	Outlet Devices
#1	Device 4	1,077.06'	2.0" Vert. Orifice/Grate C= 0.600
#2	Device 4	1,081.77'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Secondary	1,081.38'	40.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66

Noble Knight Parking Lot Expansion

MSE 24-hr 4 1 yr Rainfall=2.50"

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Page 6

#4	Primary	1,076.96'	2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
			12.0" Round Culvert
			L= 148.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 1,076.96' / 1,074.05' S= 0.0197 '/' Cc= 0.900
			n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#5	Discarded	1,073.00'	3.600 in/hr Exfiltration over Surface area
			Conductivity to Groundwater Elevation = 1,070.00'

Discarded OutFlow Max=0.26 cfs @ 12.16 hrs HW=1,081.44' (Free Discharge)
↳ **5=Exfiltration** (Controls 0.26 cfs)

Primary OutFlow Max=0.22 cfs @ 12.16 hrs HW=1,081.44' (Free Discharge)
↳ **4=Culvert** (Passes 0.22 cfs of 7.55 cfs potential flow)
↳ **1=Orifice/Grate** (Orifice Controls 0.22 cfs @ 9.98 fps)
↳ **2=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=1.49 cfs @ 12.16 hrs HW=1,081.44' (Free Discharge)
↳ **3=Broad-Crested Rectangular Weir** (Weir Controls 1.49 cfs @ 0.59 fps)

Summary for Link 9L: Fully Developed Site

Inflow Area = 4.247 ac, 62.11% Impervious, Inflow Depth = 0.14" for 1 yr event
Inflow = 1.92 cfs @ 12.16 hrs, Volume= 0.049 af
Primary = 1.92 cfs @ 12.16 hrs, Volume= 0.049 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Noble Knight Parking Lot Expansion

MSE 24-hr 4 2 yr Rainfall=2.90"

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Page 7

Summary for Subcatchment 1S: Pre-Development

Runoff = 3.78 cfs @ 12.16 hrs, Volume= 0.233 af, Depth> 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2 yr Rainfall=2.90"

Area (ac)	CN	Description
* 4.247	70	HSG C Grassland
4.247		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0					Direct Entry,

Summary for Subcatchment 2S: Offsite Water

Runoff = 0.61 cfs @ 12.11 hrs, Volume= 0.027 af, Depth> 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2 yr Rainfall=2.90"

Area (sf)	CN	Description
* 20,000	71	HSG C Landscaped
20,000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					Direct Entry,

Summary for Subcatchment 3S: Pond Surface

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.37 cfs @ 12.04 hrs, Volume= 0.021 af, Depth> 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2 yr Rainfall=2.90"

Area (sf)	CN	Description
* 3,799	100	
3,799		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					Direct Entry,

Noble Knight Parking Lot Expansion

MSE 24-hr 4 2 yr Rainfall=2.90"

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Page 8

Summary for Subcatchment 4S: Developed Area A

Runoff = 9.92 cfs @ 12.10 hrs, Volume= 0.471 af, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2 yr Rainfall=2.90"

Area (sf)	CN	Description
44,000	98	Roofs, HSG C
36,276	98	Paved parking, HSG C
38,875	79	50-75% Grass cover, Fair, HSG C
119,151	92	Weighted Average
38,875		32.63% Pervious Area
80,276		67.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					Direct Entry,

Summary for Pond 5P: Bio Retention #1 North

Inflow Area = 3.282 ac, 58.81% Impervious, Inflow Depth > 1.90" for 2 yr event
 Inflow = 10.79 cfs @ 12.09 hrs, Volume= 0.519 af
 Outflow = 2.29 cfs @ 12.32 hrs, Volume= 0.519 af, Atten= 79%, Lag= 13.7 min
 Discarded = 2.22 cfs @ 12.32 hrs, Volume= 0.517 af
 Primary = 0.07 cfs @ 12.32 hrs, Volume= 0.002 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,075.00' @ 12.32 hrs Surf.Area= 3,799 sf Storage= 7,521 cf

Plug-Flow detention time= 35.4 min calculated for 0.519 af (100% of inflow)
 Center-of-Mass det. time= 35.3 min (824.6 - 789.3)

Volume	Invert	Avail.Storage	Storage Description	
#1	1,069.00'	22,855 cf	Custom Stage Data (Prismatic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,069.00	3,799	0.0	0	0
1,069.01	3,799	33.0	13	13
1,075.99	3,799	33.0	8,751	8,763
1,076.00	3,799	100.0	38	8,801
1,077.00	6,639	100.0	5,219	14,020
1,078.00	11,031	100.0	8,835	22,855

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MSE 24-hr 4 2 yr Rainfall=2.90"

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Page 9

Device	Routing	Invert	Outlet Devices
#1	Device 4	1,074.41'	2.0" Vert. Orifice/Grate C= 0.600
#2	Device 4	1,076.99'	18.0" Horiz. Orifice/Grate C= 0.400 Limited to weir flow at low heads
#3	Secondary	1,077.90'	4.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#4	Primary	1,074.18'	12.0" Round Culvert L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,074.18' / 1,074.06' S= 0.0067 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#5	Discarded	1,069.00'	3.600 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 1,068.00'

Discarded OutFlow Max=2.22 cfs @ 12.32 hrs HW=1,075.00' (Free Discharge)
 ↳ **5=Exfiltration** (Controls 2.22 cfs)

Primary OutFlow Max=0.07 cfs @ 12.32 hrs HW=1,075.00' (Free Discharge)
 ↳ **4=Culvert** (Passes 0.07 cfs of 1.73 cfs potential flow)
 ↳ **1=Orifice/Grate** (Orifice Controls 0.07 cfs @ 3.42 fps)
 ↳ **2=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,069.00' (Free Discharge)
 ↳ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment 6S: Developed Area B

