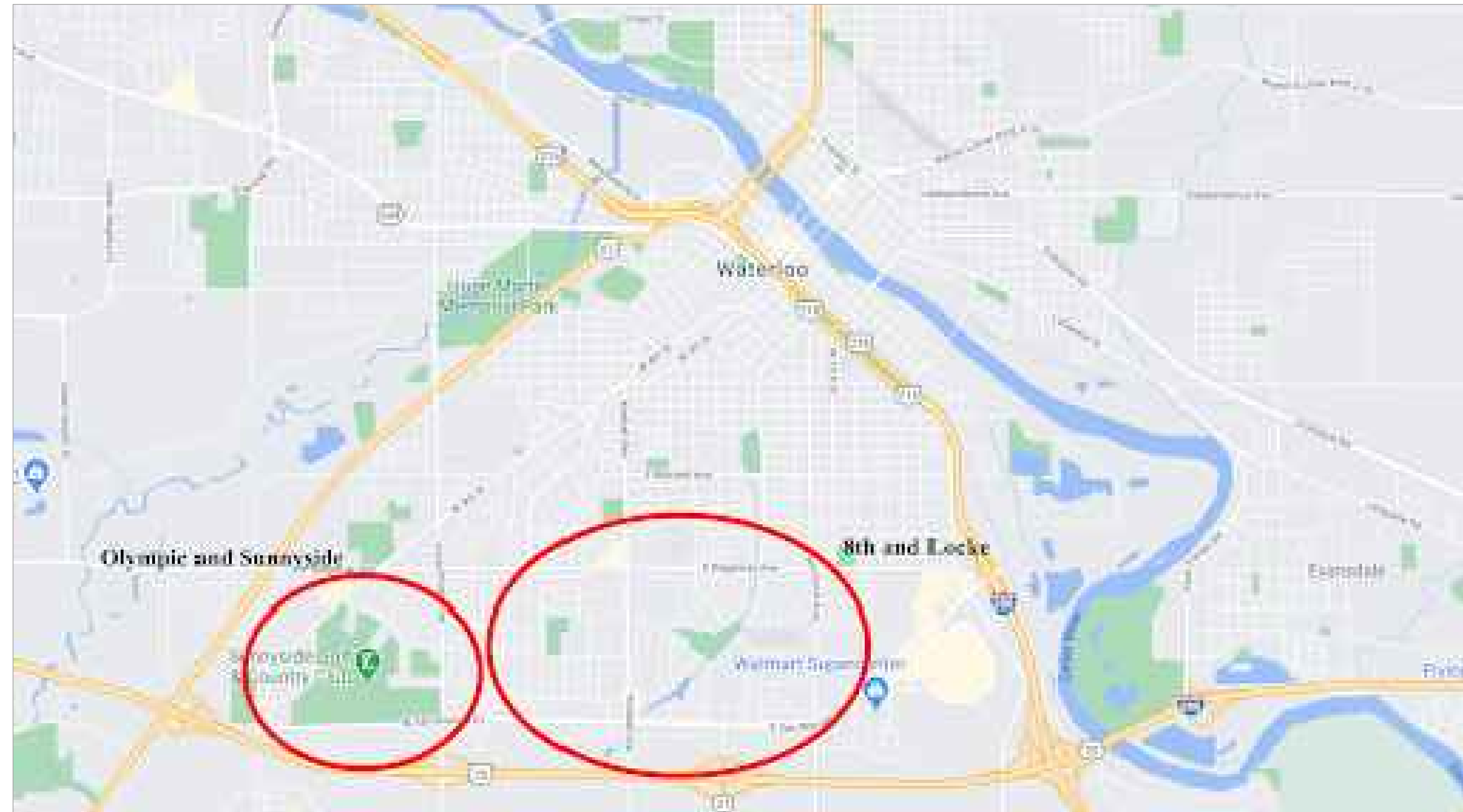


PRELIMINARY PLAN

FOR

# SUMP PUMP DISCHARGE SYSTEM PROJECT

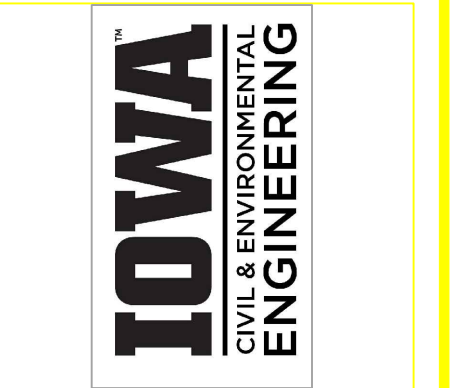
CITY OF WATERLOO, BLACK HAWK COUNTY, IOWA



SHEET NO.	INDEX OF SHEETS
1	TITLE SHEET
2	PROJECT INFORMATION
3	OVERALL SITE LAYOUT
4-27	CONNECTION PLANS FOR PROPERTIES
28-34	DRAIN TILE PLANS
35-39	DRAIN TILE DETAILS
40	OUTLET TO EXISTING CREEK PLANS AND DETAILS

PROJECT: CEE: 4850  
DATE: 11/20/2020  
DRAWN BY: JAB/TDA  
REVISION:

THE UNIVERSITY OF IOWA  
CIVIL AND ENVIRONMENTAL ENGINEERING  
4105 SEAMANS CENTER FOR THE  
ENGINEERING ARTS AND SCIENCES  
103 S CAPITOL ST  
