STH 31

Drainage Report

Project ID 2390-12-00
STH 11 to STH 20
STH 31
Racine County

March 17, 2021

Prepared By:

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Memo

Date: March 17, 2021

To: Vida Shaffer, PE, WisDOT

From: Silvana Pobric, PE, EMCS

CC: Brian Wilson, PE, EMCS

RE: 30% Hydrology Analysis and Stormwater Report
STH 31, STH 11 to STH 20
Racine County
ID 2390-12-00/70

Project Overview

The Proposed Action is located on STH 31 in the Village of Mount Pleasant and City of Racine in Racine County. The project is located between STH 11 and STH 20. Project length is approximately 1.5 miles.

The project proposes to improve pavement and operations, safety, and multimodal accommodations. The project would replace the deteriorating pavement with new pavement in addition to concrete curb and gutter. It would also include constructing shoulders, new sidewalk, storm sewer replacement, as well as traffic signal and street lighting replacement at intersections. Ground disturbing activities include clearing and grubbing of trees, excavation, and pavement and subgrade reconstruction. Strip right-of-way (R/W) acquisition and temporary limited easements (TLE) will be required for this project.

The intent of this memo is to document the pre and post runoff flows and evaluate potential solutions for the 30% design phase to determine the appropriate solutions. It is important to note that the analysis was based on current proposed typical sections. Any future changes to the typical sections will impact post-construction runoff.

Drainage Overview

Existing

Currently, the existing drainage patterns consist of four storm sewer systems (System #1-4). In general, the systems drain north to south and outfall into existing trunk lines on crossing roads except for System #1 which drains into an existing pond approximately 1,100 feet west of the STH 31. System #4 drains south to north. The existing storm sewer systems consist of 12-inch laterals and trunk lines varying from 15-inch to 48-inch. In general, the drainage area of the existing storm sewer system consists of roadway pavement, medians and adjacent residential and commercial areas.

Based on NRCS Soil Maps, the soil within the drainage areas are dominated mainly by hydrologic soil group C soils.

Proposed

Generally, the proposed storm sewer design will maintain the existing drainage patterns along STH 31. Proposed inlets will be placed in the approximate location of the existing inlets if the hydraulic design and roadway design allows. By keeping similar locations, this will allow existing connections from parking lot inlets, downspouts, and sump pumps of the private properties to remain connected to STH 31 storm sewer systems.

Due to the widening of the roadway and proposed sidewalk on the project, the impervious area of the drainage basins will increase. Though there will be increases, existing pavement medians will be replaced with grassed medians helping to reduce the increase in impervious areas.

Per WisDOT FDM Section 13-10, a 10-year storm will be used as the design storm for existing and proposed condition, with the time of concentration and peak flow calculated based on the Rational Method. The 25-year check will be done during hydraulics analysis

and design between 30% and 60% design phase.

System #1
The proposed system will consist of proposed trunk lines that generally will be located in the same location as existing or run along the center of the proposed STH 31 northbound outside lane. The system runs north and south and outfalls into the existing 48-inch storm sewer trunk line running west of STH 31 which eventually outfalls into an existing Stewart-McBride pond that is managed by the Village of Mount Pleasant and City of Racine.

System #2
The proposed system will consist of proposed trunk lines that generally will be located in the same location as existing or run along the center of the proposed STH 31 northbound outside lane. The system drains north and south and outfalls into an existing 30-inch storm sewer trunk line running along Byrd Avenue to the east.

System #3
The proposed system will consist of proposed trunk lines that generally will be located in the same location as existing or run along the center of the proposed STH 31 northbound outside lane. The system drains north and south and outfalls into an existing 36-inch storm sewer trunk line running north of 16th Avenue to the east and continues along Marboro Drive to the east.

System #4
The proposed system will consist of proposed trunk lines that generally will be located in the same location as existing or run along the center of the proposed STH 31 northbound lane. The system drains north and outfalls into an existing 21-inch storm sewer trunk line running along STH 20 to the east.

Pre/Post Construction Flow Evaluation
The difference in impervious area between existing and proposed preliminary analysis is approximately 10% increase. Due to the anticipated increase in runoff, hydraulics analysis will be run prior to 60% design and pipe sizes as well as slopes will be adjusted as needed to keep the increase to less than 5% per FDM 13-1-10.5.1.

A hydraulic analysis of the existing storm sewer systems was completed using Autodesk Storm and Sanitary Analysis (SSA). A 10-year storm was used as the design storm. The results showed that there are localized pipes within the systems having small surcharges; the hydraulic grade line (HGL) within the systems is below the roadway surface at all locations. The 25-year storm check was done for the existing storm sewer systems. The results also showed that there are localized pipes within systems having surcharges; the HGL within the system is below the roadway except at a few isolated locations.

As a preliminary analysis we evaluated a proposed system in SSA by upsizing the pipes and revising the slopes while keeping the trunk line in the same location as existing. The results of the preliminary analysis indicated that upsizing the pipes and revising the slopes will result in flow increase <5%.

The Village of Mount Pleasant and the City of Racine indicated no concerns over the anticipated increase in runoff to the existing outfalls.

Total Suspended Solids (TSS)
Per FDM 10-25 Attachment 1.1 Post Construction Stormwater Quality Management Goals the project is considered reconstruction and the TSS reduction goal is 40% or maximum extent practicable. In addition, the City of Racine and Village of Mount Pleasant are part of MS4 Communities which implement storm water control practices necessary to achieve a 20% TSS reduction.

Street cleaning, catchbasins, and the existing Stewart-McBride pond will be considered in the proposed storm sewer design to achieve the TSS reduction goals. At planning level street cleaning provides 10% TSS reduction, catchbasins proved 15% TSS reduction and wet detention pond provides 80% TSS reduction. Our preliminary analysis shows area-weighted TSS reduction of 52%.

Bioswales were not included in the design as the City of Racine and Village of Mount Pleasant indicated that maintenance of the bioswales were not desired.

Wisconsin Department of Natural Resources (DNR) Correspondence
A DNR initial project review was received on November 14, 2019. During the design process, appropriate erosion control devices will be implemented to satisfy stormwater management and erosion control requirements.

Exhibits

Exhibit 1: WisDOT Drainage Summary
Exhibit 2: Project Overview
Exhibit 3: Existing Drainage Areas
Exhibit 4: Existing Drainage Calculations
Exhibit 5: Proposed Drainage Areas
Exhibit 6: Proposed Drainage Calculations
Exhibit 7: Existing and Proposed Discharge Comparison
Exhibit 8: NRCS Soil Map
Exhibit 9: DNR Initial Review Letter

Basic Project Information

Project ID: 2390-12-00
Title: STH 31
Designer/Checker: SXP/HXT
DOT Region/Firm Name: SE Region/EMCS, Inc.
Date: March 17, 2021

HIGHWAY:	STH 31
LIMITS:	STH 11 to STH 20
COUNTY:	Racine
DESCRIPTION OF WORK:	Pavement and curb&gutter reconstruction, construction of shoulder and new sidewalk.
PROJECT MANAGER:	Vida Shaffer, PE, WisDOT & Brian Wilson, PE, EMCS, Inc.
PS&E DATE:	
DESIGN STAGE	☐ **Planning** ☑ **30%** ☐ **60%** ☐ **90%** ☐ **Final**

Drainage Summary

IS THERE A SIGNIFICANT FLOW INCREASE OR DECREASE WITHIN ANY SUB BASIN OF THE PROJECT? IF YES, DESCRIBE THE CAUSE OF THE CHANGE AND WHY IT IS NECESSARY.

Flow increases are anticipated to be non-significant (<5%).

IS THERE A SIGNIFICANT IMPERVIOUS AREA CHANGE TO ANY SUB BASIN OF THE PROJECT? IF YES, DESCRIBE THE CAUSE OF THE CHANGE AND WHY IT IS NECESSARY.

The impervious area will increase at all drainage basins due to 5' shoulders and sidewalks that are being added to the roadway section, which are not present in the existing condition.

HAVE THE DRAINAGE SUB BASIN AREAS OR FLOW PATHS CHANGED SIGNIFICANTLY? IF YES, DESCRIBE THE CAUSE OF THE CHANGE AND WHY IT IS NECESSARY.

Drainage sub basin areas or flow paths will not have significant changes.

DESCRIBE THE PROPOSED DRAINAGE CONVEYANCE AND CONTROL SYSTEMS FOR THE PROJECT.

The proposed drainage will consist of reconstructing of trunk lines, laterals, manholes and inlets.

DESCRIBE THE AQUATIC ORGANISM PASSAGE ISSUES FOR THE PROJECT, IF ANY.

There are no aquatic organism passage issues for the project.

IF THE DESIGN DOES NOT MEET THE DOT FDM CHAPTER 13 DRAINAGE REQUIREMENTS, EXPLAIN HOW AND WHY.

N/A

DESCRIBE WDNR COORDINATION. PROVIDE NAME OF WDNR CONTACT AND DATE, AND ATTACH ANY CORRESPONDENCE.

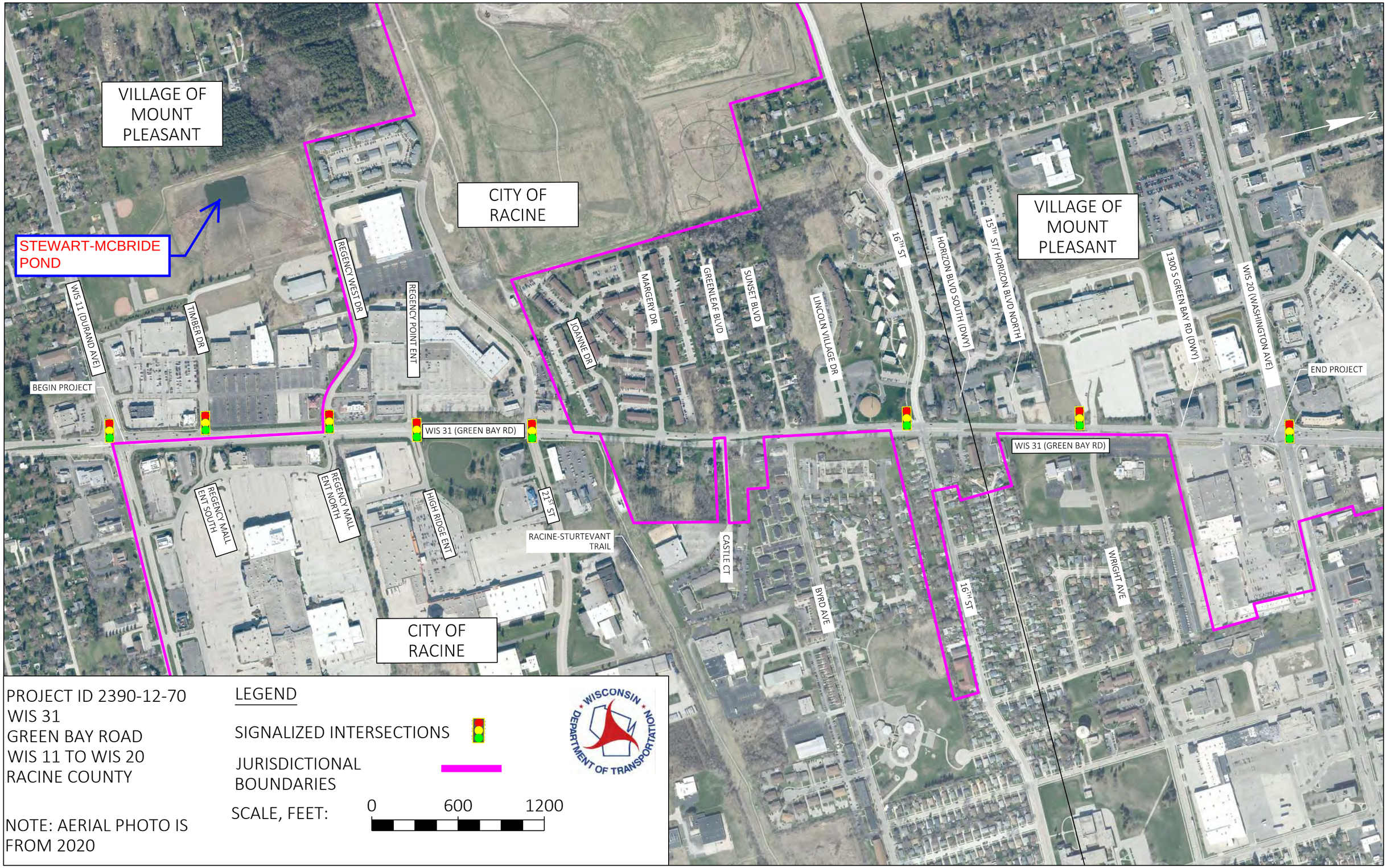
The initial review request was sent to WDNR on August 21, 2019. Kristina Betzold from WDNR responded with an initial review letter. See Exhibit 9.