Runoff = 3.30 cfs @ 12.12 hrs, Volume= 0.171 af, Depth> 2.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 2 yr Rainfall=2.90"

Area (sf)	CN	Description
18,000	98	Roofs, HSG C
12,280	98	Paved parking, HSG C
11,220	79	50-75% Grass cover, Fair, HSG C
41,500	93	Weighted Average
11,220		27.04% Pervious Area
30,280		72.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Noble Knight Parking Lot Expansion

MSE 24-hr 4 2 yr Rainfall=2.90"

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Page 10

Summary for Subcatchment 7S: Pond Surface

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.05 cfs @ 12.04 hrs, Volume= 0.003 af, Depth> 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 2 yr Rainfall=2.90"

Area (sf)	CN	Description
* 553	100	Pond
553		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					Direct Entry,

Summary for Pond 8P: Bio Retention #2 East

Inflow Area = 0.965 ac, 73.32% Impervious, Inflow Depth > 2.17" for 2 yr event
 Inflow = 3.32 cfs @ 12.12 hrs, Volume= 0.174 af
 Outflow = 3.26 cfs @ 12.13 hrs, Volume= 0.174 af, Atten= 2%, Lag= 0.8 min
 Discarded = 0.27 cfs @ 12.13 hrs, Volume= 0.105 af
 Primary = 0.22 cfs @ 12.13 hrs, Volume= 0.038 af
 Secondary = 2.77 cfs @ 12.13 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,081.47' @ 12.13 hrs Surf.Area= 1,633 sf Storage= 1,980 cf

Plug-Flow detention time= 52.5 min calculated for 0.174 af (100% of inflow)
 Center-of-Mass det. time= 52.5 min (838.2 - 785.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,073.00'	3,160 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet) Cum.Store (cubic-feet)
1,073.00	553	0.0	0 0
1,073.01	553	33.0	2 2
1,080.99	553	33.0	1,456 1,458
1,081.00	553	100.0	6 1,464
1,082.00	2,840	100.0	1,697 3,160

Device	Routing	Invert	Outlet Devices
#1	Device 4	1,077.06'	2.0" Vert. Orifice/Grate C= 0.600
#2	Device 4	1,081.77'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Secondary	1,081.38'	40.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66

Noble Knight Parking Lot Expansion

MSE 24-hr 4 2 yr Rainfall=2.90"

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Page 11

#4	Primary	1,076.96'	2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
			12.0" Round Culvert
			L= 148.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 1,076.96' / 1,074.05' S= 0.0197 '/' Cc= 0.900
			n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#5	Discarded	1,073.00'	3.600 in/hr Exfiltration over Surface area
			Conductivity to Groundwater Elevation = 1,070.00'

Discarded OutFlow Max=0.27 cfs @ 12.13 hrs HW=1,081.47' (Free Discharge)
↳ **5=Exfiltration** (Controls 0.27 cfs)

Primary OutFlow Max=0.22 cfs @ 12.13 hrs HW=1,081.47' (Free Discharge)
↳ **4=Culvert** (Passes 0.22 cfs of 7.57 cfs potential flow)
↳ **1=Orifice/Grate** (Orifice Controls 0.22 cfs @ 10.02 fps)
↳ **2=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=2.65 cfs @ 12.13 hrs HW=1,081.47' (Free Discharge)
↳ **3=Broad-Crested Rectangular Weir** (Weir Controls 2.65 cfs @ 0.72 fps)

Summary for Link 9L: Fully Developed Site

Inflow Area = 4.247 ac, 62.11% Impervious, Inflow Depth = 0.20" for 2 yr event
Inflow = 3.00 cfs @ 12.14 hrs, Volume= 0.072 af
Primary = 3.00 cfs @ 12.14 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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MSE 24-hr 4 10 yr Rainfall=4.20"

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Page 12

Summary for Subcatchment 1S: Pre-Development

Runoff = 9.11 cfs @ 12.16 hrs, Volume= 0.518 af, Depth> 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10 yr Rainfall=4.20"

Area (ac)	CN	Description
* 4.247	70	HSG C Grassland
4.247		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0					Direct Entry,

Summary for Subcatchment 2S: Offsite Water

Runoff = 1.34 cfs @ 12.10 hrs, Volume= 0.059 af, Depth> 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10 yr Rainfall=4.20"

Area (sf)	CN	Description
* 20,000	71	HSG C Landscaped
20,000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					Direct Entry,

Summary for Subcatchment 3S: Pond Surface

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.53 cfs @ 12.05 hrs, Volume= 0.031 af, Depth> 4.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10 yr Rainfall=4.20"

Area (sf)	CN	Description
* 3,799	100	
3,799		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					Direct Entry,

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MSE 24-hr 4 10 yr Rainfall=4.20"

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Page 13

Summary for Subcatchment 4S: Developed Area A

Runoff = 15.34 cfs @ 12.10 hrs, Volume= 0.755 af, Depth> 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10 yr Rainfall=4.20"

Area (sf)	CN	Description
44,000	98	Roofs, HSG C
36,276	98	Paved parking, HSG C
38,875	79	50-75% Grass cover, Fair, HSG C
119,151	92	Weighted Average
38,875		32.63% Pervious Area
80,276		67.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					Direct Entry,

