raSmith

CREATIVITY BEYOND ENGINEERING

Drainage Study for

FIESTA LANE CAPITAL IMPROVEMENTS

Mequon, Wisconsin

Project No. 2235336

June 7, 2023

Brookfield, WI | Milwaukee, WI | Appleton, WI | Madison, WI | Cedarburg, WI
Naperville, IL | Irvine, CA

Drainage Study

FIESTA LANE CAPITAL IMPROVEMENTS
Mequon, WI

Prepared by

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Prepared for

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Mequon, WI 53092

June 7, 2023

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Exhibits:

PROJECT OVERVIEW

raSmith was retained by the City of Mequon (City) to prepare a stormwater study for proposed capital improvements for the drainage area near Fiesta Lane. Fiesta Lane from Grasslyn Road to Port Washington Lane is a current high priority for drainage improvements. A project location map has been included with Exhibit A of this report.

Per the City's Request for Proposals, the original drainage inquiry dates back to 2010 and the project has been prioritized as a part of the Drainage Capital Improvement Plan since 2015. Drainage improvements are currently planned to be implemented with the City's annual road program in the 2024 construction season.

Localized flooding within the project study area impacts driveways, overtops the roadway, overburdens culverts and ditches, and is conveyed through properties within the project area. Residents report drainage issues in both small and large wet weather events and have stated that water lingers long after the wet weather event has concluded. Residents also share concerns regarding drainage from adjacent subdivisions being conveyed through their property and have identified culverts and ditches as being inadequately sized to properly convey runoff within the right-of-way.

The drainage study has been separated into two phases. Initially, Fiesta Lane and surrounding areas were visited and studied to understand current drainage patterns and to identify drainage problems and their causes. After identifying the drainage problems, potential flood mitigation alternatives will be presented later in this report.

DRAINAGE ANALYSIS

During the time in which raSmith has been contracted for this study, there has not been significant rainfall that has caused flooding problems within the study area. However, historical photos, videos, and correspondence between residents and the City have been reviewed to best understand the drainage concerns in this area. A site visit during dry weather was completed by raSmith staff on April 21, 2023 and a visit during intermittent rain on April 29, 2023. Photos of the existing drainage ditches and culverts were taken along with noting observations that are discussed in this report.

Drainage patterns along Fiesta Lane and surrounding areas such as the Columbia Creek and Columbia Reserve subdivisions were analyzed as a part of this study. The City also prepared a Stormwater Management Master Plan in 1999 that was reviewed as part of this study.

raSmith used historical documentation of the drainage problems along Fiesta Lane, which were provided by the City of Mequon. The documentation includes email correspondence from residence, approved plans and stormwater reports, topographic survey, and photos.

FIESTA LANE OVERVIEW

Fiesta Lane consists of a 20-foot wide roadway with roadside ditches and driveway culverts serving as the conveyance system for stormwater runoff. A few properties along the roadway have extended culverts and an enclosed ditch extending across the entire property. The culvert ultimately outfalls back into the roadside ditch drainage system.

Using the latest topographic LiDAR information (2015 Ozaukee County LiDAR), a delineation of the watershed tributary to the entirety of the Fiesta Lane roadside ditches was prepared and included with Exhibit B. The drainage area consists of primarily ¾-acre residential lots. There are 7.5 acres tributary to the north ditch along Fiesta Lane while 20.8 acres are tributary to the south ditch. A significant portion of the tributary area to the south roadside ditch travels via an overland flow route in the backyards of homes that front on Fiesta Lane. Runoff is conveyed through the backyards until it reaches the side yard

between 1711 and 1701 Fiesta Lane. The runoff is conveyed through the side yard to the Fiesta Lane right-of-way between 1711 and 1701 Fiesta Lane. A portion of this drainage area originates from the Columbia Creek neighborhood, which will be discussed in more detail later in this report.

Survey data of Fiesta Lane was reviewed as part of this study. Exhibit C was prepared to summarize the survey data findings. As shown in the red text in the exhibit, there are several concerns along the roadway such as flat or back-pitched culverts and depressional areas, which exacerbate problems with runoff conveyance along Fiesta Lane.

The driveway culvert of 1701 Fiesta Lane receives runoff from both the backyard/side yard overland flow route and the roadside ditch of Fiesta Lane. An analysis was completed to determine the flow tributary to the 1701 Fiesta Lane driveway culvert. Driveway culverts are typically sized for a 10-year event per industry standards; therefore, we calculated the 10-year peak flow to determine if the culvert had sufficient capacity. The drainage area tributary to this culvert is 15.6 acres, with a runoff curve number of 79, and a time of concentration of 66 minutes. Using these hydrologic parameters, a peak flow of 14.9 cubic feet per second (cfs) was determined. Given the slope of the culvert and overtopping elevation of the driveway, the 18-inch corrugated metal pipe (CMP) culvert does not have sufficient capacity to convey flow from the 10-year event. The current capacity for the 1701 Fiesta Lane driveway culvert is 7.6 cfs. All culverts downstream of this driveway are undersized for the 10-year event. Neighbor reports indicate that multiple driveways overtop during significant rainfall event, which is reinforced by the culvert sizing calculations.

ADJACENT SUBDIVISIONS

Columbia Creek and Columbia Reserve subdivisions were developed after the lots fronting Fiesta Lane. The approved plans and drainage plans were reviewed in detail to determine the effects, if any, on the Fiesta Lane drainage problems. Exhibit D was provided with this report to detail the drainage patterns throughout both subdivisions.

Columbia Creek

The Columbia Creek development was approved by the City in 1997. As part of that development, a Drainage Report was required to be submitted to the City before any approvals could be issued. Excerpts of the report have been provided with Exhibit E.

Stormwater management requirements in 1997 differ from today's standards. The standards in 1997 required the development to provide a detention basin capable of containing the difference in flows between the post-development 100-year event and the pre-development 10-year event for the site. Per the approved drainage report, the post-development 100-year flow for the site was 50 cfs while the pre-development 10-year flow was 20 cfs. A detention basin capable of reducing the post-development flow from 50 cfs to 20 cfs was designed and constructed. Discharge from the detention basin outlets to County Line Road near the south of end of Columbia Creek Lane and does not enter the Fiesta Lane watershed.