IF THE DRAINAGE DESIGN MEETS LOCAL, MUNICIPAL OR REGIONAL GUIDELINES THAT EXCEED FDM CHAPTER 13 DRAINAGE REQUIREMENTS, EXPLAIN HOW AND WHY.

N/A

IF A SIGNIFICANT IMPACT TO THE PROJECT OCCURS DUE TO DRAINAGE, PROJECT MANAGER CONCURRENCE IS REQUIRED. (PM SIGN AND DATE)

Exhibit 2



PROJECT ID 2390-12-70
WIS 31
GREEN BAY ROAD
WIS 11 TO WIS 20
RACINE COUNTY

NOTE: AERIAL PHOTO IS FROM 2020

LEGEND

SIGNALIZED INTERSECTIONS

JURISDICTIONAL BOUNDARIES

SCALE, FEET: 0 600 1200

WISCONSIN DEPARTMENT OF TRANSPORTATION

Exhibit 3

2

2

OUTFALL #1

TIMBER DR

Drainage Basin 116
Tc = 5 min
C = 0.71
i = 6.8 in/hr
Q = 0.3 cfs

Drainage Basin 115
Tc = 5 min
C = 0.59
i = 6.8 in/hr
Q = 3.9 cfs

REGENCY MALL
ENT SOUTH

Drainage Basin 110
Tc = 5 min
C = 0.70
i = 6.8 in/hr
Q = 5.0 cfs

STH 31

Drainage Basin 105
Tc = 5 min
C = 0.56
i = 6.8 in/hr
Q = 2.0 cfs

Drainage Basin 105
Tc = 5 min
C = 0.56
i = 6.8 in/hr
Q = 2.0 cfs

Drainage Basin 100
Tc = 5 min
C = 0.85
i = 6.8 in/hr
Q = 0.9 cfs

STH 11

N

SCALE
1" = 100'

DIRECTION OF FLOW

SYSTEM #1 DRAINING
TO OUTFALL #1

PROJECT NO: 2390-12-70	HWY: STH 31	COUNTY: RACINE	EXISTING DRAINAGE BASINS	SHEET	E

FILE NAME : Y:\52XX\5231_DP.STH31.RCN\CADDS\23901200\SHEETSOTHER\DRAINAGE\STH 31_DRAINAGE BASINS_EX.DWG
LAYOUT NAME - Sheet 1

PLOT DATE : 3/9/2021 1:29 PM PLOT BY : SILVANA POBRIC PLOT NAME : PLOT SCALE : 1 IN:100 FT

WISDOT/CADDS SHEET 42

Exhibit 3

2

2

Drainage Basin 125
Tc = 5 min
C = 0.62
i = 6.8 in/hr
Q = 6.3 cfs

Drainage Basin 120
Tc = 5 min
C = 0.64
i = 6.8 in/hr
Q = 8.5 cfs

Tc = 5 min
C = 0.85
i = 6.8 in/hr
Q = 14.7 cfs

N

SCALE
1" = 100'

STH 31

OUTFALL #1

TIMBER DR

Drainage Basin 116
Tc = 5 min
C = 0.71
i = 6.8 in/hr
Q = 0.3 cfs

Drainage Basin 115
Tc = 5 min
C = 0.59
i = 6.8 in/hr
Q = 3.9 cfs

REGENCY MALL
ENT SOUTH

705

710

DIRECTION OF FLOW

SYSTEM #1 DRAINING
TO OUTFALL #1

PROJECT NO: 2390-12-70	HWY: STH 31	COUNTY: RACINE	EXISTING DRAINAGE BASINS	SHEET	E

FILE NAME : Y:\52XX\5231_DP.STH31.RCN\CADDS\23901200\SHEETSOTHER\DRAINAGE\STH 31_DRAINAGE BASINS_EX.DWG
LAYOUT NAME - Sheet 2

PLOT DATE : 3/9/2021 1:29 PM PLOT BY : SILVANA POBRIC PLOT NAME : PLOT SCALE : 1 IN:100 FT

WISDOT/CADDS SHEET 42

Exhibit 3

2

2

N

REGENCY POINT ENT

HIGH RIDGE ENT

STH 31

715

710

REGENCY WEST DR

REGENCY MALL
ENT NORTH

Drainage Basin 135
Tc = 5 min
C = 0.72
i = 6.8 in/hr
Q = 12.8 cfs

Drainage Basin 130
Tc = 5 min
C = 0.61
i = 6.8 in/hr
Q = 3.9 cfs

Drainage Basin
Tc = 5 min
C = 0.85
i = 6.8 in/hr
Q = 11.0 cfs

Drainage Basin 131
Tc = 5 min
C = 0.85
i = 6.8 in/hr
Q = 14.7 cfs

Drainage Basin 125
Tc = 5 min
C = 0.62

SCALE
1" = 100'

DIRECTION OF FLOW

SYSTEM #1 DRAINING
TO OUTFALL #1

PROJECT NO: 2390-12-70	HWY: STH 31	COUNTY: RACINE	EXISTING DRAINAGE BASINS	SHEET	E

FILE NAME : Y:\52XX\5231_DP.STH31.RCN\CADDS\23901200\SHEETSOTHER\DRAINAGE\STH 31_DRAINAGE BASINS_EX.DWG
LAYOUT NAME - Sheet 3

PLOT DATE : 3/9/2021 1:29 PM PLOT BY : SILVANA POBRIC PLOT NAME : PLOT SCALE : 1 IN:100 FT

WISDOT/CADDS SHEET 42

Exhibit 3

21ST ST

21ST ST

STH 31

Drainage Basin 145
Tc = 5 min
C = 0.56
i = 6.8 in/hr
Q = 4.2 cfs

Drainage Basin 150
Tc = 5 min
C = 0.75
i = 6.8 in/hr
Q = 5.9 cfs

Drainage Basin 140
Tc = 5 min
C = 0.58
i = 6.8 in/hr
Q = 3.7 cfs

N

SCALE
1" = 100'

DIRECTION OF FLOW

SYSTEM #1 DRAINING TO OUTFALL #1

PROJECT NO: 2390-12-70	HWY: STH 31	COUNTY: RACINE	EXISTING DRAINAGE BASINS	SHEET	E

FILE NAME : Y:\52XX\5231_DP.STH31.RCN\CADDS\23901200\SHEETSOTHER\DRAINAGE\STH 31_DRAINAGE BASINS_EX.DWG
LAYOUT NAME - Sheet 4

PLOT DATE : 3/9/2021 1:30 PM PLOT BY : SILVANA POBRIC PLOT NAME : PLOT SCALE : 1 IN:100 FT

WISDOT/CADDS SHEET 42

Exhibit 3

2

2

SUNSET BLVD

GREENLEAFT BLVD

MARGERY DR

JOANNE DR

21ST ST

STH 31

BYRD AVE

N

SCALE
1" = 200'

OUTFALL #2

Tc 210

Tc 195

Drainage Basin 195
Tc = 21.1 min
C = 0.61
i = 3.5 in/hr
Q = 9.1 cfs

Drainage Basin 216
Tc = 5 min
C = 0.75
i = 6.8 in/hr
Q = 0.3 cfs

Drainage Basin 205
Tc = 5 min
C = 0.66
i = 6.8 in/hr
Q = 1.7 cfs

Drainage Basin 200
Tc = 5 min
C = 0.63
i = 6.8 in/hr
Q = 3.1 cfs

Drainage Basin 190
Tc = 5 min
C = 0.56
i = 6.8 in/hr
Q = 2.6 cfs

Drainage Basin 185
Tc = 5 min
C = 0.66
i = 6.8 in/hr
Q = 1.7 cfs

Drainage Basin 180
Tc = 5 min
C = 0.46
i = 6.8 in/hr
Q = 3.1 cfs

Drainage Basin 175
Tc = 5 min
C = 0.43
i = 6.8 in/hr
Q = 4.9 cfs

Drainage Basin 170
Tc = 5 min
C = 0.34
i = 6.8 in/hr
Q = 5.5 cfs

Drainage Basin 165
Tc = 5 min
C = 0.54
i = 6.8 in/hr
Q = 78.6 cfs

Drainage Basin 160
Tc = 5 min
C = 0.74
i = 6.8 in/hr
Q = 3.8 cfs

Drainage Basin 155
Tc = 5 min
C = 0.63
i = 6.8 in/hr
Q = 11.3 cfs

DIRECTION OF FLOW

SYSTEM #1 DRAINING TO OUTFALL #1

SYSTEM #2 DRAINING TO OUTFALL #2

PROJECT NO: 2390-12-70	HWY: STH 31	COUNTY: RACINE	EXISTING DRAINAGE BASINS	SHEET	E

FILE NAME : Y:\52XX\5231_DP.STH31.RCN\CADDS\23901200\SHEETSOTHER\DRAINAGE\STH 31_DRAINAGE BASINS_EX.DWG
LAYOUT NAME - Sheet 5

PLOT DATE : 3/15/2021 8:33 PM PLOT BY : SILVANA POBRIC PLOT NAME : PLOT SCALE : 1 IN:200 FT

WISDOT/CADDS SHEET 42

Exhibit 3

2

2

DIRECTION OF FLOW

SYSTEM #2 DRAINING TO OUTFALL #2

SYSTEM #3 DRAINING TO OUTFALL #3

OUTFALL #3

OUTFALL #2

SCALE
1" = 200'