Summary for Pond 5P: Bio Retention #1 North

Inflow Area = 3.282 ac, 58.81% Impervious, Inflow Depth > 3.09" for 10 yr event
 Inflow = 17.09 cfs @ 12.09 hrs, Volume= 0.844 af
 Outflow = 3.18 cfs @ 12.34 hrs, Volume= 0.844 af, Atten= 81%, Lag= 14.7 min
 Discarded = 3.02 cfs @ 12.34 hrs, Volume= 0.827 af
 Primary = 0.16 cfs @ 12.34 hrs, Volume= 0.017 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,076.86' @ 12.34 hrs Surf.Area= 6,249 sf Storage= 13,136 cf

Plug-Flow detention time= 42.8 min calculated for 0.843 af (100% of inflow)
 Center-of-Mass det. time= 42.8 min (822.2 - 779.5)

Volume	Invert	Avail.Storage	Storage Description	
#1	1,069.00'	22,855 cf	Custom Stage Data (Prismatic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,069.00	3,799	0.0	0	0
1,069.01	3,799	33.0	13	13
1,075.99	3,799	33.0	8,751	8,763
1,076.00	3,799	100.0	38	8,801
1,077.00	6,639	100.0	5,219	14,020
1,078.00	11,031	100.0	8,835	22,855

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MSE 24-hr 4 10 yr Rainfall=4.20"

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Page 14

Device	Routing	Invert	Outlet Devices
#1	Device 4	1,074.41'	2.0" Vert. Orifice/Grate C= 0.600
#2	Device 4	1,076.99'	18.0" Horiz. Orifice/Grate C= 0.400 Limited to weir flow at low heads
#3	Secondary	1,077.90'	4.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#4	Primary	1,074.18'	12.0" Round Culvert L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,074.18' / 1,074.06' S= 0.0067 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#5	Discarded	1,069.00'	3.600 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 1,068.00'

Discarded OutFlow Max=3.02 cfs @ 12.34 hrs HW=1,076.86' (Free Discharge)
 ↳ **5=Exfiltration** (Controls 3.02 cfs)

Primary OutFlow Max=0.16 cfs @ 12.34 hrs HW=1,076.86' (Free Discharge)
 ↳ **4=Culvert** (Passes 0.16 cfs of 5.59 cfs potential flow)
 ↳ **1=Orifice/Grate** (Orifice Controls 0.16 cfs @ 7.41 fps)
 ↳ **2=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,069.00' (Free Discharge)
 ↳ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment 6S: Developed Area B

Runoff = 5.07 cfs @ 12.12 hrs, Volume= 0.271 af, Depth> 3.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 10 yr Rainfall=4.20"

Area (sf)	CN	Description
18,000	98	Roofs, HSG C
12,280	98	Paved parking, HSG C
11,220	79	50-75% Grass cover, Fair, HSG C
41,500	93	Weighted Average
11,220		27.04% Pervious Area
30,280		72.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

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MSE 24-hr 4 10 yr Rainfall=4.20"

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Page 15

Summary for Subcatchment 7S: Pond Surface

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.08 cfs @ 12.05 hrs, Volume= 0.004 af, Depth> 4.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 10 yr Rainfall=4.20"

Area (sf)	CN	Description
* 553	100	Pond
553		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					Direct Entry,

Summary for Pond 8P: Bio Retention #2 East

Inflow Area = 0.965 ac, 73.32% Impervious, Inflow Depth > 3.42" for 10 yr event
 Inflow = 5.09 cfs @ 12.12 hrs, Volume= 0.275 af
 Outflow = 5.05 cfs @ 12.13 hrs, Volume= 0.275 af, Atten= 1%, Lag= 0.5 min
 Discarded = 0.28 cfs @ 12.13 hrs, Volume= 0.137 af
 Primary = 0.22 cfs @ 12.13 hrs, Volume= 0.054 af
 Secondary = 4.56 cfs @ 12.13 hrs, Volume= 0.085 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,081.51' @ 12.13 hrs Surf.Area= 1,715 sf Storage= 2,039 cf

Plug-Flow detention time= 46.6 min calculated for 0.275 af (100% of inflow)
 Center-of-Mass det. time= 46.5 min (822.0 - 775.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,073.00'	3,160 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)
1,073.00	553	0.0	0
1,073.01	553	33.0	2
1,080.99	553	33.0	1,456
1,081.00	553	100.0	6
1,082.00	2,840	100.0	1,697
		Cum.Store (cubic-feet)	
		0	
		2	
		1,458	
		1,464	
		3,160	

Device	Routing	Invert	Outlet Devices
#1	Device 4	1,077.06'	2.0" Vert. Orifice/Grate C= 0.600
#2	Device 4	1,081.77'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Secondary	1,081.38'	40.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66

Noble Knight Parking Lot Expansion

MSE 24-hr 4 10 yr Rainfall=4.20"

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Page 16

#4	Primary	1,076.96'	2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
			12.0" Round Culvert
			L= 148.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 1,076.96' / 1,074.05' S= 0.0197 '/' Cc= 0.900
			n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#5	Discarded	1,073.00'	3.600 in/hr Exfiltration over Surface area
			Conductivity to Groundwater Elevation = 1,070.00'

Discarded OutFlow Max=0.28 cfs @ 12.13 hrs HW=1,081.51' (Free Discharge)
↑**5=Exfiltration** (Controls 0.28 cfs)

Primary OutFlow Max=0.22 cfs @ 12.13 hrs HW=1,081.51' (Free Discharge)
↑**4=Culvert** (Passes 0.22 cfs of 7.61 cfs potential flow)
↑**1=Orifice/Grate** (Orifice Controls 0.22 cfs @ 10.06 fps)
↑**2=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=4.35 cfs @ 12.13 hrs HW=1,081.51' (Free Discharge)
↑**3=Broad-Crested Rectangular Weir** (Weir Controls 4.35 cfs @ 0.85 fps)