IOWA CITY, IOWA 52242  
PHONE: 319.335.5647  
FAX: 319.335.5660  
EMAIL: civil-hawks@iowa.edu



EDUCATIONAL - NOT  
FOR CONSTRUCTION

**SUMP PUMP PROJECT**  
WATERLOO, IA  
BLACK HAWK COUNTY

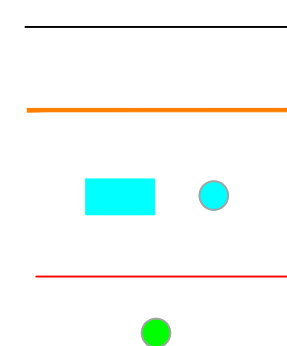
SHEET NAME  
LAYOUT

SHEET NO.  
**01**

LEGEND

Features

- Existing Curb
- New Drain Tile
- Tee Connector
- Bored Lengths
- New Rain Garden



UTILITY WARNING

THE EXISTING UTILITIES HAVE NOT BEEN LOCATED BY FIELD SURVEY INFORMATION.

UTILITY CONTACT INFORMATION

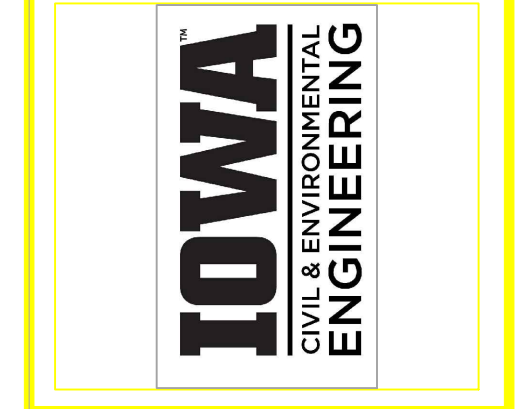
UTILITY CONTACT FOR MAPPING INFORMATION CAN BE OBTAINED FROM IOWA ONE CALL,  
1-800-292-8989