N

16TH ST

MARBORO DR

16TH ST

STH 31

LINCOLN VILLAGE DR

SUNSET BLVD

GREENLEAF BLVD

BYRD AVE

Drainage Basin 231
Tc = 5 min
C = 0.61
i = 6.8 in/hr
Q = 21.9 cfs

Drainage Basin 225
Tc = 5 min
C = 0.61
i = 6.8 in/hr
Q = 8.1 cfs

Drainage Basin 230
Tc = 5 min
C = 0.66
i = 6.8 in/hr
Q = 2.4 cfs

Drainage Basin 210
Tc = 22.8 min
C = 0.45
i = 3.4 in/hr
Q = 36.9 cfs

Drainage Basin 220
Tc = 5 min
C = 0.67
i = 6.8 in/hr
Q = 5.0 cfs

Drainage Basin 215
Tc = 5 min
C = 0.75
i = 6.8 in/hr
Q = 2.9 cfs

Drainage Basin 216
Tc = 5 min
C = 0.75
i = 6.8 in/hr
Q = 0.3 cfs

Drainage Basin 205
Tc = 5 min
C = 0.66
i = 6.8 in/hr
Q = 1.7 cfs

Drainage Basin 200
Tc = 5 min
C = 0.63
i = 6.8 in/hr
Q = 3.1 cfs

Drainage Basin 195
Tc = 21.1 min
C = 0.61
i = 3.5 in/hr
Q = 9.1 cfs

Tc 210

Tc 195

PROJECT NO: 2390-12-70	HWY: STH 31	COUNTY: RACINE	EXISTING DRAINAGE BASINS	SHEET	E

FILE NAME : Y:\52XX\5231_DP.STH31.RCN\CADDS\23901200\SHEETSOTHER\DRAINAGE\STH 31_DRAINAGE BASINS_EX.DWG
LAYOUT NAME - Sheet 6

PLOT DATE : 3/15/2021 8:34 PM PLOT BY : SILVANA POBRIC PLOT NAME : PLOT SCALE : 1 IN:200 FT

WISDOT/CADDS SHEET 42

Exhibit 3

2

2

N

SCALE
1" = 100'

WRIGHT AVE

Drainage Basin 235
Tc = 5 min
C = 0.59
i = 6.8 in/hr
Q = 13.8 cfs

Drainage Basin 240
Tc = 5 min
C = 0.55
i = 6.8 in/hr
Q = 3.2 cfs

Drainage Basin 245
Tc = 5 min
C = 0.59
i = 6.8 in/hr
Q = 3.8 cfs

735
735
735
730
730
725

STH 31

DIRECTION OF FLOW

SYSTEM #3 DRAINING
TO OUTFALL #3

PROJECT NO: 2390-12-70	HWY: STH 31	COUNTY: RACINE	EXISTING DRAINAGE BASINS	SHEET	E

FILE NAME : Y:\52XX\5231_DP.STH31.RCN\CADDS\23901200\SHEETSOTHER\DRAINAGE\STH 31_DRAINAGE BASINS_EX.DWG
LAYOUT NAME - Sheet 7

PLOT DATE : 3/9/2021 1:30 PM PLOT BY : SILVANA POBRIC PLOT NAME : PLOT SCALE : 1 IN:100 FT

WISDOT/CADDS SHEET 42

Exhibit 3

2

2

N

SCALE
1" = 100'

Drainage Basin 260
Tc = 5 min
C = 0.78
i = 6.8 in/hr
Q = 11.2 cfs

Drainage Basin 255
Tc = 5 min
C = 0.63
i = 6.8 in/hr
Q = 5.5 cfs

Drainage Basin 250
Tc = 5 min
C = 0.63
i = 6.8 in/hr
Q = 10.2 cfs

STH 31

HP

725

730

735

740

740

735

DIRECTION OF FLOW

SYSTEM #3 DRAINING TO OUTFALL #3

SYSTEM #4 DRAINING TO OUTFALL #4

PROJECT NO: 2390-12-70	HWY: STH 31	COUNTY: RACINE	EXISTING DRAINAGE BASINS	SHEET	E

FILE NAME : Y:\52XX\5231_DP.STH31.RCN\CADDS\23901200\SHEETSOTHER\DRAINAGE\STH 31_DRAINAGE BASINS_EX.DWG
LAYOUT NAME - Sheet 8

PLOT DATE : 3/9/2021 1:30 PM PLOT BY : SILVANA POBRIC PLOT NAME : PLOT SCALE : 1 IN:100 FT

WISDOT/CADDS SHEET 42

Exhibit 3

2

2

N

SCALE
1" = 100'

STH 31

STH 20

Drainage Basin 271
Tc = 5 min
C = 0.81
i = 6.8 in/hr
Q = 4.0 cfs

OUTFALL #4

Drainage Basin 270
Tc = 5 min
C = 0.75
i = 6.8 in/hr
Q = 11.1 cfs

Drainage Basin 265
Tc = 5 min
C = 0.85
i = 6.8 in/hr
Q = 2.7 cfs

730

725

735

740

DIRECTION OF FLOW

SYSTEM #4 DRAINING
TO OUTFALL #4

PROJECT NO: 2390-12-70	HWY: STH 31	COUNTY: RACINE	EXISTING DRAINAGE BASINS	SHEET	E

FILE NAME : Y:\52XX\5231_DP.STH31.RCN\CADDS\23901200\SHEETSOTHER\DRAINAGE\STH 31_DRAINAGE BASINS_EX.DWG
LAYOUT NAME - Sheet 9

PLOT DATE : 3/9/2021 1:30 PM PLOT BY : SILVANA POBRIC PLOT NAME : PLOT SCALE : 1 IN:100 FT

WISDOT/CADDS SHEET 42

Exhibit 4

PROJECT ID: 2390-12-70
STH 31
Existing Runoff Coefficient and Discharge Calcluations
HYDROLOGY

DRAINAGE BASIN	LAND USE	AREA (SF)	AREA (acres)	% OF TOTAL BASIN AREA	% OF BASIN CHECK	TOTAL AREA (acres)	RUNOFF COEFFICIENT (C)	C * (% of TTL basin area)	COMBINED COEFFICIENT (C)	RAINFALL INTENSITY (i) 10-yr (in/hr)	DISCHARGE Q=C*i*A 10-yr (cfs)
100	ASPHALT	6,440	0.15	100%	100%	0.148	0.85	0.850	0.85	6.8	0.9
105	ASPHALT	12,220	0.28	53%	100%	0.528	0.85	0.452	0.56	6.8	2.0
	GRASS	10,771	0.25	47%			0.23	0.108			
110	ASPHALT	34,167	0.784	76%	100%	1.037	0.85	0.643	0.70	6.8	5.0
	GRASS	10,996	0.252	24%			0.23	0.056			
115	ASPHALT	24,428	0.561	58%	100%	0.969	0.85	0.492	0.59	6.8	3.9
	GRASS	17,764	0.408	42%			0.23	0.097			
116	ASPHALT	2,394	0.055	78%	100%	0.071	0.85	0.659	0.71	6.8	0.3
	GRASS	692	0.016	22%			0.23	0.052			
120	ASPHALT	55,747	1.280	66%	100%	1.951	0.85	0.558	0.64	6.8	8.5
	GRASS	29,234	0.671	34%			0.23	0.079			
125	ASPHALT	40,354	0.926	62%	100%	1.492	0.85	0.528	0.62	6.8	6.3
	GRASS	24,628	0.565	38%			0.23	0.087			
130	ASPHALT	25,311	0.581	62%	100%	0.942	0.85	0.524	0.61	6.8	3.9
	GRASS	15,725	0.361	38%			0.23	0.088			
131	ASPHALT	110,164	2.529	100%	100%	2.529	0.85	0.850	0.85	6.8	14.7
	GRASS	0	0.000	0%			0.23	0.000			
132	ASPHALT	82,234	1.888	100%	100%	1.888	0.85	0.850	0.85	6.8	11.0
	GRASS	0	0.000	0%			0.23	0.000			
135	ASPHALT	89,448	2.053	80%	100%	2.577	0.85	0.677	0.72	6.8	12.8
	GRASS	22,798	0.523	20%			0.23	0.047			
140	ASPHALT	22,887	0.525	56%	100%	0.939	0.85	0.475	0.58	6.8	3.7
	GRASS	18,028	0.414	44%			0.23	0.101			
145	ASPHALT	25,305	0.581	53%	100%	1.105	0.85	0.447	0.56	6.8	4.2
	GRASS	22,808	0.524	47%			0.23	0.109			
150	ASPHALT	42,339	0.972	84%	100%	1.154	0.85	0.716	0.75	6.8	5.9
	GRASS	7,932	0.182	16%			0.23	0.036			
155	ASPHALT	73,535	1.688	64%	100%	2.623	0.85	0.547	0.63	6.8	11.3
	GRASS	40,713	0.935	36%			0.23	0.082			
160	ASPHALT	26,716	0.613	82%	100%	0.745	0.85	0.700	0.74	6.8	3.8
	GRASS	5,739	0.132	18%			0.23	0.041			
165	ASPHALT	143,817	3.302	16%	100%	21.154	0.85	0.133	0.54	6.8	78.6
	HIGH DENSITY RESIDENTIAL	642,814	14.757	70%			0.54	0.377			
	GRASS	134,831	3.095	15%			0.23	0.034			
170	ASPHALT	18,368	0.422	18%	100%	2.377	0.85	0.151	0.34	6.8	5.5
	GRASS	85,155	1.955	82%			0.23	0.189			
175	ASPHALT	23,754	0.545	33%	100%	1.668	0.85	0.278	0.43	6.8	4.9
	GRASS	48,907	1.123	67%			0.23	0.155			
180	ASPHALT	15,829	0.363	36%	100%	1.000	0.85	0.309	0.46	6.8	3.1
	GRASS	27,741	0.637	64%			0.23	0.146			
185	ASPHALT	11,476	0.263	69%	100%	0.380	0.85	0.590	0.66	6.8	1.7
	GRASS	5,069	0.116	31%			0.23	0.070			
190	ASPHALT	15,548	0.357	53%	100%	0.674	0.85	0.450	0.56	6.8	2.6
	GRASS	13,832	0.318	47%			0.23	0.108			
195	ASPHALT	29,399	0.675	16%	100%	4.220	0.85	0.136	0.61	3.5	9.1
	MEDIUM DENSITY RESIDENTIAL	136,807	3.141	74%			0.38	0.283			
	GRASS	17,602	0.404	10%			0.23	0.022			
200	ASPHALT	20,417	0.469	65%	100%	0.720	0.85	0.553	0.63	6.8	3.1
	GRASS	10,952	0.251	35%			0.23	0.080			
205	ASPHALT	11,674	0.268	69%	100%	0.387	0.85	0.589	0.66	6.8	1.7
	GRASS	5,162	0.119	31%			0.23	0.071			
210	ASPHALT	179,110	4.112	21%	100%	19.181	0.85	0.182	0.45	3.4	29.4
	MEDIUM DENSITY RESIDENTIAL	445,463	10.226	53%			0.38	0.203			
	HIGH DENSITY RESIDENTIAL	21,195	0.487	3%			0.54	0.014			
	GRASS	189,762	4.356	23%			0.23	0.052			
215	ASPHALT	20,602	0.473	84%	100%	0.560	0.85	0.718	0.75	6.8	2.9
	GRASS	3,802	0.087	16%			0.23	0.036			
216	ASPHALT	2,304	0.053	84%	100%	0.063	0.85	0.713	0.75	6.8	0.3
	GRASS	441	0.010	16%			0.23	0.037			
220	ASPHALT	33,421	0.767	70%	100%	1.091	0.85	0.598	0.67	6.8	5.0
	GRASS	14,110	0.324	30%			0.23	0.068			
225	ASPHALT	52,113	1.196	62%	100%	1.938	0.85	0.525	0.61	6.8	8.1
	GRASS	32,303	0.742	38%			0.23	0.088			
230	ASPHALT	16,206	0.372	69%	100%	0.542	0.85	0.583	0.66	6.8	2.4
	GRASS	7,416	0.170	31%			0.23	0.072			
231	ASPHALT	140,446	3.224	62%	100%	5.199	0.85	0.527	0.61	6.8	21.9
	GRASS	86,005	1.974	38%			0.23	0.087			
235	ASPHALT	86,518	1.986	58%	100%	3.417	0.85	0.494	0.59	6.8	13.8
	GRASS	62,344	1.431	42%			0.23	0.096			
240	ASPHALT	18,972	0.436	52%	100%	0.837	0.85	0.443	0.55	6.8	3.2
	GRASS	17,471	0.401	48%			0.23	0.110			
245	ASPHALT	23,795	0.546	58%	100%	0.939	0.85	0.495	0.59	6.8	3.8
	GRASS	17,101	0.393	42%			0.23	0.096			
250	ASPHALT	66,440	1.525	64%	100%	2.393	0.85	0.542	0.63	6.8	10.2
	GRASS	37,811	0.868	36%			0.23	0.083			
255	ASPHALT	35,737	0.820	64%	100%	1.274	0.85	0.548	0.63	6.8	5.5
	GRASS	19,745	0.453	36%			0.23	0.082			
260	ASPHALT	81,378	1.868	89%	100%	2.103	0.85	0.755	0.78	6.8	11.2
	GRASS	10,225	0.235	11%			0.23	0.026			
265	ASPHALT	20,471	0.470	100%	100%	0.470	0.85	0.850	0.85	6.8	2.7
270	ASPHALT	79,244	1.819	84%	100%	2.165	0.85	0.714	0.75	6.8	11.1
	GRASS	15,070	0.346	16%			0.23	0.037			
271	ASPHALT	29,702	0.682	93%	100%	0.731	0.85	0.793	0.81	6.8	4.0
	GRASS	2,133	0.049	7%			0.23	0.015			