Summary for Link 9L: Fully Developed Site

Inflow Area = 4.247 ac, 62.11% Impervious, Inflow Depth = 0.44" for 10 yr event
Inflow = 4.93 cfs @ 12.13 hrs, Volume= 0.156 af
Primary = 4.93 cfs @ 12.13 hrs, Volume= 0.156 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Noble Knight Parking Lot Expansion

MSE 24-hr 4 100 yr Rainfall=6.00"

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Page 17

Summary for Subcatchment 1S: Pre-Development

Runoff = 17.76 cfs @ 12.15 hrs, Volume= 0.992 af, Depth> 2.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100 yr Rainfall=6.00"

Area (ac)	CN	Description
* 4.247	70	HSG C Grassland
4.247		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0					Direct Entry,

Summary for Subcatchment 2S: Offsite Water

Runoff = 2.50 cfs @ 12.10 hrs, Volume= 0.111 af, Depth> 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100 yr Rainfall=6.00"

Area (sf)	CN	Description
* 20,000	71	HSG C Landscaped
20,000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					Direct Entry,

Summary for Subcatchment 3S: Pond Surface

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.76 cfs @ 12.02 hrs, Volume= 0.044 af, Depth> 6.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100 yr Rainfall=6.00"

Area (sf)	CN	Description
* 3,799	100	
3,799		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					Direct Entry,

Noble Knight Parking Lot Expansion

MSE 24-hr 4 100 yr Rainfall=6.00"

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Page 18

Summary for Subcatchment 4S: Developed Area A

Runoff = 22.72 cfs @ 12.10 hrs, Volume= 1.155 af, Depth> 5.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100 yr Rainfall=6.00"

Area (sf)	CN	Description
44,000	98	Roofs, HSG C
36,276	98	Paved parking, HSG C
38,875	79	50-75% Grass cover, Fair, HSG C
119,151	92	Weighted Average
38,875		32.63% Pervious Area
80,276		67.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0					Direct Entry,

Summary for Pond 5P: Bio Retention #1 North

Inflow Area = 3.282 ac, 58.81% Impervious, Inflow Depth > 4.79" for 100 yr event
 Inflow = 25.86 cfs @ 12.09 hrs, Volume= 1.310 af
 Outflow = 8.22 cfs @ 12.18 hrs, Volume= 1.310 af, Atten= 68%, Lag= 5.6 min
 Discarded = 3.54 cfs @ 12.18 hrs, Volume= 1.123 af
 Primary = 4.68 cfs @ 12.18 hrs, Volume= 0.187 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,077.62' @ 12.18 hrs Surf.Area= 9,352 sf Storage= 18,960 cf

Plug-Flow detention time= 42.2 min calculated for 1.310 af (100% of inflow)
 Center-of-Mass det. time= 42.2 min (812.9 - 770.7)

Volume	Invert	Avail.Storage	Storage Description	
#1	1,069.00'	22,855 cf	Custom Stage Data (Prismatic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,069.00	3,799	0.0	0	0
1,069.01	3,799	33.0	13	13
1,075.99	3,799	33.0	8,751	8,763
1,076.00	3,799	100.0	38	8,801
1,077.00	6,639	100.0	5,219	14,020
1,078.00	11,031	100.0	8,835	22,855

Noble Knight Parking Lot Expansion

MSE 24-hr 4 100 yr Rainfall=6.00"

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Page 19

Device	Routing	Invert	Outlet Devices
#1	Device 4	1,074.41'	2.0" Vert. Orifice/Grate C= 0.600
#2	Device 4	1,076.99'	18.0" Horiz. Orifice/Grate C= 0.400 Limited to weir flow at low heads
#3	Secondary	1,077.90'	4.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#4	Primary	1,074.18'	12.0" Round Culvert L= 18.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,074.18' / 1,074.06' S= 0.0067 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#5	Discarded	1,069.00'	3.600 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 1,068.00'

Discarded OutFlow Max=3.54 cfs @ 12.18 hrs HW=1,077.62' (Free Discharge)
 ↳ **5=Exfiltration** (Controls 3.54 cfs)

Primary OutFlow Max=4.68 cfs @ 12.18 hrs HW=1,077.62' (Free Discharge)
 ↳ **4=Culvert** (Passes 4.68 cfs of 6.48 cfs potential flow)
 ↳ **1=Orifice/Grate** (Orifice Controls 0.19 cfs @ 8.51 fps)
 ↳ **2=Orifice/Grate** (Orifice Controls 4.49 cfs @ 2.54 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=1,069.00' (Free Discharge)
 ↳ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Subcatchment 6S: Developed Area B

Runoff = 7.48 cfs @ 12.12 hrs, Volume= 0.411 af, Depth> 5.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 MSE 24-hr 4 100 yr Rainfall=6.00"

Area (sf)	CN	Description
18,000	98	Roofs, HSG C
12,280	98	Paved parking, HSG C
11,220	79	50-75% Grass cover, Fair, HSG C
41,500	93	Weighted Average
11,220		27.04% Pervious Area
30,280		72.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Noble Knight Parking Lot Expansion

MSE 24-hr 4 100 yr Rainfall=6.00"

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Page 20

Summary for Subcatchment 7S: Pond Surface

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.11 cfs @ 12.02 hrs, Volume= 0.006 af, Depth> 6.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
MSE 24-hr 4 100 yr Rainfall=6.00"

Area (sf)	CN	Description
* 553	100	Pond
553		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					Direct Entry,