GENERAL NOTES

- A. NOTIFY ALL UTILITY PROVIDERS BEFORE BEGINNING CONSTRUCTION AND COORDINATE WITH UTILITY PROVIDERS DURING CONSTRUCTION. AS FIELD SURVEYS HAVE NOT BEEN DONE, CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE LOCATION AND DEPTH OF EXISTING UTILITIES.
- B. DIMENSIONS ON PLANS AND PROFILES ARE BASED OFF OF AVAILABLE INFORMATION AT THE TIME OF DESIGN. REPORT CONFLICTS BETWEEN PLAN, PROFILES, AND FIELD INFORMATION TO THE PROJECT ENGINEER BEFORE STARTING CONSTRUCTION.
- C. CONTOURS SHOWN ARE BASED OFF INFORMATION OBTAINED FROM THE CITY ENGINEERS.
- D. CONTRACTORS ARE RESPONSIBLE FOR CLEANING DIRT AND OTHER DEBRIS CAUSED BY CONSTRUCTION FROM STREETS, DRIVEWAYS, AND SIDEWALKS IN A TIMELY MANNER.
- E. CONTRACTORS ARE RESPONSIBLE FOR MAINTAINING A 18" MINIMUM VERTICAL AND HORIZONTAL CLEARING BETWEEN EXISTING UTILITIES.

PROJECT:	CEE: 4850
DATE :	11/20/2020
DRAWN BY:	JAB/TDA
REVISION:	

**THE UNIVERSITY OF IOWA**  
**CIVIL AND ENVIRONMENTAL ENGINEERING**  
4105 SEAMANS CENTER FOR THE  
ENGINEERING ARTS AND SCIENCES  
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PHONE: 319.335.5647  
FAX: 319.335.5660  
EMAIL: [civil-hawks@iowa.edu](mailto:civil-hawks@iowa.edu)