Exhibit 4

PROJECT ID: 2390-12-70
EXISTING HYDROLOGY

	LAND USE	COMBAINED DRAINAGE AREA (SF)	AREA (acres)	% OF TOTAL BASIN AREA	% OF BASIN CHECK	TOTAL AREA (acres)	RUNOFF COEFFICIENT (C)	C * (% of TTL basin area)	COMBINED COEFFICIENT (C)	RAINFALL INTENSITY (i) 10-yr (in/hr)	DISCHARGE Q=C*i*A 10-yr (cfs)
OUTFALL #1	ASPHALT	875,457	20.10	43%	100%	46.89	0.85	0.36	0.59	2.8	77.9
	MEDIUM DENSITY RESIDENTIAL	0	0.00	0%			0.38	0.00			
	HIGH DENSITY RESIDENTIAL	642,814	14.76	31%			0.54	0.17			
	GRASS	524,462	12.04	26%			0.23	0.06			

	LAND USE	COMBAINED DRAINAGE AREA (SF)	AREA (acres)	% OF TOTAL BASIN AREA	% OF BASIN CHECK	TOTAL AREA (acres)	RUNOFF COEFFICIENT (C)	C * (% of TTL basin area)	COMBINED COEFFICIENT (C)	RAINFALL INTENSITY (i) 10-yr (in/hr)	DISCHARGE Q=C*i*A 10-yr (cfs)
OUTFALL #2	ASPHALT	323,951	7.44	27%	100%	27.28	0.85	0.23	0.48	6.8	89.2
	MEDIUM DENSITY RESIDENTIAL	582,270	13.37	49%			0.38	0.19			
	HIGH DENSITY RESIDENTIAL	21,195	0.49	2%			0.54	0.01			
	GRASS	260,732	5.99	22%			0.23	0.05			

	LAND USE	COMBAINED DRAINAGE AREA (SF)	AREA (acres)	% OF TOTAL BASIN AREA	% OF BASIN CHECK	TOTAL AREA (acres)	RUNOFF COEFFICIENT (C)	C * (% of TTL basin area)	COMBINED COEFFICIENT (C)	RAINFALL INTENSITY (i) 10-yr (in/hr)	DISCHARGE Q=C*i*A 10-yr (cfs)
OUTFALL #3	ASPHALT	440,227	10.11	61%	100%	16.54	0.85	0.52	0.61	6.8	68.9
	MEDIUM DENSITY RESIDENTIAL	0	0.00	0%			0.38	0.00			
	HIGH DENSITY RESIDENTIAL	0	0.00	0%			0.54	0.00			
	GRASS	280,196	6.43	39%			0.23	0.09			

	LAND USE	COMBAINED DRAINAGE AREA (SF)	AREA (acres)	% OF TOTAL BASIN AREA	% OF BASIN CHECK	TOTAL AREA (acres)	RUNOFF COEFFICIENT (C)	C * (% of TTL basin area)	COMBINED COEFFICIENT (C)	RAINFALL INTENSITY (i) 10-yr (in/hr)	DISCHARGE Q=C*i*A 10-yr (cfs)
OUTFALL #4	ASPHALT	210,795	4.84	89%	100%	5.42	0.85	0.76	0.78	6.8	29.0
	MEDIUM DENSITY RESIDENTIAL	0	0.00	0%			0.38	0.00			
	HIGH DENSITY RESIDENTIAL	0	0.00	0%			0.54	0.00			
	GRASS	25,295	0.58	11%			0.23	0.02			

Exhibit 4

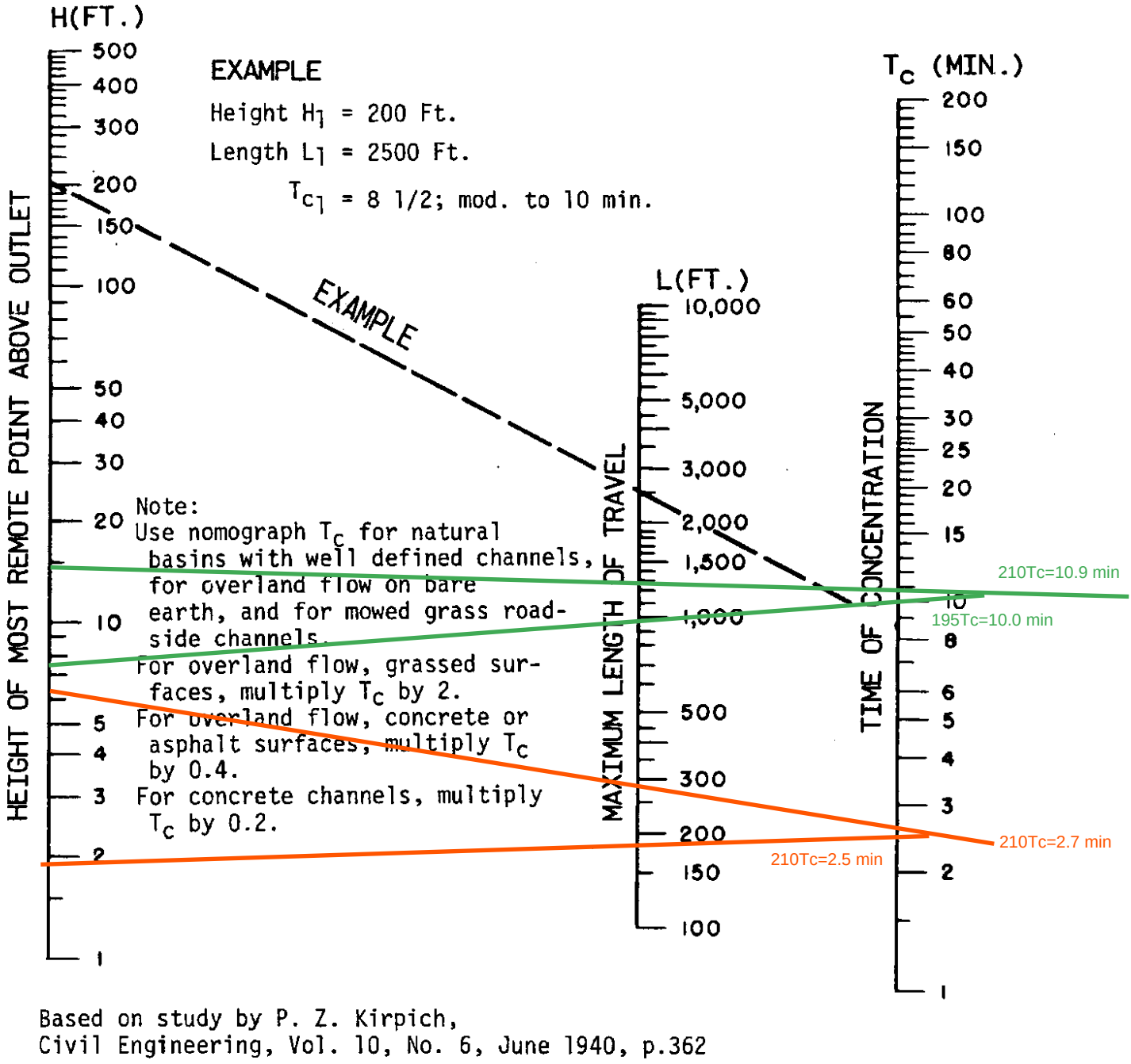
PROJECT ID: 2390-12-70
STH 31
Time of Concentration Calculations
(See FDM 13-10 Attachment 5.3)

BASIN #	elev(hi)	elev(lo)	H (FT)	L (FT)	Tc	Tc * 2	Tc * 0.4	Used Tc	COMMENTS
100								5	This is very small area. Used minimum of 5 minutes.
105								5	This is very small area. Used minimum of 5 minutes.
110								5	This is very small area. Used minimum of 5 minutes.
115								5	This is very small area. Used minimum of 5 minutes.
116								5	This is very small area. Used minimum of 5 minutes.
120								5	This is very small area. Used minimum of 5 minutes.
125								5	This is very small area. Used minimum of 5 minutes.
130								5	This is very small area. Used minimum of 5 minutes.
131								5	This is very small area. Used minimum of 5 minutes.
132								5	This is very small area. Used minimum of 5 minutes.
133								5	This is very small area. Used minimum of 5 minutes.
135								5	This is very small area. Used minimum of 5 minutes.
140								5	This is very small area. Used minimum of 5 minutes.
145								5	This is very small area. Used minimum of 5 minutes.
150								5	This is very small area. Used minimum of 5 minutes.
155								5	This is very small area. Used minimum of 5 minutes.
160								5	This is very small area. Used minimum of 5 minutes.
165								5	This is very small area. Used minimum of 5 minutes.
170								5	This is very small area. Used minimum of 5 minutes.
175								5	This is very small area. Used minimum of 5 minutes.
180								5	This is very small area. Used minimum of 5 minutes.
185								5	This is very small area. Used minimum of 5 minutes.
190								5	This is very small area. Used minimum of 5 minutes.
195	742.61	735.02	7.59	974	10.0	20		21.1	Tc over the grassed surface
	734.65	728.2	6.45	286	2.7		1.08		Tc over the concret or asphalt surface
	Total					20	1.08		
200								5	This is very small area. Used minimum of 5 minutes.
205								5	This is very small area. Used minimum of 5 minutes.
210	742.61	727.9	14.71	1288	10.9	21.8		22.8	Tc over the grassed surface
	727.79	725.97	1.82	180	2.5		1		Tc over the concret or asphalt surface
	Total					21.8	1		
215								5	This is very small area. Used minimum of 5 minutes.
216								5	This is very small area. Used minimum of 5 minutes.
220								5	This is very small area. Used minimum of 5 minutes.
225								5	This is very small area. Used minimum of 5 minutes.
230								5	This is very small area. Used minimum of 5 minutes.
231								5	This is very small area. Used minimum of 5 minutes.
235								5	This is very small area. Used minimum of 5 minutes.
240								5	This is very small area. Used minimum of 5 minutes.
245								5	This is very small area. Used minimum of 5 minutes.
250								5	This is very small area. Used minimum of 5 minutes.
255								5	This is very small area. Used minimum of 5 minutes.
260								5	This is very small area. Used minimum of 5 minutes.
265								5	This is very small area. Used minimum of 5 minutes.
270								5	This is very small area. Used minimum of 5 minutes.
271								5	This is very small area. Used minimum of 5 minutes.