Summary for Pond 8P: Bio Retention #2 East

Inflow Area = 0.965 ac, 73.32% Impervious, Inflow Depth > 5.19" for 100 yr event
 Inflow = 7.52 cfs @ 12.12 hrs, Volume= 0.418 af
 Outflow = 7.48 cfs @ 12.13 hrs, Volume= 0.414 af, Atten= 1%, Lag= 0.4 min
 Discarded = 0.29 cfs @ 12.13 hrs, Volume= 0.170 af
 Primary = 0.22 cfs @ 12.13 hrs, Volume= 0.076 af
 Secondary = 6.97 cfs @ 12.13 hrs, Volume= 0.169 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 1,081.55' @ 12.13 hrs Surf.Area= 1,821 sf Storage= 2,122 cf

Plug-Flow detention time= 42.1 min calculated for 0.414 af (99% of inflow)
 Center-of-Mass det. time= 36.8 min (803.3 - 766.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,073.00'	3,160 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)
1,073.00	553	0.0	0
1,073.01	553	33.0	2
1,080.99	553	33.0	1,456
1,081.00	553	100.0	6
1,082.00	2,840	100.0	1,697
		Cum.Store (cubic-feet)	
		0	
		2	
		1,458	
		1,464	
		3,160	

Device	Routing	Invert	Outlet Devices
#1	Device 4	1,077.06'	2.0" Vert. Orifice/Grate C= 0.600
#2	Device 4	1,081.77'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Secondary	1,081.38'	40.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66

Noble Knight Parking Lot Expansion

MSE 24-hr 4 100 yr Rainfall=6.00"

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Page 21

#4	Primary	1,076.96'	2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
			12.0" Round Culvert
			L= 148.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 1,076.96' / 1,074.05' S= 0.0197 '/' Cc= 0.900
			n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#5	Discarded	1,073.00'	3.600 in/hr Exfiltration over Surface area
			Conductivity to Groundwater Elevation = 1,070.00'

Discarded OutFlow Max=0.29 cfs @ 12.13 hrs HW=1,081.55' (Free Discharge)
↑**5=Exfiltration** (Controls 0.29 cfs)

Primary OutFlow Max=0.22 cfs @ 12.13 hrs HW=1,081.55' (Free Discharge)
↑**4=Culvert** (Passes 0.22 cfs of 7.65 cfs potential flow)
↑**1=Orifice/Grate** (Orifice Controls 0.22 cfs @ 10.11 fps)
↑**2=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=6.91 cfs @ 12.13 hrs HW=1,081.55' (Free Discharge)
↑**3=Broad-Crested Rectangular Weir** (Weir Controls 6.91 cfs @ 0.99 fps)

Summary for Link 9L: Fully Developed Site

Inflow Area = 4.247 ac, 62.11% Impervious, Inflow Depth = 1.22" for 100 yr event
Inflow = 11.73 cfs @ 12.13 hrs, Volume= 0.431 af
Primary = 11.73 cfs @ 12.13 hrs, Volume= 0.431 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

TSS Reduction

Suspended Solids Before Controls (Fully Dev. Site):

North Basin Area - 832.8 lbs

East Basin Area - 278.2 lbs

Total 1,111.0 lbs

Suspended Solids After Controls (Fully Dev. Site):

North Basin Area - 10.1

East Basin Area - 12.1

Total 22.2 / 1,111 lbs \Rightarrow 98% reduction

Data file name: C:\Program Files (x86)\WinSLAMM v10\Noble Knight North Basin.mdb
 WinSLAMM Version 10.2.0
 Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Madison WI 1981.RAN
 Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
 Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
 Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
 Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
 Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
 Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
 Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
 Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
 Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
 Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
 Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
 Cost Data file name:
 Seed for random number generator: -42
 Study period starting date: 01/01/81 Study period ending date: 12/31/81
 Start of Winter Season: 12/02 End of Winter Season: 03/12
 Date: 07-08-2021 Time: 15:10:07
 Site information:

LU# 1 - Commercial: Commercial 1 Total area (ac): 3.281
 1 - Roofs 1: 1.010 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 13 - Paved Parking 1: 0.833 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 45 - Large Landscaped Areas 1: 0.459 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 51 - Small Landscaped Areas 1: 0.892 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
 70 - Water Body Areas: 0.087 ac. Source Area PSD File:

Control Practice 1: Biofilter CP# 1 (DS) - DS Biofilters # 1

1. Top area (square feet) = 11031
2. Bottom area (square feet) = 3799
3. Depth (ft): 9
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 2.5
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 1
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 0
10. Porosity of rock filled volume = 0
11. Engineered soil infiltration rate: 3.76
12. Engineered soil depth (ft) = 7
13. Engineered soil porosity = 0.39
14. Percent solids reduction due to flow through engineered soil = 0
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data	Soil Type Fraction in Eng. Soil
Sands	0.500
Loamy Sands	0.500
Saturation water content percent (Porosity) = 0	
Field capacity (%) = 0	
Permanent Wilting Point (%) = 0	
Infiltration rate (in/hr) = 3.76	

Biofilter Outlet/Discharge Characteristics:

- Outlet type: Broad Crested Weir
1. Weir crest length (ft): 4
 2. Weir crest width (ft): 4
 3. Height of datum to bottom of weir opening: 8.9
- Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 1.5
 2. Stand pipe height above datum (ft): 7.99
- Outlet type: Drain Tile/Underdrain
1. Underdrain outlet diameter (ft): 0.167
 2. Invert elevation above datum (ft): 5.41
 3. Number of underdrain outlets: 1

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Data file name: C:\Program Files (x86)\WinSLAMM v10\Noble Knight North Basin.mdb
 Data file description:

Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Madison WI 1981.RAN
 Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
 Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
 Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
 Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
 Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
 Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
 Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
 Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
 Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppd
 Start of Winter Season: 12/02 End of Winter Season: 03/12
 Model Run Start Date: 01/01/81 Model Run End Date: 12/31/81
 Date of run: 07-08-2021 Time of run: 15:09:53
 Total Area Modeled (acres): 3.281
 Years in Model Run: 1.00