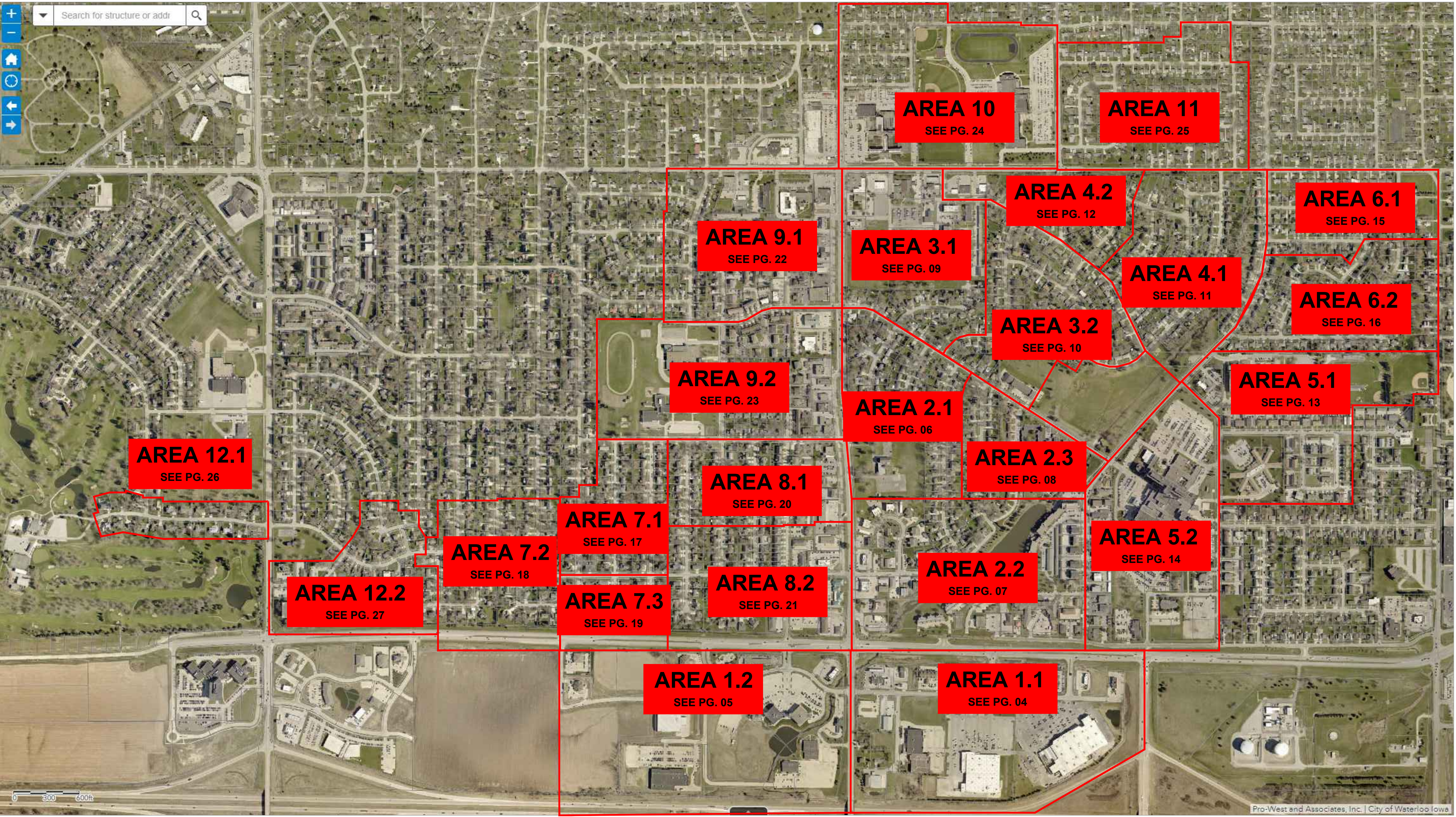
EDUCATIONAL - NOT FOR CONSTRUCTION

**SUMP PUMP PROJECT**  
WATERLOO, IA  
BLACK HAWK COUNTY

SHEET NAME  
OVERALL SITE LAYOUT

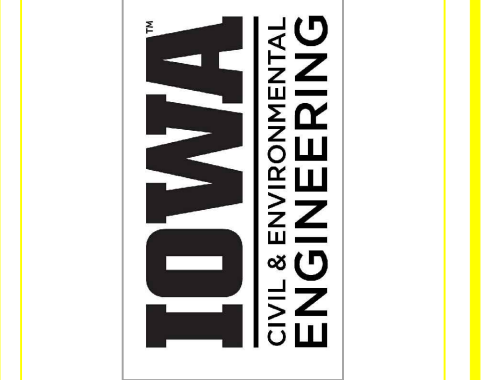
SHEET NO.  
**02**





PROJECT: CEE: 4850  
 DATE: 11/20/2020  
 DRAWN BY: JAB/TDA  
 REVISION:

**THE UNIVERSITY OF IOWA**  
**CIVIL AND ENVIRONMENTAL ENGINEERING**  
 4105 SEAMANS CENTER FOR THE  
 ENGINEERING ARTS AND SCIENCES  
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 EMAIL: civil-hawks@iowa.edu



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**SUMP PUMP PROJECT**  
 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 OVERALL SITE LAYOUT

SHEET NO.  
**03**

Pro-West and Associates, Inc. | City of Waterloo Iowa



# AREA 1.1



## NOTES

**PRIVATE AREA,  
NO MODIFICATIONS NEEDED**

## KEY

- NEW DRAIN TILE ---
- EXISTING DRAIN TILE ---
- CITY STORM SEWER →
- PRIVATE STORM SEWER →
- CONNECT TO EXISTING STORM SEWER OR TILE ■
- RAIN GARDEN ■
- OUTLET TO EXISTING WATERWAY ■

PROJECT: CEE- 4850  
DATE : 12/11/2020  
DRAWN BY: JAB/TDA  
REVISION:

**THE UNIVERSITY OF IOWA**  
**CIVIL AND ENVIRONMENTAL ENGINEERING**  
4105 SEAMANS CENTER FOR THE  
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IOWA CITY, IOWA 52242  
PHONE: 319.335.5647  
FAX: 319.335.5660  
EMAIL: civil-hawks@iowa.edu