NOTES:
H= elev(hi)- elev(lo) [height of most remote point above outlet]
L= length of Tc path
Tc determined by nomograph
For overland flow, grassed surfaces, multiply Tc by 2
For overland flow, concrete or asphalt surfaces, multiply Tc by 0.4

Tc over the concret or asphalt surface
Tc over the grassed surface

TIME OF CONCENTRATION OF SMALL T_c DRAINAGE BASINS



Based on study by P. Z. Kirpich,
Civil Engineering, Vol. 10, No. 6, June 1940, p.362

Exhibit 5

2

2

OUTFALL #1

TIMBER DR

STH 31

116

See Exhibit 3 Existing Drainage Areas for storm sewer systems and flow direction.

SCALE
1" = 100'

Drainage Basin 116
Tc = 5 min
C = 0.83
i = 6.8 in/hr
Q = 1.7 cfs

Drainage Basin 115
Tc = 5 min
C = 0.73
i = 6.8 in/hr
Q = 5.4 cfs

REGENCY MALL
ENT SOUTH

Drainage Basin 110
Tc = 5 min
C = 0.73
i = 6.8 in/hr
Q = 4.4 cfs

Drainage Basin 105
Tc = 5 min
C = 0.71
i = 6.8 in/hr
Q = 3.3 cfs

Drainage Basin 100
Tc = 5 min
C = 0.90
i = 6.8 in/hr
Q = 0.8 cfs

STH 11

PROJECT NO: 2390-12-70	HWY: STH 31	COUNTY: RACINE	PROPOSED DRAINAGE BASINS	SHEET	E

FILE NAME : Y:\52XX\5231_DP.STH31.RCN\CADDS\23901200\SHEETSOTHER\DRAINAGE\STH 31_DRAINAGE BASINS_PR.DWG
LAYOUT NAME - Sheet 1

PLOT DATE : 3/16/2021 2:48 PM PLOT BY : SILVANA POBRIC PLOT NAME : PLOT SCALE : 1 IN:100 FT

WISDOT/CADDS SHEET 42

Exhibit 5

2

2

Drainage Basin 125
Tc = 5 min
C = 0.72
i = 6.8 in/hr
Q = 6.6 cfs

Drainage Basin 120
Tc = 5 min
C = 0.73
i = 6.8 in/hr
Q = 10.4 cfs

Drainage Basin 115
Tc = 5 min
C = 0.73
i = 6.8 in/hr
Q = 5.4 cfs

Drainage Basin 116
Tc = 5 min
C = 0.83
i = 6.8 in/hr
Q = 1.7 cfs

Tc = 5 min
C = 0.85
i = 6.8 in/hr
Q = 14.7 cfs

N

SCALE
1" = 100'

STH 31

OUTFALL #1

TIMBER DR

116

REGENCY MALL
ENT SOUTH

710

PROJECT NO: 2390-12-70	HWY: STH 31	COUNTY: RACINE	PROPOSED DRAINAGE BASINS	SHEET	E

FILE NAME : Y:\52XX\5231_DP.STH31.RCN\CADDS\23901200\SHEETSOTHER\DRAINAGE\STH 31_DRAINAGE BASINS_PR.DWG
LAYOUT NAME - Sheet 2

PLOT DATE : 3/16/2021 2:48 PM PLOT BY : SILVANA POBRIC PLOT NAME : PLOT SCALE : 1 IN:100 FT

WISDOT/CADDS SHEET 42

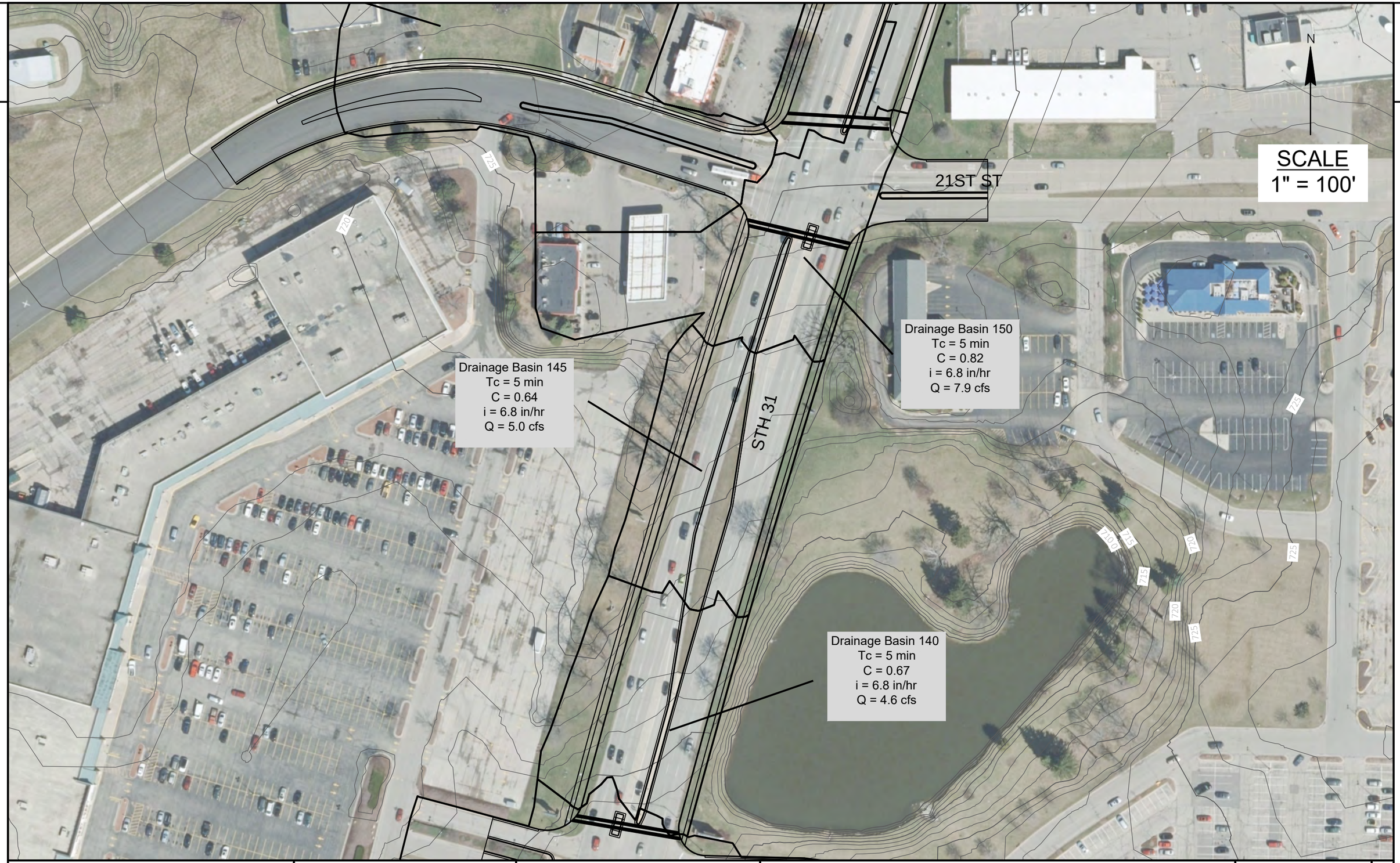
Exhibit 5

PROJECT NO: 2390-12-70	HWY: STH 31	COUNTY: RACINE	PROPOSED DRAINAGE BASINS	SHEET	E

FILE NAME : Y:\52XX\5231_DP.STH31.RCN\CADDS\23901200\SHEETSOTHER\DRAINAGE\STH 31_DRAINAGE BASINS_PR.DWG
LAYOUT NAME - Sheet 3

PLOT DATE : 3/16/2021 2:48 PM PLOT BY : SILVANA POBRIC PLOT NAME : PLOT SCALE : 1 IN:100 FT

Exhibit 5



PROJECT NO: 2390-12-70	HWY: STH 31	COUNTY: RACINE	PROPOSED DRAINAGE BASINS	SHEET	E

FILE NAME : Y:\52XX\5231_DP.STH31.RCN\CADDS\23901200\SHEETSOTHER\DRAINAGE\STH 31_DRAINAGE BASINS_PR.DWG
LAYOUT NAME - Sheet 4

PLOT DATE : 3/16/2021 2:49 PM PLOT BY : SILVANA POBRIC PLOT NAME : PLOT SCALE : 1 IN:100 FT

WISDOT/CADDS SHEET 42

Exhibit 5

2

2

SUNSET BLVD

GREENLEAF BLVD

MARGERY DR

JOANNE DR

STH 31

21ST ST

BYRD AVE

N

OUTFALL #2

Tc 210

Tc 195

Drainage Basin 195
Tc = 21.1 min
C = 0.61
i = 3.5 in/hr
Q = 9.2 cfs

Drainage Basin 216
Tc = 5 min
C = 0.74
i = 6.8 in/hr
Q = 0.2 cfs

Drainage Basin 205
Tc = 5 min
C = 0.73
i = 6.8 in/hr
Q = 1.4 cfs

Drainage Basin 200
Tc = 5 min
C = 0.70
i = 6.8 in/hr
Q = 3.6 cfs

SCALE
1" = 200'