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses	177621	-	75.1	832.8	-
Outfall Total with Controls	1779	99.00%	91.06	10.11	98.79%
Annualized Total After Controls	1784			10.14	

Data file name: C:\Program Files (x86)\WinSLAMM v10\Noble Knight East Basin.mdb
WinSLAMM Version 10.2.0
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Madison WI 1981.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SLO6 Dec06.rsvx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Study period starting date: 01/01/81 Study period ending date: 12/31/81
Start of Winter Season: 12/02 End of Winter Season: 03/12
Date: 07-08-2021 Time: 15:56:02
Site information:

LU# 1 - Commercial: Commercial 1 Total area (ac): 0.966
1 - Roofs 1: 0.413 ac. Pitched Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
13 - Paved Parking 1: 0.282 ac. Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1: 0.258 ac. Normal Silty Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
70 - Water Body Areas: 0.013 ac. Source Area PSD File:

Control Practice 1: Biofilter CP# 1 (DS) - DS Biofilters # 1

1. Top area (square feet) = 2840
2. Bottom area (square feet) = 553
3. Depth (ft): 9
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 2.5
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 1
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 0
10. Porosity of rock filled volume = 0
11. Engineered soil infiltration rate: 3.76
12. Engineered soil depth (ft) = 7
13. Engineered soil porosity = 0.39
14. Percent solids reduction due to flow through engineered soil = 0
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data Soil Type Fraction in Eng. Soil
Sands 0.500
Loamy Sands 0.500
Saturation water content percent (Porosity) = 0
Field capacity (%) = 0
Permanent Wilting Point (%) = 0
Infiltration rate (in/hr) = 3.76

Biofilter Outlet/Discharge Characteristics:

- Outlet type: Broad Crested Weir
1. Weir crest length (ft): 40
 2. Weir crest width (ft): 4
 3. Height of datum to bottom of weir opening: 8.38
- Outlet type: Vertical Stand Pipe
1. Stand pipe diameter (ft): 2
 2. Stand pipe height above datum (ft): 8.77
- Outlet type: Drain Tile/Underdrain
1. Underdrain outlet diameter (ft): 0.17
 2. Invert elevation above datum (ft): 4.06
 3. Number of underdrain outlets: 1

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Data file name: C:\Program Files (x86)\WinSLAMM v10\Noble Knight East Basin.mdb
 Data file description:
 Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Madison WI 1981.RAN
 Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
 Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
 Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
 Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
 Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
 Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
 Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
 Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
 Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppx
 Start of Winter Season: 12/02 End of Winter Season: 03/12
 Model Run Start Date: 01/01/81 Model Run End Date: 12/31/81
 Date of run: 07-08-2021 Time of run: 15:55:51
 Total Area Modeled (acres): 0.966
 Years in Model Run: 1.00

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses	63972	-	69.67	278.2	-
Outfall Total with Con	2487	96.11%	77.49	12.03	95.68%
Annualized Total After	2494			12.06	

Stay-On Volume

Pre-Development

$$26.66(4.247)(1/12)(43,560) = 410,329 \text{ ft}^3$$

x 90%

$$369,296 \text{ ft}^3 - \text{goal}$$

Post-Development

$$\text{North Basin} - 25.759(3.282)(1/12)(43,560) = 306,884 \text{ ft}^3$$

$$\text{East Basin} - 20.94(0.965)(1/12)(43,560) = 73,352 \text{ ft}^3$$

Total

$$380,236 \text{ ft}^3$$

$$\approx 92.7\%$$

Units English

Pre-Development RECARGA Version 2.3

Bioretention/Raingarden Sizing Program

Planview Data

Facility Area [sf]

Tributary Area [acre]

Percent Impervious

Pervious CN

Files

Regional Ave. ET [in./day]

Simulation Type days

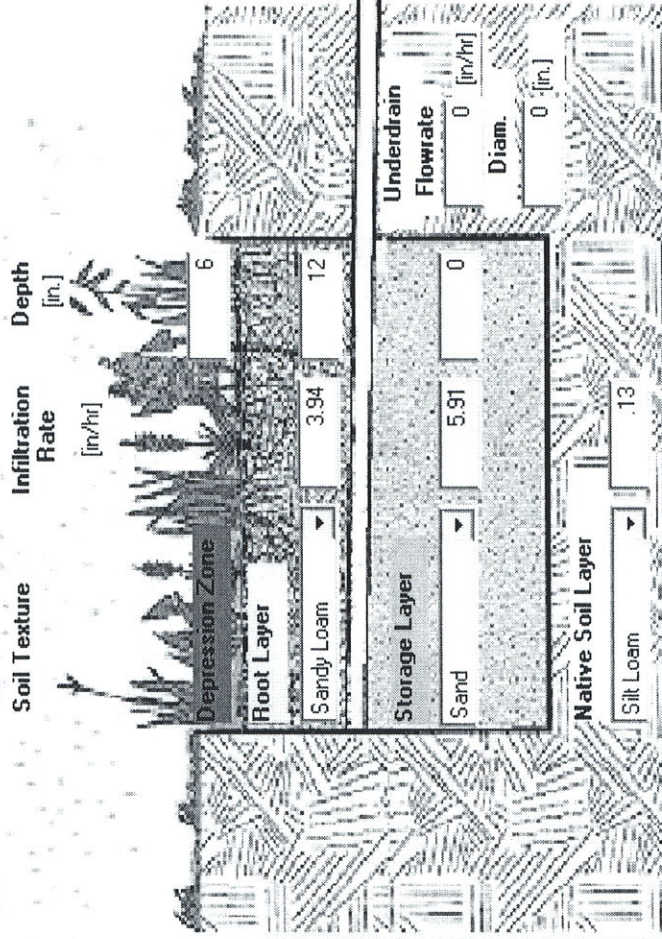
Input File Length

Precip. File Name

Output File Name

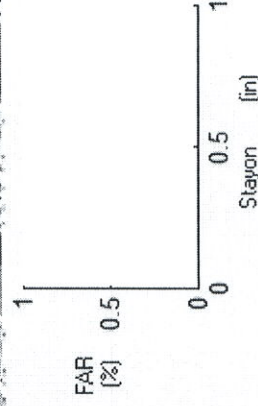
Summary Record

Facility Inputs



Target Stay-on [in]