Another metric that was evaluated in the 1997 drainage report for Columbia Creek was the amount of runoff that was considered undetained from the site. Undetained runoff is not routed to the basin, and typically drains from the post-development site at the same location as pre-development. The report states that in the pre-development condition, 2.85 acres of the site drains northeast (to Fiesta Lane). In the post-development condition, the report states that 1.6 acres of the site drains northeast. The report demonstrated that the flow draining to the northeast would be reduced as a result of this development. The pre-development 10-year flow to the northeast was shown as 3 cfs while the post-development 100-year flow was also 3 cfs.

Upon a closer analysis of the drainage areas based on 2015 LiDAR information, it appears that 2.5 acres from the Columbia Creek development drains undetained to the northeast. The 2.5 acres draining to the northeast is less than the pre-development area (2.85 acres) stated in the report, but more than the approved post-development area (1.6 acres) stated in the report. It also is a relatively small portion of the overall tributary (12.3 acres) that drains to the to the swale between 1701 and 1711 Fiesta Lane. Exhibit F has been included to depict the tributary area draining to the south property line of 1817 Fiesta Lane

where Columbia Creek discharges runoff to the Fiesta Lane backyards. 2.35 of the 2.5 acres of undetained runoff area from Columbia Creek drains to the south property line of 1817 Fiesta Lane. The additional 0.15 acres drains northeast and ultimately ends up discharging to the Fiesta Lane right-of-way at the same location as the rear yard drainage. Table 1 has been provided below to summarize the different tributary areas between the approved report and current conditions.

Table 1. Tributary Area to Fiesta Lane Right-of-Way at 1701/1711 Fiesta Lane

Tributary Area	Drainage Area (ac)
Columbia Creek Pre-Development Area from Approved Drainage Report	2.85
Columbia Creek Post-Development Area from Approved Drainage Report	1.60
Actual Columbia Creek Area to Fiesta Lane	2.50
Total Overall Area to Fiesta Lane	12.30

There is sump pump discharge in the rear yards of homes of the Columbia Creek Subdivision, some of which drain to the northeast. These sump laterals could be tied into Columbia Creek Lane rather than draining to Fiesta Lane if the elevation of the existing sump line collector in Columbia Creek Lane is low enough. Specifically, there appears to be a sump discharge in the back of 9748 Columbia Creek Lane per video from a resident.

The drainage report indicates the development would appear to meet a portion of the currently effective stormwater management requirements found in Chapter 58 of the City of Mequon Code of Ordinances. Per Section 58-675(e) of the City Code which states all activities subject to on-site detention and runoff control regulation shall not exceed the pre-settlement condition peak release rates for the 100-year, 10-year, and 2-year, 24-hour duration storm events. While the drainage report did not analyze the 2-year or 10-year events, the 100-year post-development release rate for the site is equal to the pre-development release rate for the 10-year event meaning that the 100-year requirement would be met. The drainage report does not provide enough information to determine whether the 2-year and 10-year events also meet the current requirements. These design events were not calculated as part of the approved report as they were not required at the time.

Columbia Dr.

Columbia Reserve

The Columbia Reserve subdivision was developed in the late 1980s. Grading plans for the development provided by the City were reviewed as a part of this drainage study. The subdivision development included the installation of multiple cross culverts along ~~Columbia Creek Lane~~ and Columbia Court. The locations of the culverts are provided in Exhibit D. It appears that stormwater management was not required for this development as the development pre-dated any City stormwater ordinance. With that said, the development would not meet current standards found in the City Code.

Runoff from the north portion of the subdivision is conveyed through a 15” CMP culvert to the north towards the Grasslyn Nature Center. Approximately 600 feet north of the Fiesta Lane and Grasslyn Road intersection, the runoff from Columbia Reserve, along with additional offsite runoff, enters a culvert under Grasslyn Road that discharges to the east. The runoff is then conveyed easterly through an Unnamed Tributary to Fish Creek along the backyards of homes fronting Fiesta Lane. These homes are roughly 5-feet or more above the invert elevation of the Unnamed Tributary. There does not appear to be any reports of significant flooding originating from the Unnamed Tributary in the backyards of the homes that front on Fiesta Lane. Any improvements to this stream would likely require other agency involvement and would not solve the drainage issues seen along Fiesta Lane.

As shown in Exhibit D, runoff from the south portion of the Columbia Reserve subdivision is conveyed in ditches and culverts through the side yards of various homes in the subdivision. Ultimately, the runoff is

conveyed through a 15” CMP culvert south across Columbia Court and through a 78” by 36” box culvert under Columbia Creek Lane. The drainage then heads south towards County Line Road and flows in roadside ditches to the east.

Based on the reviewed materials pertaining to this subdivision along with current topographic information, runoff generated from this subdivision has no impact on the Fiesta Lane drainage concerns.

DRAINAGE ANALYSIS CONCLUSIONS

The Columbia Creek subdivision would meet a portion of the current City requirements by not increasing the peak flow release rate for the 100-year event between the post-development and pre-development conditions. As for the 2-year and 10-year events, not enough information was provided in the approved drainage report to determine whether Columbia Creek would meet these newer standards. It is worth noting that the undetained area in the post-development condition from the drainage report does not align with what was actually constructed. Regardless of this difference in area, Columbia Creek still may meet the current 100-year event stormwater requirements. A further analysis of this development would be required to determine the effects of this situation, if desired.

Inspection of the Fiesta Lane right-of-way and rear yard areas, along with photos and videos, make it clear that there is stormwater runoff from Columbia Creek being conveyed through backyards and side yards of the Fiesta Lane residents. This runoff contributes to the total flow being conveyed in the south ditch and driveway culverts of Fiesta Lane. Residents who have witnessed the flooding, along with photos and video, indicate that the ditch and driveway culverts along the south side of Fiesta Lane are inadequate to convey the stormwater runoff during heavy rainfall events.

raSmith hydrologic calculations also indicate that the existing culverts are inadequate to convey stormwater runoff from the 10-year storm event and greater. These calculations confirm the conclusions of the residents.