Drainage Basin 190
Tc = 5 min
C = 0.64
i = 6.8 in/hr
Q = 3.3 cfs

Drainage Basin 180
Tc = 5 min
C = 0.63
i = 6.8 in/hr
Q = 6.0 cfs

Drainage Basin 175
Tc = 5 min
C = 0.53
i = 6.8 in/hr
Q = 6.5 cfs

Drainage Basin 165
Tc = 5 min
C = 0.54
i = 6.8 in/hr
Q = 76.1 cfs

Drainage Basin 170
Tc = 5 min
C = 0.40
i = 6.8 in/hr
Q = 7.2 cfs

Drainage Basin 155
Tc = 5 min
C = 0.64
i = 6.8 in/hr
Q = 11.1 cfs

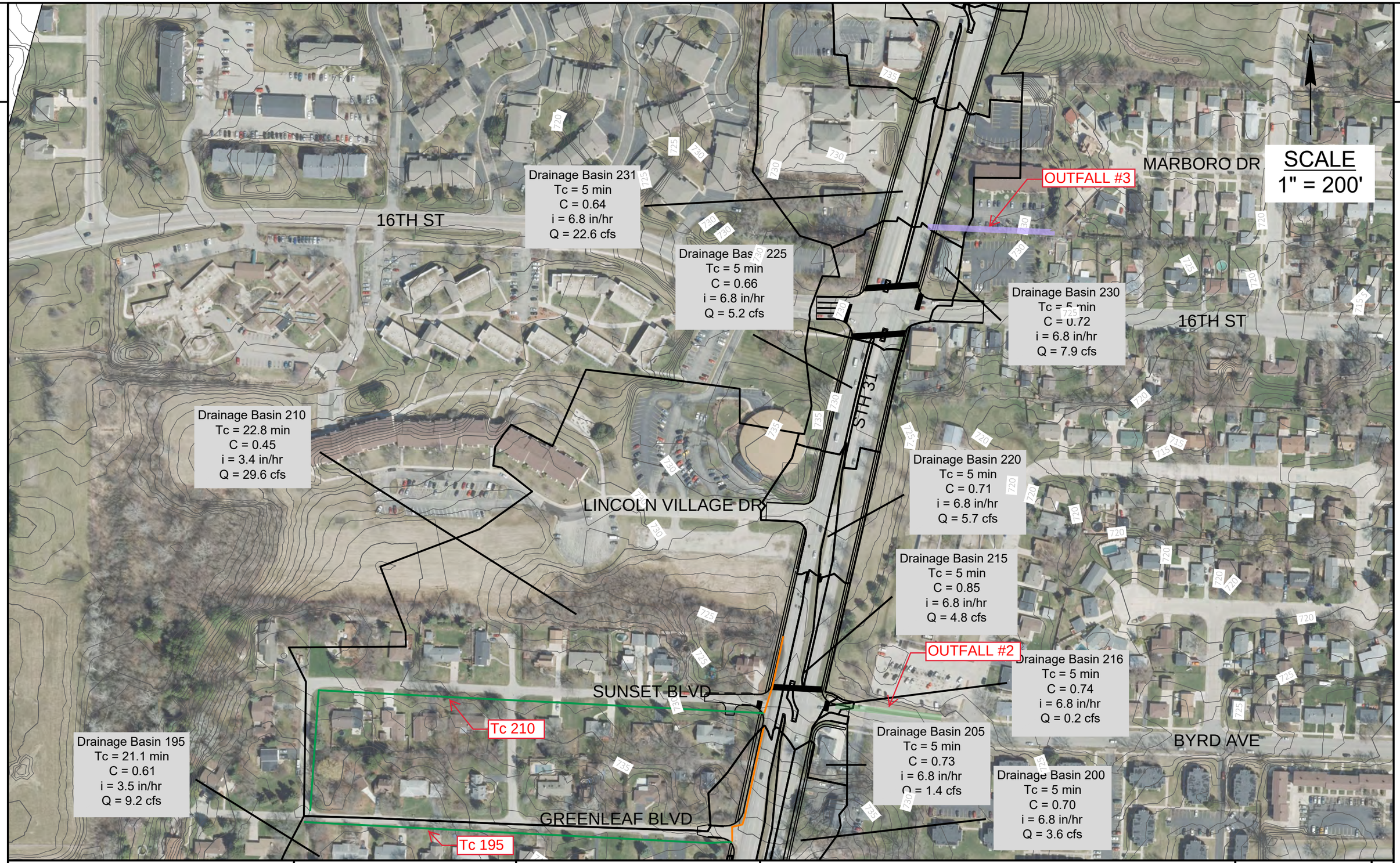
Drainage Basin 160
Tc = 5 min
C = 0.80
i = 6.8 in/hr
Q = 4.6 cfs

PROJECT NO: 2390-12-70	HWY: STH 31	COUNTY: RACINE	PROPOSED DRAINAGE BASINS	SHEET	E

FILE NAME : Y:\52XX\5231_DP.STH31.RCN\CADDS\23901200\SHEETSOTHER\DRAINAGE\STH 31_DRAINAGE BASINS_PR.DWG
LAYOUT NAME - Sheet 5

PLOT DATE : 3/16/2021 2:49 PM PLOT BY : SILVANA POBRIC PLOT NAME : PLOT SCALE : 1 IN:200 FT

Exhibit 5



PROJECT NO: 2390-12-70	HWY: STH 31	COUNTY: RACINE	PROPOSED DRAINAGE BASINS	SHEET	E

FILE NAME : Y:\52XX\5231_DP.STH31.RCN\CADDS\23901200\SHEETSOTHER\DRAINAGE\STH 31_DRAINAGE BASINS_PR.DWG
LAYOUT NAME - Sheet 6

PLOT DATE : 3/16/2021 2:49 PM PLOT BY : SILVANA POBRIC PLOT NAME : PLOT SCALE : 1 IN:200 FT

WISDOT/CADDS SHEET 42

Exhibit 5

PROJECT NO: 2390-12-70	HWY: STH 31	COUNTY: RACINE	PROPOSED DRAINAGE BASINS	SHEET	E

FILE NAME : Y:\52XX\5231_DP.STH31.RCN\CADDS\23901200\SHEETSOTHER\DRAINAGE\STH 31_DRAINAGE BASINS_PR.DWG
LAYOUT NAME - Sheet 7

PLOT DATE : 3/16/2021 2:49 PM PLOT BY : SILVANA POBRIC PLOT NAME : PLOT SCALE : 1 IN:100 FT

WISDOT/CADDS SHEET 42

Exhibit 5

PROJECT NO: 2390-12-70	HWY: STH 31	COUNTY: RACINE	PROPOSED DRAINAGE BASINS	SHEET	E

FILE NAME : Y:\52XX\5231_DP.STH31.RCN\CADDS\23901200\SHEETSOTHER\DRAINAGE\STH 31_DRAINAGE BASINS_PR.DWG
LAYOUT NAME - Sheet 8

PLOT DATE : 3/16/2021 2:49 PM PLOT BY : SILVANA POBRIC PLOT NAME : PLOT SCALE : 1 IN:100 FT

WISDOT/CADDS SHEET 42

Exhibit 5

PROJECT NO: 2390-12-70	HWY: STH 31	COUNTY: RACINE	PROPOSED DRAINAGE BASINS	SHEET	E

FILE NAME : Y:\52XX\5231_DP.STH31.RCN\CADDS\23901200\SHEETSOTHER\DRAINAGE\STH 31_DRAINAGE BASINS_PR.DWG
LAYOUT NAME - Sheet 9

PLOT DATE : 3/16/2021 2:49 PM PLOT BY : SILVANA POBRIC PLOT NAME : PLOT SCALE : 1 IN:100 FT

WISDOT/CADDS SHEET 42

Exhibit 6

PROJECT ID: 2390-12-70
STH 31
Proposed Runoff Coefficient and Discharge Calcluations
HYDROLOGY