Facility Area Ratio (%) Edit Text [%]



Results

Plant Survivability
(Less than 48 hours max. ponding is desirable)

	max.	Total
Hrs. Ponded	100.25	697.5
Number of overflows		12

Tributary Runoff

Precipitation [in]

Impervious Runoff

Pervious Runoff

Raingarden Water

	[in.]	%
Runon	2.1473	7.4533
Runoff	2.1473	7.4533
Recharge	6.5456e-	2.272e-
Evaporation	8.8994e-	3.089e-
Underdrain	0	0
Soil Moisture	.	.

Stay-on

North Basin RECARGA Version 2.3 Bioretention/Raingarden Sizing Program

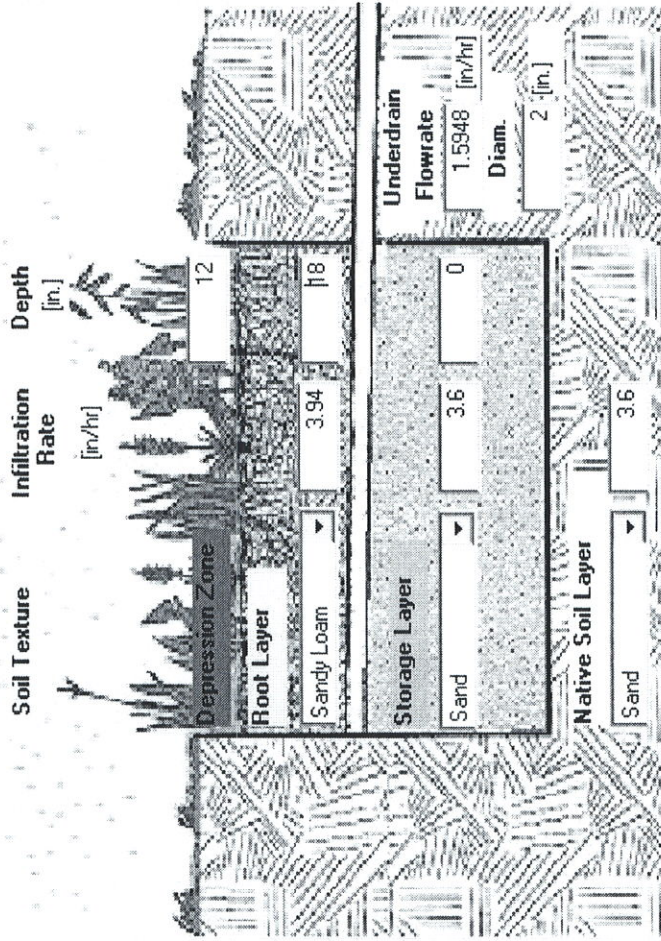
Planview Data

Facility Area [sf]
 Tributary Area [acre]
 Percent Impervious
 Pervious CN

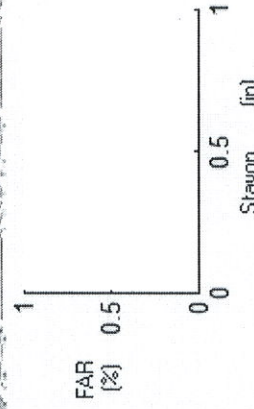
Files

Regional Ave. ET [in./day]
 Simulation Type
 Input File Length days
 Precip. File Name
 Output File Name
 Summary Record

Facility Inputs



Target Stay-on [in]
 Facility Area Ratio (%) Edit Text [%]



Results

Plant Survivability
 (Less than 48 hours max. ponding is desirable)

Hrs. Ponded	max. 6.5	Total 72
Number of overflows		5

Tributary Runoff

Precipitation		[in] 28.81
Impervious Runoff		20.8212
Pervious Runoff		4.4294

Raingarden Water

Runon	[in.] 14.2745	% 49.5471
Runoff	2.4805	8.6098
Recharge	10.374	36.0084
Evaporation	0.89603	3.1101
Underdrain	0.56986	1.978
Soil Moisture		-0.15923
Stay-on	25.759	89.4122

RUN SIMULATION

CLEAR RESULTS

East Basin RECARGA Version 2.3

Bioretention/Raingarden Sizing Program

Planview Data

Facility Area [sf]

Tributary Area [acre]

Percent Impervious

Pervious CN

Files

Regional Ave. ET [in./day]