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## SUMP PUMP PROJECT

WATERLOO, IA  
BLACK HAWK COUNTY

SHEET NAME

AREA SECTION  
MAP VIEW

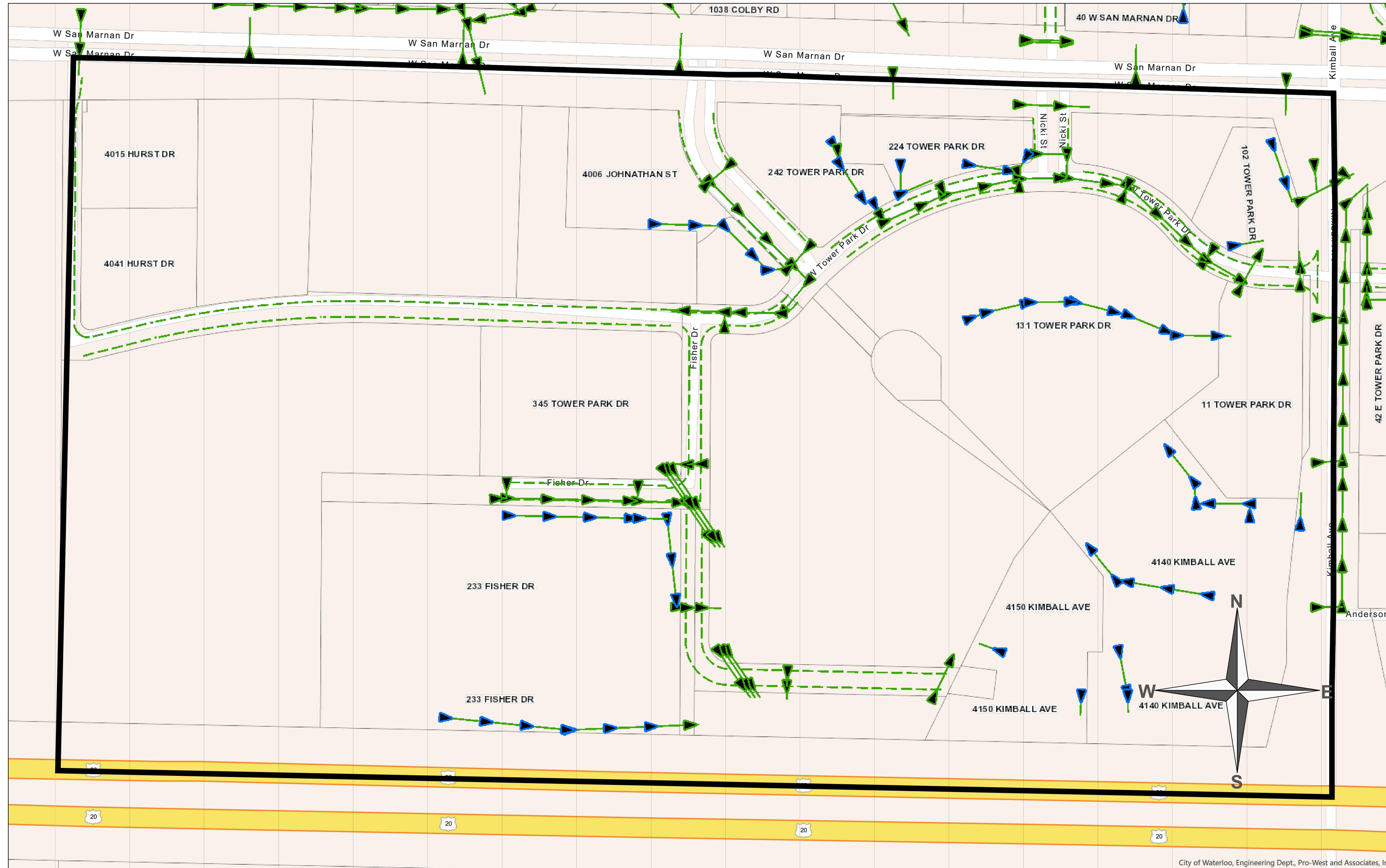
SHEET NO.

**04**

City of Waterloo, Engineering Dept., Pro-West and Associates, Inc.