The Columbia Reserve subdivision does not impact the drainage concerns along Fiesta Lane even though the subdivision would not meet current City requirements.

The following list summarizes our findings:

- Columbia Creek would meet a portion of current City requirements, but the drainage report is does not provide enough detail to form a conclusion for the smaller rain events.
- More area from Columbia Creek is undetained than what was anticipated and/or approved with the 1999 drainage report. This undetained area drains directly into the rear yards of homes along Fiesta Lane, eventually draining to the south ditch of Fiesta Lane.
- A large amount of runoff is conveyed through the backyards on the south side of Fiesta Lane. This runoff originates from the homes along Fiesta Lane as well as Columbia Creek.
- The driveway culverts on the south side of Fiesta Lane are undersized starting where the rear yard drainage enters the right-of-way at 1701/1711 Fiesta Lane. This results in roadway and driveway overtopping and flooding on the north side of Fiesta Lane.
- Columbia Reserve does not impact drainage concerns along Fiesta Lane.
- The Unnamed Tributary to Fish Creek does not impact drainage concerns along Fiesta Lane.

1999 STORMWATER MANAGEMENT MASTER PLAN

A stormwater management master plan was prepared by Camp Dresser & McKee Inc in May of 1999 for the City of Mequon and the Village of Thiensville. The purpose of the master plan was to identify an approach for both the City and Village to control stormwater drainage flooding in major storm sewers, natural streams and channels, and manmade channels. The other goals were to improve water quality of stormwater runoff and to assist municipal staff in their permitting applications and compliance efforts. The study area covered 47 square miles that included the entirety of the City of Mequon and Village of Thiensville.

While the master plan did include Fiesta Lane in the overall drainage area for the City, a detailed analysis of this area was not included in the 1999 report. At the time, only ten major stormwater flooding areas

were identified by the City of Mequon engineering staff, Village of Thiensville staff, and the stormwater steering committee. These areas were selected based on citizen complaints from the June 1997 storm event along with other storms, potential for damage, and the flooding history of areas. The ten areas are shown on Exhibit G which originated from the 1999 plan and did not include Fiesta Lane.

FLOOD MITIGATION ALTERNATIVES

Mitigation efforts have not yet been fully analyzed. Conceptual alternatives are provided below. This portion of the report will be updated after feedback has been received from City staff, Public Works Committee members, and the general public. Cost estimates and more detailed mitigation options will be presented at the August 15th Public Works Committee meeting.

FLOOD MITIGATION ALTERNATIVE #1

Provide storage and peak flow reduction of the runoff from Columbia Creek and southwest portion of Fiesta Lane backyards. This will require a stormwater detention pond within an easement on private property, in the rear yards of residence on the south side of Fiesta Lane. A concept level pond location has been provided in Exhibit F and is subject to change upon further design and analysis. This alternative will likely be the most effective as it will provide upstream storage within the watershed but may be more costly than the next two alternatives. It would also involve a significant amount of property acquisition or easements.

FLOOD MITIGATION ALTERNATIVE #2

Replace the undersized culverts within the Fiesta Lane right-of-way. Culvert capacity will be limited by the amount of cover at each driveway, but multiple culverts could potentially be provided to increase the conveyance capacity at each driveway. It will be important to analyze the amount of additional runoff that will be sent downstream so that new drainage issues are not created as a result further downstream. Specifically, the recently installed culvert on N. Port Washington Lane will need to be analyzed to determine that is has adequate capacity to handle the proposed conveyance alternatives. This alternative will likely be the most efficient in terms of cost versus effectiveness.

FLOOD MITIGATION ALTERNATIVE #3

Re-grade the ditches within the Fiesta Lane right-of-way to increase conveyance capacity. This may include wider and deeper ditches requiring right-of-way acquisition or easements. Similar to Alternative #2, the downstream conditions will need to be analyzed to ensure that there is enough capacity to handle the increase in conveyance. This alternative will likely be the most cost effective but may be the least effective mitigation alternative out of the three that were presented.

DRAINAGE STUDY CONCLUSIONS & RECOMMENDATIONS

Any recommendations and conclusions will be provided at a later date.