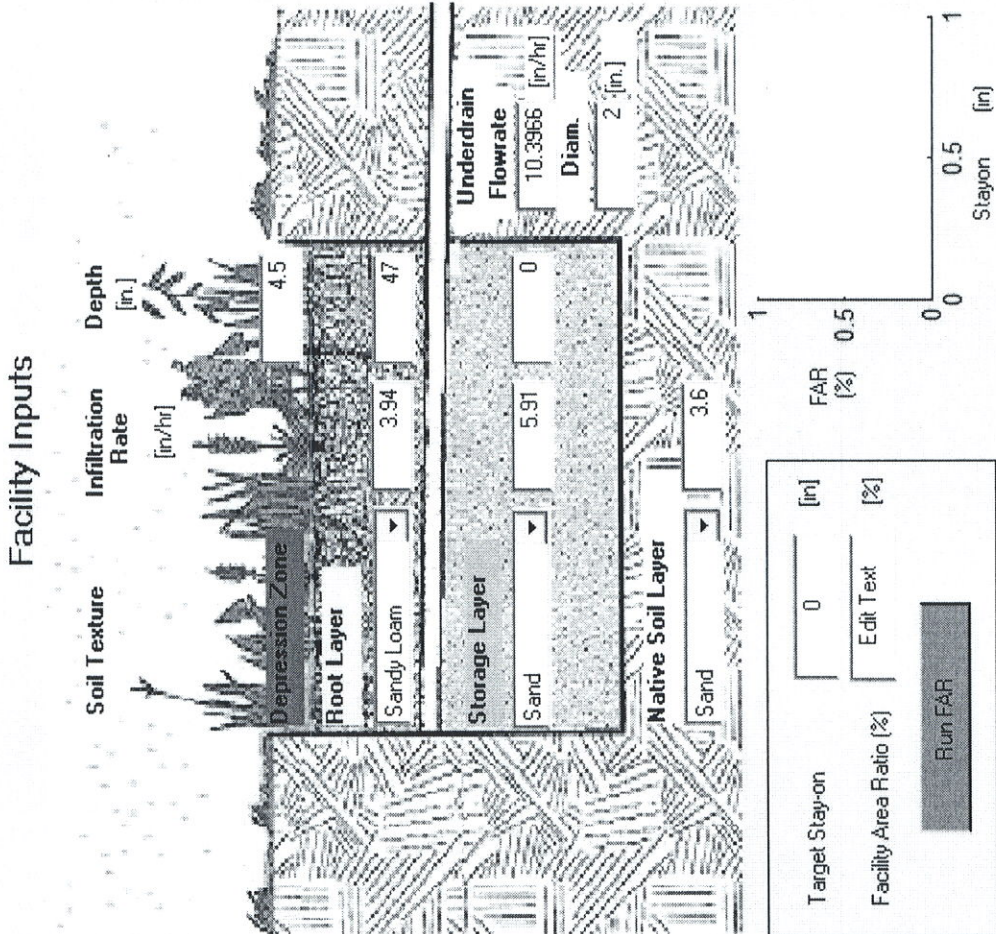
Simulation Type

Input File Length days

Precip. File Name

Output File Name

Summary Record



Results

Plant Survivability (Less than 48 hours max. ponding is desirable)

Hrs. Ponded	max. 9.75	Total 99.75
Number of overflows		19
Tributary Runoff		[in] 28.81
Precipitation		20.8212
Impervious Runoff		4.4294
Pervious Runoff		
Raingarden Water	[in.]	%
Runon	16.4529	57.1082
Runoff	7.4803	25.9642
Recharge	8.0845	28.0614
Evaporation	0.52844	1.8342
Underdrain	0.38961	1.3523
Soil Moisture	-0.029955	-0.10397
Stay-on	20.9401	72.6835



Soil Loss & Sediment Discharge Calculation Tool

for use on Construction Sites in the State of Wisconsin

WDNR Version 2.0 (06-29-2017)



YEAR 1

Developer: _____

Project: Noble Knight Games Parking Lot Expansion

Date: 07/08/21

County:

Version 1.0

Activity (1)	Begin Date (2)	End Date (3)	Period % R (4)	Annual R Factor (5)	Sub Soil Texture (6)	Soil Erodibility K Factor (7)	Slope (%) (8)	Slope Length (ft) (9)	LS Factor (10)	Land Cover C Factor (11)	Soil loss A (tons/acre) (12)	SDF (13)	Sediment Control Practice (14)	Sediment Discharge (t/ac) (15)
Bare Ground	09/01/21	10/01/21	10.7%	150	Silt Loam	0.43	3.5%	120	0.37	1.00	2.6	1.005	Sediment Basin	0.5
Seed with Mulch or Er	10/01/21	06/01/22	28.8%	150	Silt Loam	0.43	3.5%	120	0.37	0.10	0.7	1.005	Sediment Basin	0.1
End	06/01/22	-----	-----	-----	-----	-----	3.5%	120	0.37	-----	-----	0.000		0.0
		-----	-----	-----	-----	-----	3.5%	120	0.37	-----	-----	0.000		0.0
		-----	-----	-----	-----	-----	3.5%	0	-----	-----	-----	0.000		0.0
		-----	-----	-----	-----	-----	0.0%	0	-----	-----	-----	0.000		0.0
TOTAL											3.3		TOTAL	0.7
													% Reduction Required	NONE

Notes:

See Help Page for further descriptions of variables and items in drop-down boxes.
 The last land disturbing activity on each sheet must be 'End'. This is either 12 months from the start of construction or final stabilization.
 For periods of construction that exceed 12 months, please demonstrate that 5 tons/acre/year is not exceeded in any given 12 month period.

NOTE: THIS TOOL ONLY ADDRESSED SOIL EROSION DUE TO SHEET FLOW. MEASURES TO CONTROL CHANNEL EROSION MAY ALSO BE REQUIRED TO MEET SEDIMENT DISCHARGE REQUIREMENTS.

Recommended Permanent Seeding Dates:

4/1-5/15 and 8/7-8/29 Turf, introduced grasses and legumes
 Thaw-6/30 Native Grasses, forbs, and legumes

Designed By:	JJM
Date	