# AREA 1.2



## NOTES

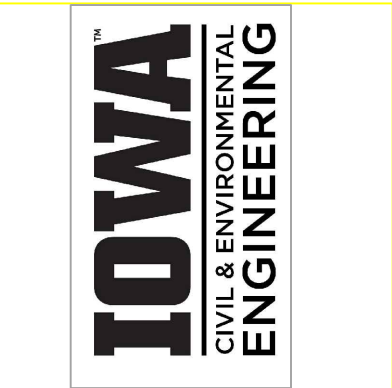
**PRIVATE AREA,  
NO MODIFICATIONS NEEDED**

## KEY

- NEW DRAIN TILE
- EXISTING DRAIN TILE
- CITY STORM SEWER
- PRIVATE STORM SEWER
- CONNECT TO EXISTING STORM SEWER OR TILE
- RAIN GARDEN
- OUTLET TO EXISTING WATERWAY

PROJECT: CEE- 4850  
DATE : 12/11/2020  
DRAWN BY: JAB/TDA  
REVISION:

**THE UNIVERSITY OF IOWA**  
**CIVIL AND ENVIRONMENTAL ENGINEERING**  
4105 SEAMANS CENTER FOR THE  
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IOWA CITY, IOWA 52242  
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## SUMP PUMP PROJECT