DRAINAGE BASIN	LAND USE	AREA (SF)	AREA (acres)	% OF TOTAL BASIN AREA	% OF BASIN CHECK	TOTAL AREA (acres)	RUNOFF COEFFICIENT (C)	C * (% of TTL basin area)	COMBINED COEFFICIENT (C)	RAINFALL INTENSITY (i) 10-yr (in/hr)	DISCHARGE Q=C*i*A 10-yr (cfs)
100	CONCRETE	5,664	0.13	100%	100%	0.130	0.90	0.900	0.90	6.8	0.8
105	CONCRETE	21,280	0.49	71%	100%	0.684	0.90	0.643	0.71	6.8	3.3
	GRASS	8,511	0.20	29%			0.23	0.066			
110	CONCRETE	28,349	0.651	75%	100%	0.869	0.90	0.674	0.73	6.8	4.4
	GRASS	9,526	0.219	25%			0.23	0.058			
115	CONCRETE	34,866	0.800	74%	100%	1.083	0.90	0.665	0.73	6.8	5.4
	GRASS	12,308	0.283	26%			0.23	0.060			
116	CONCRETE	11,368	0.261	90%	100%	0.291	0.90	0.807	0.83	6.8	1.7
	GRASS	1,307	0.030	10%			0.23	0.024			
120	CONCRETE	68,010	1.561	75%	100%	2.082	0.90	0.675	0.73	6.8	10.4
	GRASS	22,686	0.521	25%			0.23	0.058			
125	CONCRETE	42,895	0.985	73%	100%	1.354	0.90	0.655	0.72	6.8	6.6
	GRASS	16,069	0.369	27%			0.23	0.063			
130	CONCRETE	31,902	0.732	78%	100%	0.941	0.90	0.701	0.75	6.8	4.8
	GRASS	9,081	0.208	22%			0.23	0.051			
131	ASPHALT	110,164	2.529	100%	100%	2.529	0.85	0.850	0.85	6.8	14.7
	GRASS	0	0.000	0%			0.23	0.000			
132	ASPHALT	82,234	1.888	100%	100%	1.888	0.85	0.850	0.85	6.8	11.0
	GRASS	0	0.000	0%			0.23	0.000			
135	CONCRETE	56,987	1.308	52%	100%	2.523	0.90	0.467	0.80	6.8	13.8
	ASPHALT	39,112	0.898	36%			0.85	0.303			
	GRASS	13,782	0.316	13%			0.23	0.029			
140	CONCRETE	28,962	0.665	66%	100%	1.010	0.90	0.592	0.67	6.8	4.6
	GRASS	15,054	0.346	34%			0.23	0.079			
145	CONCRETE	30,746	0.706	62%	100%	1.143	0.90	0.556	0.64	6.8	5.0
	GRASS	19,034	0.437	38%			0.23	0.088			
150	CONCRETE	34,695	0.796	57%	100%	1.400	0.90	0.512	0.82	6.8	7.9
	ASPHALT	20,714	0.476	34%			0.85	0.289			
	GRASS	5,572	0.128	9%			0.23	0.021			
155	CONCRETE	35,929	0.825	33%	100%	2.522	0.90	0.294	0.64	6.8	11.1
	ASPHALT	33,959	0.780	31%			0.85	0.263			
	GRASS	39,975	0.918	36%			0.23	0.084			
160	CONCRETE	30,844	0.708	85%	100%	0.835	0.90	0.763	0.80	6.8	4.6
	GRASS	5,545	0.127	15%			0.23	0.035			
165	CONCRETE	38,634	0.887	4%	100%	20.591	0.90	0.039	0.54	6.8	76.1
	ASPHALT	94,238	2.163	11%			0.85	0.089			
	HIGH DENSITY RESIDENTIAL	626,695	14.387	70%			0.54	0.377			
	GRASS	137,397	3.154	15%			0.23	0.035			
170	CONCRETE	29,173	0.670	25%	100%	2.647	0.90	0.228	0.40	6.8	7.2
	GRASS	86,151	1.978	75%			0.23	0.172			
175	CONCRETE	35,272	0.810	45%	100%	1.795	0.90	0.406	0.53	6.8	6.5
	GRASS	42,905	0.985	55%			0.23	0.126			
180	CONCRETE	36,178	0.831	60%	100%	1.385	0.90	0.540	0.63	6.8	6.0
	GRASS	24,154	0.554	40%			0.23	0.092			
190	CONCRETE	19,922	0.457	61%	100%	0.744	0.90	0.553	0.64	6.8	3.3
	GRASS	12,477	0.286	39%			0.23	0.089			
195	CONCRETE	26,596	0.611	14%	100%	4.258	0.90	0.129	0.61	3.5	9.2
	ASPHALT	7,365	0.169	4%			0.85	0.034			
	MEDIUM DENSITY RESIDENTIAL	136,910	3.143	74%			0.38	0.281			
	GRASS	14,602	0.335	8%			0.23	0.018			
200	CONCRETE	14,747	0.339	46%	100%	0.740	0.90	0.412	0.70	6.8	3.6
	ASPHALT	8,630	0.198	27%			0.85	0.228			
	GRASS	8,864	0.203	27%			0.23	0.063			
205	CONCRETE	1,496	0.034	12%	100%	0.280	0.90	0.110	0.73	6.8	1.4
	ASPHALT	8,212	0.189	67%			0.85	0.572			
	GRASS	2,495	0.057	20%			0.23	0.047			
210	CONCRETE	15,803	0.363	2%	100%	19.205	0.90	0.017	0.45	3.4	29.6
	ASPHALT	167,171	3.838	20%			0.85	0.170			
	MEDIUM DENSITY RESIDENTIAL	441,645	10.139	53%			0.38	0.201			
	HIGH DENSITY RESIDENTIAL	21,195	0.487	3%			0.54	0.014			
	GRASS	190,739	4.379	23%			0.23	0.052			
215	CONCRETE	33,524	0.770	92%	100%	0.838	0.90	0.826	0.85	6.8	4.8
	GRASS	2,988	0.069	8%			0.23	0.019			
216	CONCRETE	1,298	0.030	75%	100%	0.040	0.90	0.679	0.74	6.8	0.2
	GRASS	423	0.010	25%			0.23	0.057			
220	CONCRETE	36,674	0.842	72%	100%	1.167	0.90	0.649	0.71	6.8	5.7
	ASPHALT	0	0.000	0%			0.85	0.000			
	GRASS	14,162	0.325	28%			0.23	0.064			
225	CONCRETE	32,542	0.747	64%	100%	1.159	0.90	0.580	0.66	6.8	5.2
	GRASS	17,936	0.412	36%			0.23	0.082			
230	CONCRETE	51,283	1.177	73%	100%	1.603	0.90	0.661	0.72	6.8	7.9
	ASPHALT	0	0.000	0%			0.85	0.000			
	GRASS	18,543	0.426	27%			0.23	0.061			
231	CONCRETE	36,034	0.827	16%	100%	5.184	0.90	0.144	0.64	6.8	22.6
	ASPHALT	109,783	2.520	49%			0.85	0.413			
	GRASS	79,989	1.836	35%			0.23	0.081			
235	CONCRETE	27,510	0.632	31%	100%	2.060	0.90	0.276	0.67	6.8	9.4
	ASPHALT	33,873	0.778	38%			0.85	0.321			
	GRASS	28,366	0.651	32%			0.23	0.073			
240	CONCRETE	38,949	0.894	40%	100%	2.210	0.90	0.364	0.66	6.8	10.0
	ASPHALT	25,209	0.579	26%			0.85	0.223			
	GRASS	32,116	0.737	33%			0.23	0.077			
245	CONCRETE	36,434	0.836	75%	100%	1.122	0.90	0.671	0.73	6.8	5.6
	GRASS	12,448	0.286	25%			0.23	0.059			
250	CONCRETE	30,897	0.709	45%	100%	1.579	0.90	0.404	0.72	6.8	7.7
	ASPHALT	20,613	0.473	30%			0.85	0.255			
	GRASS	17,274	0.397	25%			0.23	0.058			
255	CONCRETE	34,103	0.783	38%	100%	2.054	0.90	0.343	0.66	6.8	9.2
	ASPHALT	24,718	0.567	28%			0.85	0.235			
	GRASS	30,664	0.704	34%			0.23	0.079			
260	CONCRETE	32,141	0.738	34%	100%	2.174	0.90	0.305	0.78	6.8	11.5
	ASPHALT	48,707	1.118	51%			0.85	0.437			
	GRASS	13,840	0.318	15%			0.23	0.034			
265	CONCRETE	22,983	0.528	100%	100%	0.528	0.90	0.900	0.90	6.8	3.2
270	CONCRETE	34,661	0.796	35%	100%	2.246	0.90	0.319	0.79	6.8	12.1
	ASPHALT	50,791	1.166	52%			0.85	0.441			
	GRASS	12,369	0.284	13%			0.23	0.029			
271	CONCRETE	12,580	0.289	40%	100%	0.730	0.9	0.356	0.83	6.8	4.1
	ASPHALT	16,950	0.389	53%			0.85	0.453			
	GRASS	2,276	0.052	7%			0.23	0.016			

Exhibit 6

PROJECT ID: 2390-12-70
PROPOSED HYDROLOGY

	LAND USE	COMBAINED DRAINAGE AREA (SF)	AREA (acres)	% OF TOTAL BASIN AREA	% OF BASIN CHECK	TOTAL AREA (acres)	RUNOFF COEFFICIENT (C)	C * (% of TTL basin area)	COMBINED COEFFICIENT (C)	RAINFALL INTENSITY (i) 10-yr (in/hr)	DISCHARGE Q=C*i*A 10-yr (cfs)
OUTFALL #1	CONCRETE	601,754	13.81	29%	100%	47.70	0.90	0.26	0.63	2.8	84.3
	ASPHALT	380,421	8.73	18%			0.85	0.16			
	HIGH DENSITY RESIDENTIAL	626,695	14.39	30%			0.54	0.16			
	GRASS	469,057	10.77	23%			0.23	0.05			

	LAND USE	COMBAINED DRAINAGE AREA (SF)	AREA (acres)	% OF TOTAL BASIN AREA	% OF BASIN CHECK	TOTAL AREA (acres)	RUNOFF COEFFICIENT (C)	C * (% of TTL basin area)	COMBINED COEFFICIENT (C)	RAINFALL INTENSITY (i) 10-yr (in/hr)	DISCHARGE Q=C*i*A 10-yr (cfs)
OUTFALL #2	CONCRETE	150,060	3.44	13%	100%	27.27	0.90	0.11	0.49	6.8	92.0
	ASPHALT	191,378	4.39	16%			0.85	0.14			
	HIGH DENSITY RESIDENTIAL	21,195	0.49	2%			0.54	0.01			
	MEDIUM DENSITY RESIDENTIAL	578,555	13.28	49%			0.38	0.19			
	GRASS	246,750	5.66	21%			0.23	0.05			

	LAND USE	COMBAINED DRAINAGE AREA (SF)	AREA (acres)	% OF TOTAL BASIN AREA	% OF BASIN CHECK	TOTAL AREA (acres)	RUNOFF COEFFICIENT (C)	C * (% of TTL basin area)	COMBINED COEFFICIENT (C)	RAINFALL INTENSITY (i) 10-yr (in/hr)	DISCHARGE Q=C*i*A 10-yr (cfs)
OUTFALL #3	CONCRETE	287,752	6.61	39%	100%	16.97	0.90	0.35	0.67	6.8	77.8
	ASPHALT	214,196	4.92	29%			0.85	0.25			
	HIGH DENSITY RESIDENTIAL	0	0.00	0%			0.54	0.00			
	GRASS	237,336	5.45	32%			0.23	0.07			

	LAND USE	COMBAINED DRAINAGE AREA (SF)	AREA (acres)	% OF TOTAL BASIN AREA	% OF BASIN CHECK	TOTAL AREA (acres)	RUNOFF COEFFICIENT (C)	C * (% of TTL basin area)	COMBINED COEFFICIENT (C)	RAINFALL INTENSITY (i) 10-yr (in/hr)	DISCHARGE Q=C*i*A 10-yr (cfs)
OUTFALL #4	CONCRETE	102,365	2.35	41%	100%	5.68	0.90	0.37	0.80	6.8	31.0
	ASPHALT	116,448	2.67	47%			0.85	0.40			
	HIGH DENSITY RESIDENTIAL	0	0.00	0%			0.54	0.00			
	GRASS	28,485	0.65	12%			0.23	0.03			

This table is for comparisons of individual sub-basins data only. Comparisons of the overall systems are on shown on the Exhibit 4 and Exhibit 6.

Exhibit 7

PROJECT ID: 2390-12-70			
EXISTING DRAINAGE BASIN	PROPOSED DRAINAGE BASIN	EXISTING DISCHARGE Q 10-yr (cfs)	PROPOSED DISCHARGE Q 10-yr (cfs)
100	100	0.9	0.8
105	105	2.0	3.3
110	110	5.0	4.4
115	115	3.9	5.4
116	116	0.3	1.7
120	120	8.5	10.4
125	125	6.3	6.6
130	130	3.9	4.8
131	131	14.7	14.7
132	132	11.0	11.0
135	135	12.8	13.8
140	140	3.7	4.6
145	145	4.2	5.0
150	150	5.9	7.9
155	155	11.3	11.1
160	160	3.8	4.6
165	165	78.6	76.1
170	170	5.5	7.2
175	175	4.9	6.5
180	180	3.1	6.0
185	PART OF BASIN 180	1.7	PART OF BASIN 180
190	190	2.6	3.3
195	195	9.1	9.2
200	200	3.1	3.6
205	205	1.7	1.4
210	210	29.4	29.6
215	215	2.9	4.8
216	216	0.3	0.2
220	220	5.0	5.7
225	225	8.1	5.2
230	230	2.4	7.9
231	231	21.9	22.6
235	235	13.8	9.4
240	240	3.2	10.0
245	245	3.8	5.6
250	250	10.2	7.7
255	255	5.5	9.2
260	260	11.2	11.5
265	265	2.7	3.2
270	270	11.1	12.1
271	271	4.0	4.1

Exhibit 8

Hydrologic Soil Group—Kenosha and Racine Counties, Wisconsin
(STH 31)

87° 51' 56" W — 87° 50' 12" W
42° 43' 34" N — 42° 41' 29" N
429200 429500 429800 430100 430400 430700 431000 431300
4730600 4730300 4730000 4729700 4729400 4729100 4728800 4728500 4728200 4727900 4727600 4727300 4727000

Haven Ave
Ranger Dr
Kinzie Ave
Newman
Kinzie
20
31
Meadow Ln
16th St
16th
13th St
Echo Ln
Margery Dr
21st
Roosevelt Ave
Cozy Acres Rd
Driveway
11
Wander Ln
Evarit Dr
Wood Rd
Oakwood Dr

MeB2 MeB EtB BcA BcA OzaB2 VaB BcA Lu BcA MeB2 EtB AtA BcA BcA OzaB2 VaB2 MeC2 AtA AtA VaB OzaB2 EtA VaB OzaB2 OzaC2 OzaB VaB2 OzaB2 EtB OzaB AtA VaB EtB OzaB OzaC2 EtB AtA W OzaB EtB WeB OzaC2 VaB OzaC2 OzaC2 Dt MzfA AtA MeB2 VaB WeB OzaC2 MeC2 AtA MeC2 MeC2 MeC2 MeB2 AtA OzaB EtB OzaC2 VaB VaB MeB2 EtB EtB VaB EtB MeB VaB OzaB