EXHIBIT A

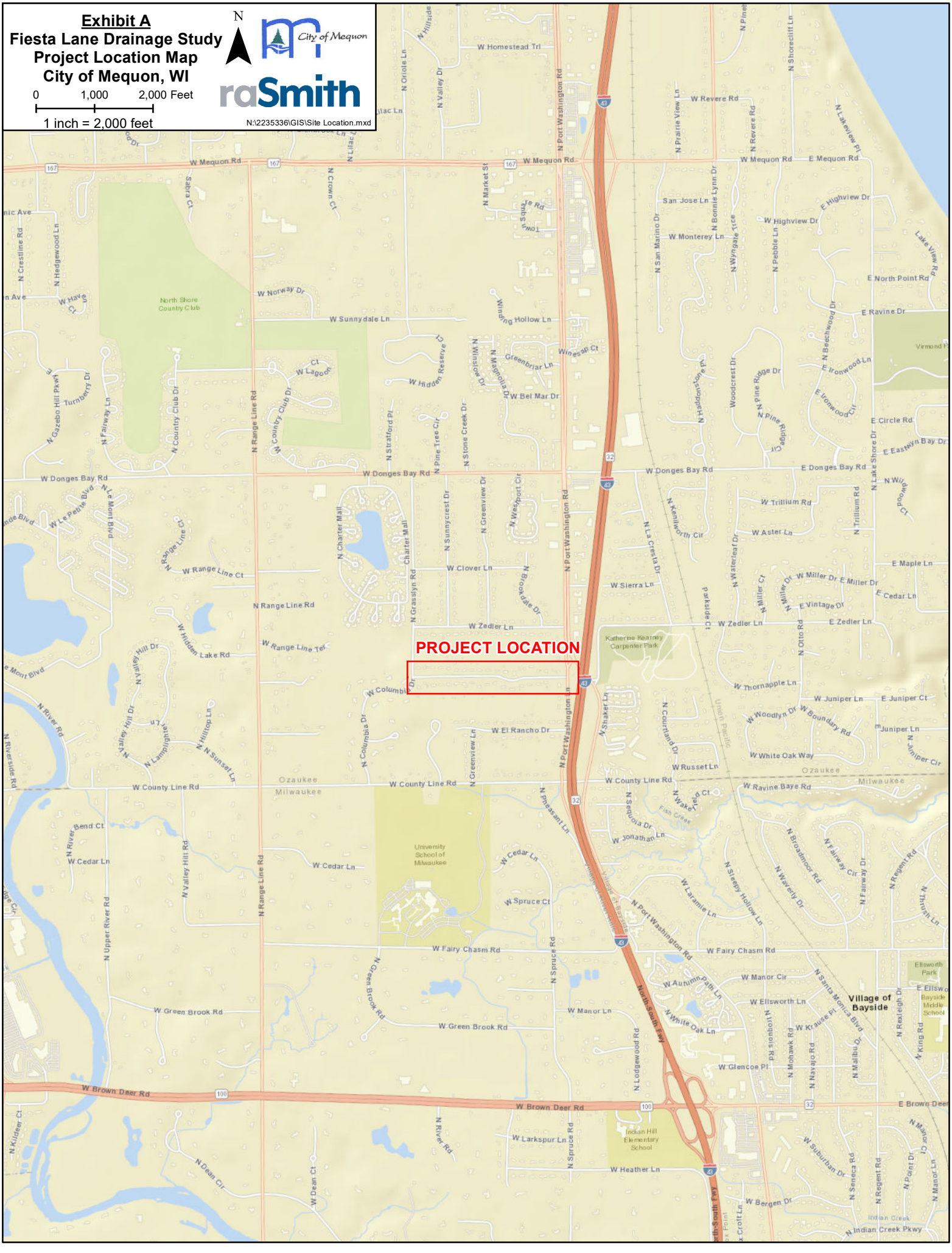


Exhibit A
Fiesta Lane Drainage Study
Project Location Map
City of Mequon, WI
0 1,000 2,000 Feet
1 inch = 2,000 feet
N
City of Mequon
raSmith
N:\2235336\GIS\Site Location.mxd
PROJECT LOCATION
W Mequon Rd
W Homestead Trl
W Revere Rd
E Mequon Rd
W Norway Dr
W Sunnydale Ln
W Donges Bay Rd
E Donges Bay Rd
W Range Line Rd
N Range Line Rd
W Range Line Ct
W Clover Ln
W Zedler Ln
E Zedler Ln
W Trillium Rd
W Aster Ln
W Sierra Ln
W Hidden Lake Rd
W Range Line Ter
W Columbia Dr
W El Rancho Dr
W County Line Rd
W Russet Ln
W Ravine Baye Rd
W Thornapple Ln
W Juniper Ln
E Juniper Ct
W White Oak Way
W Cedar Ln
W Spruce Ct
W Fairy Chasm Rd
W Manor Cir
W Manor Ln
W Ellsworth Ln
W Green Brook Rd
W Brown Deer Rd
E Brown Deer
W Larkspur Ln
W Heather Ln
W Bergen Dr
E Highview Dr
W Highview Dr
W Monterey Ln
San Jose Ln
E North Point Rd
E Ravine Dr
E Circle Rd
E Eastwin Bay Dr
E Maple Ln
E Cedar Ln
E Miller Dr
W Miller Dr
E Vintage Dr
W Autumn Path Ln
W Glencoe Pl
W White Oak Ln
W Laramie Ln
W Wakefield Ct
W Jonathan Ln
W Woodlyn Dr
W Boundary Rd
W Suburban Dr
N Port Washington Rd
N Range Line Rd
N Country Club Dr
N Fairway Ln
N Valley Hill Dr
N River Rd
N Riverside Rd
N Upper River Rd
N Green Brook Rd
N Spruce Rd
N Lodgewood Rd
N Pheasant Ln
N Greenview Ln
N Columbia Dr
N Shaker Ln
N Courtland Dr
N Otto Rd
N Kenilworth Cir
N Waterleaf Dr
N Sunnycrest Dr
N Greenview Dr
N Charter Mall
N Grassyn Rd
N Stratford Pl
N Pine Tree Cir
N Stone Creek Dr
N Meadowbrook Dr
N Westport Cir
N Hillside Ln
N Oriole Ln
N Valley Dr
N Market St
N Prairie View Ln
N Shorecliff Ln
N Lakeview Pl
N San Marino Dr
N Bonnie Lynn Dr
N Wyngate Tce
N Pebble Ln
N Beechwood Dr
E Ironwood Ln
E Ironwood Cir
N Pine Ridge Dr
N Pine Ridge Cir
Woodcrest Dr
N Lake Shore Dr
N Wildwood Ct
N Trillium Rd
N Miller Ct
N Waverly Dr
N Broadmoor Rd
N Fairway Cir
N Fairway Dr
N Regent Rd
N Throsh Ln
N Juniper Cir
N Rexleigh Dr
N King Rd
N Mohawk Rd
N Navajo Rd
N Malibu Dr
N Santa Monica Blvd
N Illinois Rd
W Krause Pl
N Seneca Rd
N Regent Rd
N Point Dr
N Manor Ln
N Indian Creek Pkwy
Village of Bayside
Ellsworth Park
Bayside Middle School
Indian Hill Elementary School
Katherine Kearney Carpenter Park
University School of Milwaukee
North Shore Country Club
Ozaukee
Milwaukee
Union Pacific
Fish Creek
North-South Fwy