Map Scale: 1:10,800 if printed on B portrait (11" x 17") sheet.
N
Meters 0 150 300 600 900
Feet 0 500 1000 2000 3000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kenosha and Racine Counties, Wisconsin
Survey Area Data: Version 17, Jun 8, 2020

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

Date(s) aerial images were photographed: Jun 7, 2020—Aug 16, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AtA	Ashkum silty clay loam, 0 to 2 percent slopes	C/D	93.6	10.9%
BcA	Beecher silt loam, 1 to 3 percent slopes	C/D	31.7	3.7%
Dt	Drummer silt loam, gravelly substratum	B/D	6.1	0.7%
EtA	Elliott silt loam, 0 to 2 percent slopes	C/D	4.6	0.5%
EtB	Elliott silty clay loam, 2 to 6 percent slopes	C/D	81.2	9.5%
Lu	Loamy land		1.2	0.1%
MeB	Markham silt loam, 2 to 6 percent slopes	C	8.4	1.0%
MeB2	Markham silt loam, 2 to 6 percent slopes, eroded	C	166.8	19.5%
MeC2	Markham silt loam, 6 to 12 percent slopes, eroded	C	8.8	1.0%
MzfA	Mundelein silt loam, 0 to 3 percent slopes	B/D	5.4	0.6%
OzaB	Ozaukee silt loam, 2 to 6 percent slopes	C	76.4	8.9%
OzaB2	Ozaukee silt loam, 2 to 6 percent slopes, eroded	C	81.2	9.5%
OzaC2	Ozaukee silt loam, 6 to 12 percent slopes, eroded	C	29.8	3.5%
VaB	Varna silt loam, 2 to 6 percent slopes	C	227.4	26.5%
VaB2	Varna silt loam, 2 to 6 percent slopes, eroded	C	18.6	2.2%
W	Water		1.8	0.2%
WeB	Warsaw loam, 2 to 6 percent slopes	B	13.5	1.6%
Totals for Area of Interest			**856.7**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Exhibit 9

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
101 S. Webster Street
Box 7921
Madison WI 53707-7921

Tony Evers, Governor
Preston D. Cole, Secretary
Telephone 608-266-2621
Toll Free 1-888-936-7463
TTY Access via relay - 711

November 13, 2019

Vida Shaffer
Wisconsin Department of Transportation
141 N.W. Barstow Street
P.O. BOX 798
Waukesha, WI 53187-0798

Subject: DNR Initial Project Review
WisDOT ID 2390-12-00
STH 31
Project Limits: STH 11 to STH 20
Racine County

Dear Ms. Shaffer:

The Wisconsin Department of Natural Resources (DNR) has received the information you provided for the above-referenced project. According to your proposal, the purpose of this project is to reconstruct the roadway, intersections and provide accommodations for pedestrians and bicycles. Proposed improvements include providing long term improvement to the pavement, operations and safety of the roadway.

Preliminary information has been reviewed by DNR staff for the project under the DNR/DOT Cooperative Agreement. Initial comments on the project as proposed are included below, and we assume that additional information will be provided that addresses all resource concerns identified.

When requesting Final Concurrence/Water Quality Certification, please send the most up-to-date plan set (including the erosion control plan sheets), contract special provisions, Wetland permit documentation and Impact Tracking Form, Notice of Intent for the Transportation Construction General Permit (TCGP), and any additional pertinent information to ensure environmental commitments have been met.

A. Project-Specific Resource Concerns

Section 4(f) Requirement:
Public lands are present in the vicinity of this project. If there is potential for impacts to these lands, please begin coordination with us as soon as possible.

There is a U.S. Dept. of Transportation “Section 4(f)” process for federally funded transportation projects that impact various types of public parks, wildlife refuges, and recreation areas. This requirement is coordinated by state and federal transportation departments. Please ensure the 4f process is followed according to the DOT facilities development manual.

Wetlands:

DNR records of mapped wetlands and wetland indicator soils are present throughout the project area. The entire project area is within the Southwest Lake Michigan watershed in the Great Lakes basin.

There is potential for wetland impacts to occur as a result of this project. Wetland impacts must be avoided and/or minimized to the greatest extent practicable. Unavoidable wetland losses must be compensated for in accordance with the DNR/DOT Cooperative Agreement and the DOT Wetland Mitigation Banking Technical Guideline. DNR requests information regarding the amount and type of unavoidable wetland impacts.

Fisheries/Stream Work:
There are no navigable waterways within the project area.

Endangered Resources:

Based upon a review of the Natural Heritage Inventory (NHI) dated 11/13/19, the project area is within a known occurrence for the threatened and/or endangered species listed below, and there is potential for these species to occur if there is suitable habitat within your project limits. To ensure there are no adverse impacts, habitat suitability should be determined for these listed species. If suitable habitat is found within the project limits, and impacts to that habitat cannot be avoided, then additional surveys may be necessary:

Prairie Indian Plantain	*Arnoglossum plantagineum*	Plant	Special Concern
Bluestem Goldenrod	*Solidago caesia*	Plant	Endangered
Waxleaf Meadowrue	*Thalictrum revolutum*	Plant	Special Concern
Blanchard's Cricket Frog	*Acris blanchardi*	Frog	Endangered
Queensnake	*Regina septemvittata*	Reptile	Endangered

With this review, the following have been determined:

- There are no known Northern Long-eared Bat (NLEB) maternity roost trees within 150 feet of the project, or known hibernacula within 0.25 miles of the proposed project area.
- This project is located outside of any High Potential Zones (HPZ) for the Rusty Patched Bumblebee (RPBB), and therefore should have no impact on this federally endangered species. It should be noted that the High Potential Zones for the RPBB routinely change and can be reviewed at: https://www.fws.gov/midwest/endangered/insects/rpbb/rpbbmap.html . Coordination with the federal agency should be initiated if any portion of the project is included in a high potential zone prior to construction.

❖ *NHI Disclaimer: This review letter may contain NHI data, including specific locations of endangered resources, which are considered sensitive and are not subject to Wisconsin's Open Records Law. As a result, information contained in this review letter may be shared only with individuals or agencies that require this information in order to carry out specific roles in the permitting, planning and implementation of the proposed project. Specific locations of endangered resources may not be released or reproduced in any publicly disseminated documents.*

Invasive Species and Viral Hemorrhagic Septicemia (VHS):
All project equipment shall be decontaminated for removal of invasive species prior to and after each use on the project site by utilizing other best management practices to avoid the spread of invasive species as outlined in NR 40, Wis. Adm. Code. For more information, refer to http://dnr.wi.gov/topic/Invasives/bmp.html.

Emerald Ash Borer: This project has the potential for spreading the Emerald Ash Borer (EAB) beetle. It is illegal to move or transport ash material, the emerald ash borer, and hardwood debris (i.e. firewood) from EAB quarantined areas to a non-quarantined area without a compliance agreement issued by WI Department of Agriculture, Trade and Consumer Protection. Regulated items include cut hardwood (non-coniferous) firewood, ash logs, ash mulch or bark fragments larger than on inch in diameter, or ash nursery stock (DATCP statute 21).

- For more information regarding the EAB and quarantine areas please click on the following link: http://datcpservices.wisconsin.gov/eab/article.jsp?topicid=20
- Recommendations to reduce the spread of EAB in potentially infested Ash wood: http://datcpservices.wisconsin.gov/eab/articleassets/Recommendations%20to%20reduce%20the%20spread%20of%20EAB.pdf

Floodplains:
A determination must be made as to whether the project lies within a mapped/zoned floodplain. Any proposed temporary or permanent changes to the road or waterway geometry in mapped floodplain areas requires that DOT coordinate with the Racine Zoning Administrator to ensure compliance with the local zoning ordinance and NR116. Examples of floodplain development activity includes, but not limited to, the following: changes to waterway crossings; culvert extensions; changes to road surface elevations and/or side-slopes; temporary causeways; temporary structures; general fill.

- A preliminary review of the Surface Water Data Viewer (SWDV) indicates that floodplain conditions exist within the project limits.

Storm Water Management & Erosion Control:

- For projects disturbing an acre or more of land, erosion control and storm water measures must adhere to the Wisconsin Pollutant Discharge Elimination System Transportation Construction General Permit (TCGP) for Storm Water Discharges. Coverage under TCGP is required prior to construction. DOT should apply for permit coverage just before the project goes to final PS&E. Permit coverage will be issued by the DNR after design is complete and documentation shows that the project will meet construction and post-construction performance standards. For more information regarding the TCGP you can go to the following link, and click on the "Transportation" tab: https://dnr.wi.gov/topic/Sectors/Transportation.html.

- All projects require an Erosion Control Plan (ECP) that describes best management practices that will be implemented before, during and after construction to minimize pollution from storm water discharges. Additionally, the plan should address how post-construction storm water performance standards will be met for the specific site. The project design and Erosion Control Implementation Plan (ECIP) must comply with the TCGP in order to receive "permit-coverage" from the DNR.

- Once the project contract has been awarded, the contractor will be required to outline their construction methods in the ECIP. An adequate ECIP for the project must be developed by the contractor and submitted to this office for review at least 14 days prior to the preconstruction conference. For projects regulated under the TCGP, submit the ECIP as an amendment to the ECP.

Selected Site & Commercial Non-Metallic Mines:

- The DOT Select Site process must be adhered to for clean fill or any other material that leaves the work site. The DNR liaison will review all proposed select sites and a site visit may be required. Filling of wetlands, waterways or floodplain is not allowed under the select site process, unless the site owner obtains required permits. No new impermeable surfaces can be left at a select site (including gravel roads or pads), unless the site owner obtains required permits. Contaminated materials leaving the site need to adhere to the Hazardous Material Management Plan.

- Use of Commercial Non-Metallic Mines must accompany documentation that such mines have received all applicable local, state and federal permits before being used on the project, including local non-metallic mining reclamation permits and applicable WPDES permits as issued by the DNR.

Asbestos:
A Notification of Demolition and/or Renovation and Application for Permit Exemption, DNR form 4500-113 (chapters NR 406, 410, and 447 Wis. Adm. Code) may be required. Please refer to DOT FDM 21-35-45 and the DNR's notification requirements web page: http://dnr.wi.gov/topic/Demo/Asbestos.html for further guidance on asbestos inspections and notifications. Contact Mark Davis, Air Management Specialist 262-574-2118, with questions on the form. The notification must be submitted 10 working days in advance of demolition projects.

Other Issues:
This project may require a permit from the U.S. Army Corps of Engineers (USACE). All local, state, and federal permits and/or approvals must be obtained prior to commencing construction activities.

The above comments represent the DNR's initial concerns for the proposed project and do not constitute final concurrence. Final concurrence will be granted after further review of refined project plans, and additional consultation if necessary. If any of the concerns or information provided in this letter requires further clarification, please contact this office at (414) 507-4946, or email at Kristina.betzold@wi.gov .

Sincerely,

Kristina Betzold
Environmental Analysis & Review Specialist

cc: Brian Wilson, EMCS
Tim McElmeel, WDOT