EXHIBIT B

Exhibit B
Fiesta Lane Drainage Study
Drainage Area Map
City of Mequon, WI

0 100 200 Feet

1 inch = 200 feet

N

City of Mequon

raSmith

N:\2235336\GIS\Drainage Map.mxd

UNNAMED TRIBUTARY
TO FISH CREEK

DRAINAGE AREA TRIBUTARY
TO NORTH DITCH OUTFALL = 7.5 ACRES

NORTH DITCH
OUTFALL LOCATION

FIESTA LANE

DRAINAGE AREA TRIBUTARY
TO SOUTH DITCH OUTFALL = 20.8 ACRES

SOUTH DITCH
OUTFALL LOCATION

COLUMBIA CREEK

PORT WASHINGTON LANE

Legend

- Drainage Areas
- Columbia Creek Parcel

2015 Ozaukee County LiDAR

- Index Contours
- Intermediate Contours
- Parcels

EXHIBIT C

Exhibit C
Fiesta Lane Drainage Study
Survey Information
City of Mequon, WI

N

0 50 100 Feet

1 inch = 100 feet

City of Mequon

raSmith

N:\2235336\GIS\Survey Info.mxd

1718 1704 1624 1608 1528 1516 1436 1428 1414 1332 9927 9915

12" CMP W 695.79 E 695.52

12" CMP W 694.83 E 694.83 Flat

12" CMP W 694.10 E 693.92

12" CMP W 693.40 E 692.68

12" HDPE W 691.96 E 689.29

15" CMP W 688.83 E 688.90 Backpitched

15" CMP W 686.00 E 686.15 Backpitched

15" CMP W 685.25 E 685.29 Backpitched

15" CMP W 684.65 E 684.73 Backpitched

15" HDPE W 684.61 E 683.89

18" CMP W 683.68 E 683.53

18" CMP W 683.31 E 683.20

18" CMP W 683.45 E 683.40

1318

West Fiesta Lane

15" CMP W 695.26 E 695.04

18" CMP W 692.83 E 692.53

18" CMP W 691.73 E 691.54

24" HDPE W 690.30 E 689.52

18" CMP W 688.32 E 688.19

18" CMP W 687.57 E 687.56 Flat

18" CMP W 686.42 E 685.99

18" CMP W 685.39 E 685.30

18" CMP W 684.23 E 684.17

18" CMP W 683.15 E 683.35 Backpitched

18" CMP W 681.80 E 681.50

18" CMP W 681.11 E 680.84

1321 1313

Rear yard drainage enters right-of-way

Larger culvert discharging to a smaller culvert

Depressional area that ponds water in minor rain events

1711 1701 1627 1613 1519 1503 1429 1415 1727 1601 9823

1616 1534 1524 1510 1434 1426 1414

Note: Prelminary calculations show that all south driveway culverts are undersized to convey a 10-year rain event. Sizes and inverts will be determined at a later date along with analyzing the north driveway culverts.

Legend

- Surveyed Culverts
- Parcels

2015 Ozaukee County LiDAR

- Index Contours
- Intermediate Contours

EXHIBIT D

Exhibit D
Fiesta Lane Drainage Study
Columbia Drainage Map
City of Mequon, WI

0 100 200 Feet
1 inch = 200 feet

N

City of Mequon

raSmith

N:\2235336\GIS\Drainage Columbia.mxd

FIESTA LANE

COLUMBIA RESERVE

COLUMBIA CREEK

15" CMP Culvert

15" CMP Culvert

15" CMP Culvert

Natural Depressional Area

Natural Depressional Area

Columbia Creek Detention Basin

78" x 36" Box Culvert

North Columbia Creek Lane

West Columbia Court

Columbia Creek Lane

West el Rancho Drive

West County Line Road

Legend

Fiesta Lane Drainage Areas

Parcels

2015 Ozaukee County LiDAR

Index Contours

Intermediate Contours

EXHIBIT E

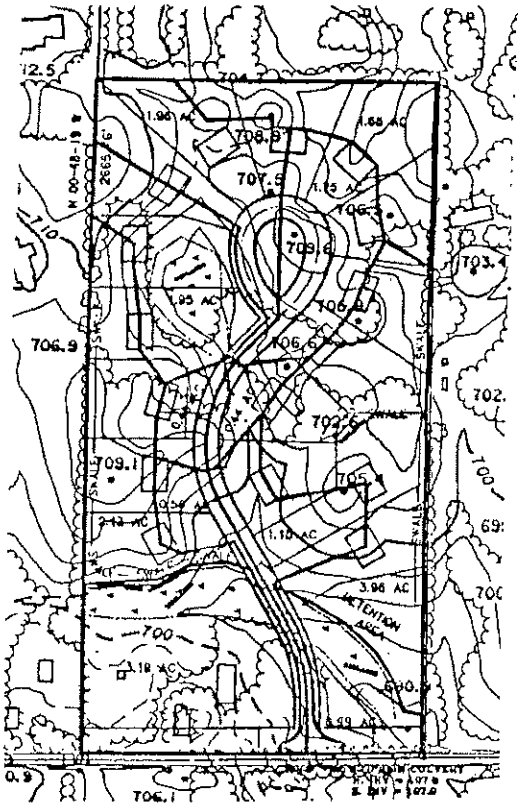
DRAINAGE REPORT

FOR

COLUMBIA CREEK

A RESIDENTIAL DEVELOPMENT

CITY OF MEQUON



PREPARED BY:

M.I.C. ENGINEERING, INC.

6542 HAWTHORNE LANE, HARTFORD, WISCONSIN (414)673–4550

JANUARY 31, 1997

PROPOSED COLUMBIA CREEK
DRAINAGE REPORT

EXISTING DRAINAGE

The existing drainage patterns of the approximate 20.00 acre parcel, located at 1934 W County Line Road, Mequon, which is the site of an existing lightly wooded farmstead and the proposed site of a residential development of 3/4 acre parcels. This site in it's existing condition can be defined as two distinct drainage areas:

NORTHEAST - approximately ONE-SEVENTH of the site drains toward northeast, collecting water and directing it overland and into the adjoining subdivided areas.

REMAINDER - the remainder of the site, approximately SIX-SEVENTHS of the site, drains toward the South central portion of the site, collecting water from the existing buildings and pavement areas and directing it towards the ditchline that crosses the parcel from west to east and crossing southward under County Line Road.

The existing parcel is occupied by a farmstead with outbuildings. The remainder of the site is in good naturally landscaped condition with a light woody growth.

PROPOSED DRAINAGE

The proposed drainage patterns of the parcel after development of the proposed street, construction of new homes, and installation of all municipal utilities, can be defined as three individual drainage areas:

SOUTHWEST - approximately 20% of the site will remain as it is, containing the existing farmstead and areas of wetlands along the ditchline crossing the parcel, will drain internally, following existing swales and patterns.

NORTHEAST - approximately 8% of the site will continue to drain toward the northeast, collecting water and directing it overland and into the adjoining subdivided areas.

REMAINDER - the remainder of the site will be built upon but with every care taken to preserve the integrity of the natural landscaping. This area will contain the bulk of the roadway and all new homesites. The area will be storm sewered towards natural swales which lead to a detention basin capable of containing the

difference of the 100-year rainfall runoff and the pre-development 10-year rainfall runoff. Outlet runoff from the basin was assumed to be the remainder of the pre-existing condition minus the developed runoff from the areas that are directly tributary to areas that cannot be accommodated by the detention area.

SUMMARY

PRE-DEVELOPMENT

NE	10-YEAR =	3 CFS
SE		(SITE)
SITE	=	17 CFS
TOTAL		20 CFS

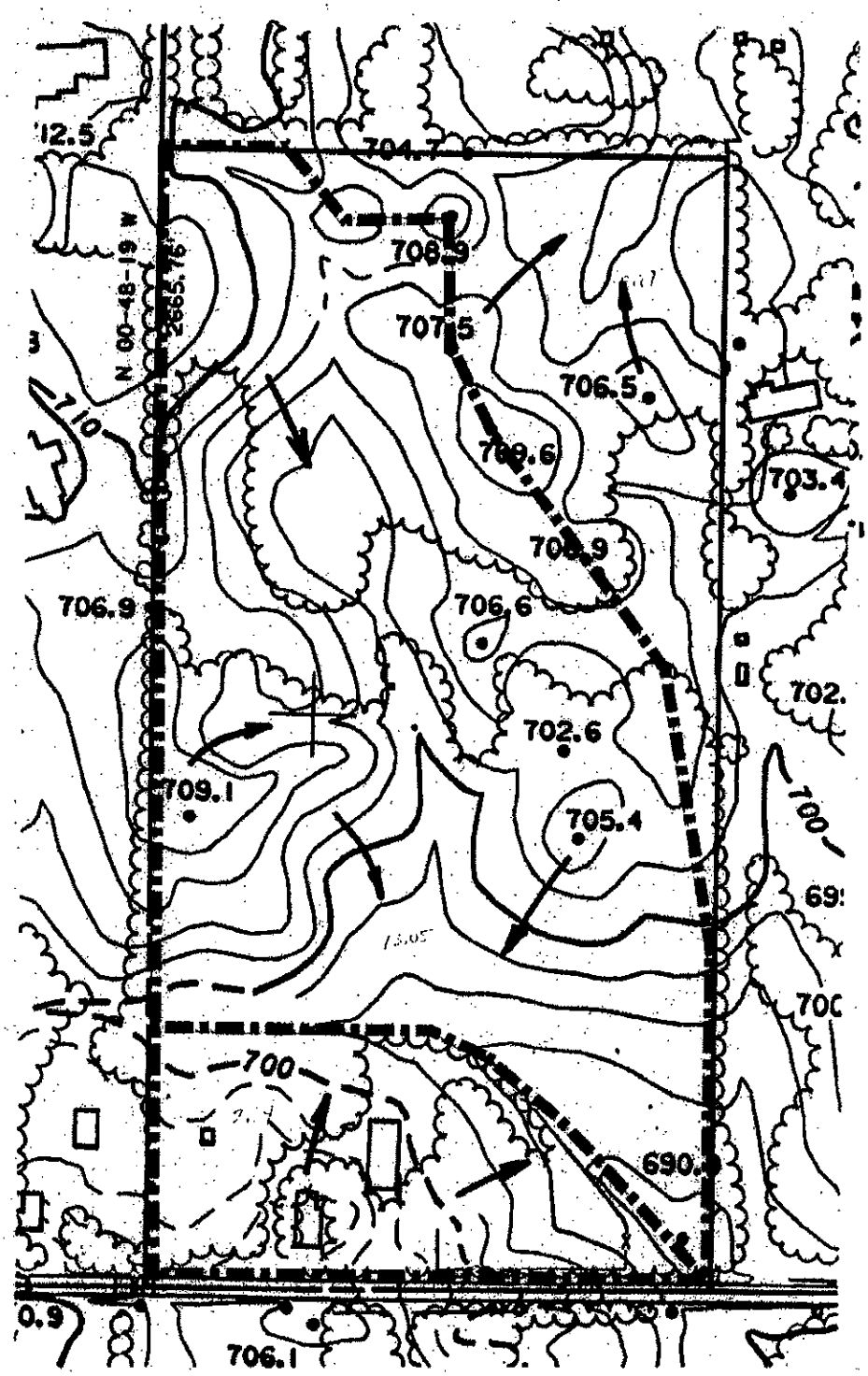
POST-DEVELOPMENT

100-YEAR	=	3 CFS
	=	8 CFS
	=	39 CFS
		50 CFS

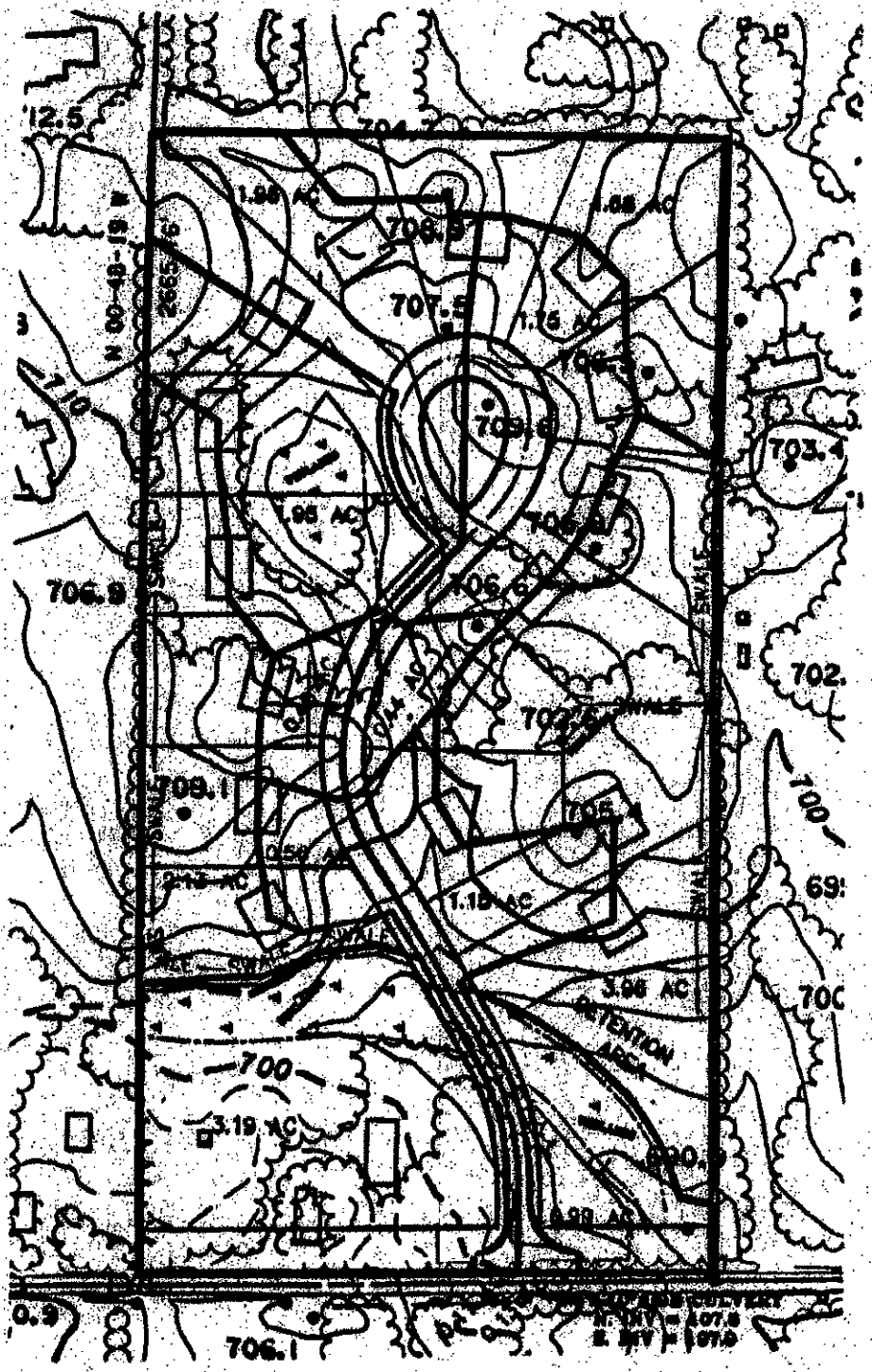
DETENTION BASIN RAINFALL EVENTS	MAX INFLOW	MAX OUTFLOW	MAX BASIN ELEVATION
100-YEAR	39.0 CFS	8.9 CFS	115.06

PRE-DEVELOPMENT NE 10-YEAR = POST-DEVELOPMENT NE 100-YEAR

DETENTION BASIN SIZED TO DETAIN 30 CFS (50 CFS - 20 CFS)

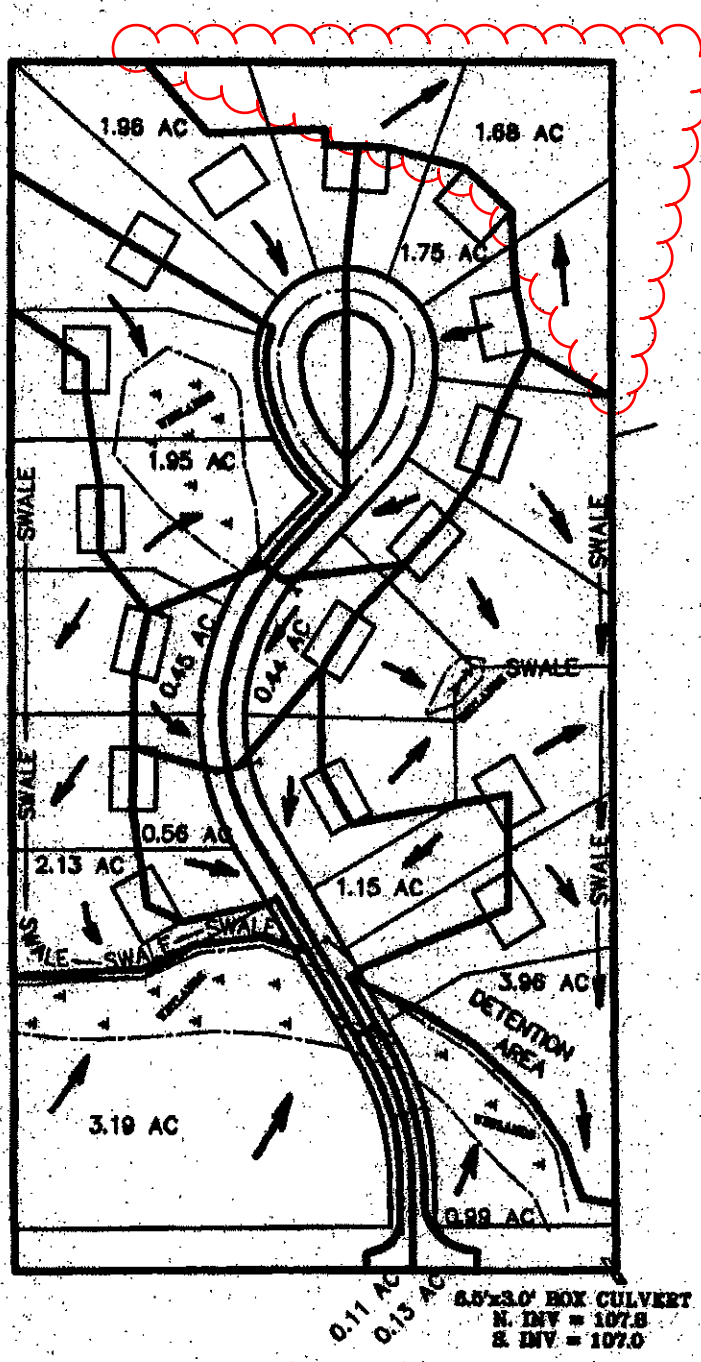


EXISTING DRAINAGE PATTERN



PROPOSED DRAINAGE PATTERN

AREA TO DRAIN
NORTH TOWARDS
FIESTA LANE



PROPOSED DRAINAGE PATTERN

EXHIBIT F

Exhibit F
Fiesta Lane Drainage Study
Columbia Creek Drainage Map
City of Mequon, WI

0 40 80 Feet

1 inch = 80 feet

N

City of Mequon

raSmith

N:\2235336\GIS\Drainage Map Columbia Creek.mxd

Drainage Area to South Property Line of 1817 Fiesta Lane = 3.39 acres

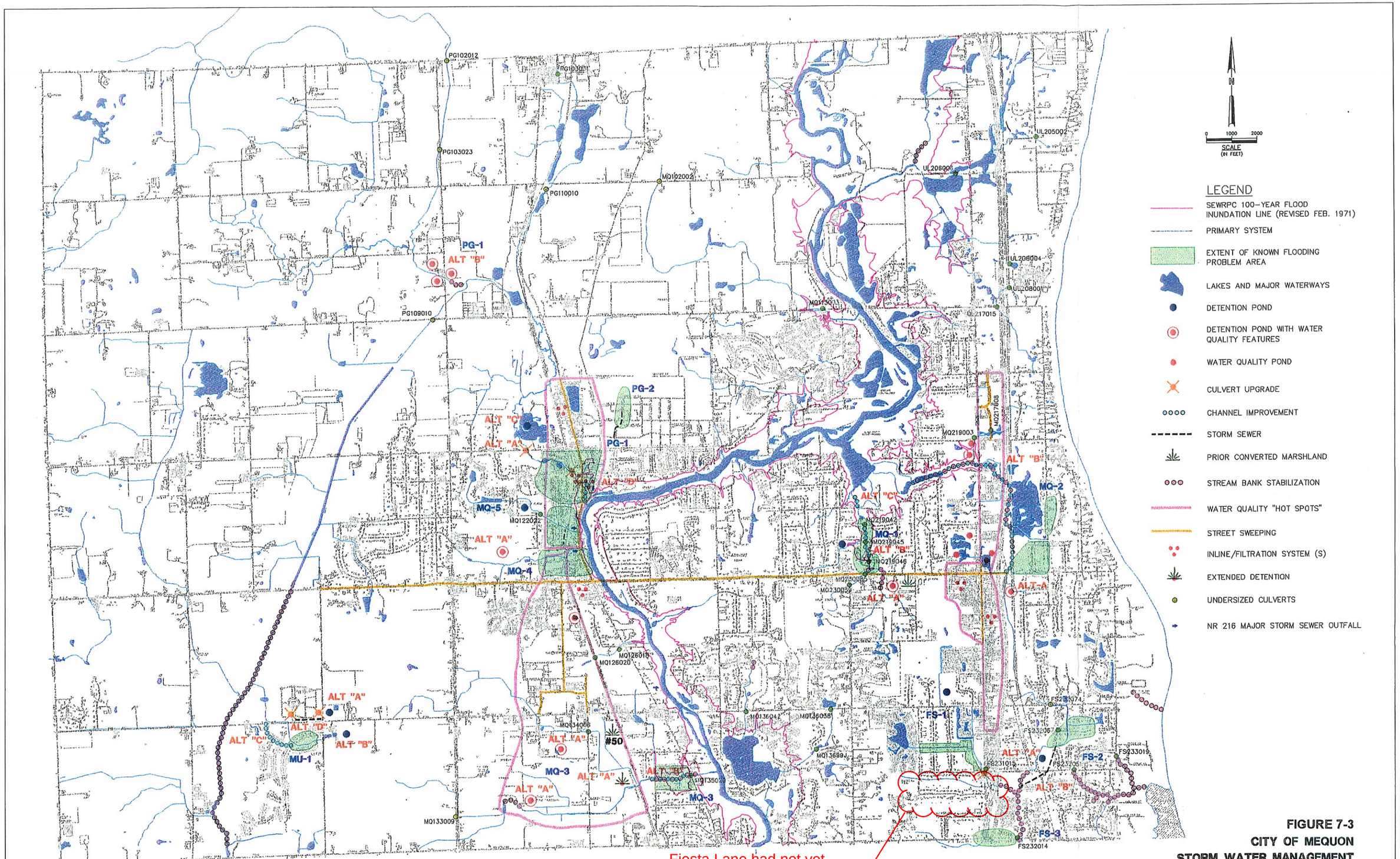
Drainage Area to South Property Line of 1817 Fiesta Lane = 2.35 acres

Flood Mitigation Alternative #1
Proposed Pond - Size and Extents To Be Determined

Legend

- Drainage Area
- **2015 Ozaukee County LiDAR**
- Index Contours
- Intermediate Contours
- Approximate Proposed Pond Location
- Parcels

EXHIBIT G



Fiesta Lane had not yet been identified as a flooding problem area

FIGURE 7-3
CITY OF MEQUON
STORM WATER MANAGEMENT
FLOODING PROBLEM AREAS AND ALTERNATIVES

CDM Camp Dresser & McKee Inc.