WATERLOO, IA  
BLACK HAWK COUNTY

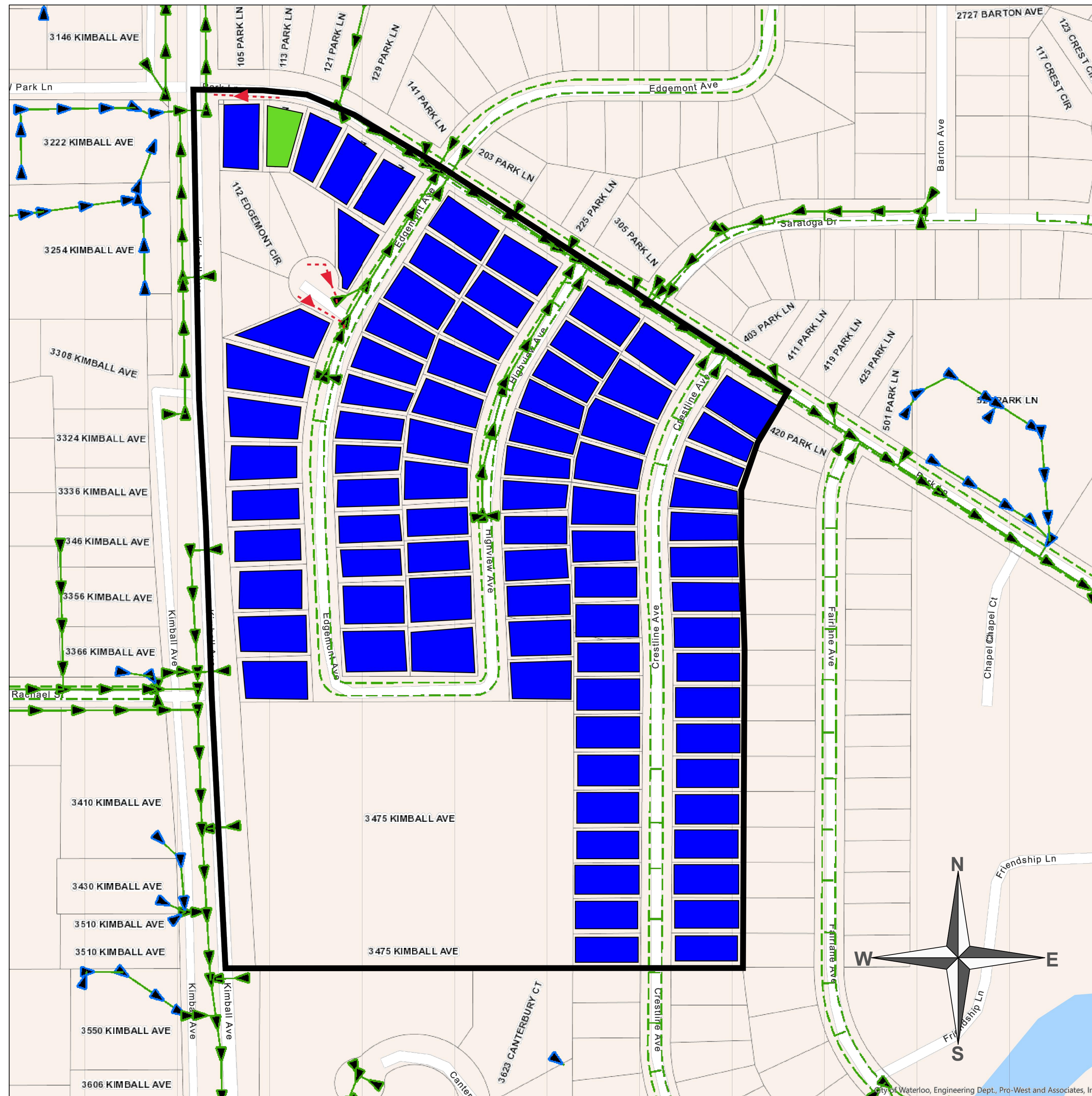
SHEET NAME  
AREA SECTION  
MAP VIEW

SHEET NO.  
**05**

City of Waterloo, Engineering Dept., Pro-West and Associates, Inc.



# AREA 2.1



## NOTES

**DRAIN TILE AND RAIN GARDEN  
PROPOSED**

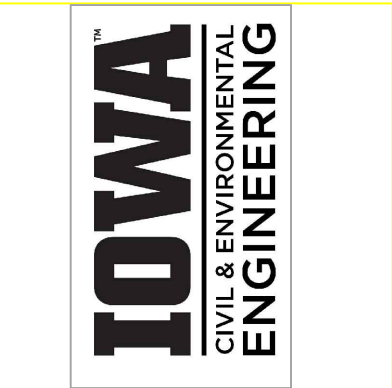
**DRAIN TILE LENGTH: 370 FT**

## KEY

- NEW DRAIN TILE - - - - -
- EXISTING DRAIN TILE - - - - -
- CITY STORM SEWER —▶
- PRIVATE STORM SEWER ▶—
- CONNECT TO EXISTING STORM SEWER OR TILE ■
- RAIN GARDEN ■
- OUTLET TO EXISTING WATERWAY ■

PROJECT:	CEE- 4850
DATE :	12/11/2020
DRAWN BY:	JAB/TDA
REVISION:	

**THE UNIVERSITY OF IOWA**  
**CIVIL AND ENVIRONMENTAL ENGINEERING**  
 4105 SEAMANS CENTER FOR THE  
 ENGINEERING ARTS AND SCIENCES  
 103 S CAPITOL ST  
 IOWA CITY, IOWA 52242  
 PHONE: 319.335.5647  
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 EMAIL: civil-hawks@iowa.edu



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**SUMP PUMP PROJECT**  
 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**06**



# AREA 2.2



## NOTES

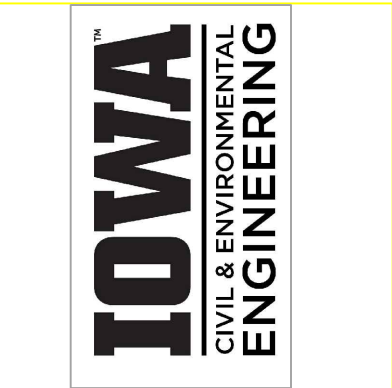
NO MODIFICATIONS NEEDED

## KEY

- NEW DRAIN TILE - - - -
- EXISTING DRAIN TILE - - - -
- CITY STORM SEWER →
- PRIVATE STORM SEWER →
- CONNECT TO EXISTING STORM SEWER OR TILE
- RAIN GARDEN
- OUTLET TO EXISTING WATERWAY

PROJECT:	CEE- 4850
DATE :	12/11/2020
DRAWN BY:	JAB/TDA
REVISION:	

**THE UNIVERSITY OF IOWA**  
**CIVIL AND ENVIRONMENTAL ENGINEERING**  
 4105 SEAMANS CENTER FOR THE  
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 IOWA CITY, IOWA 52242  
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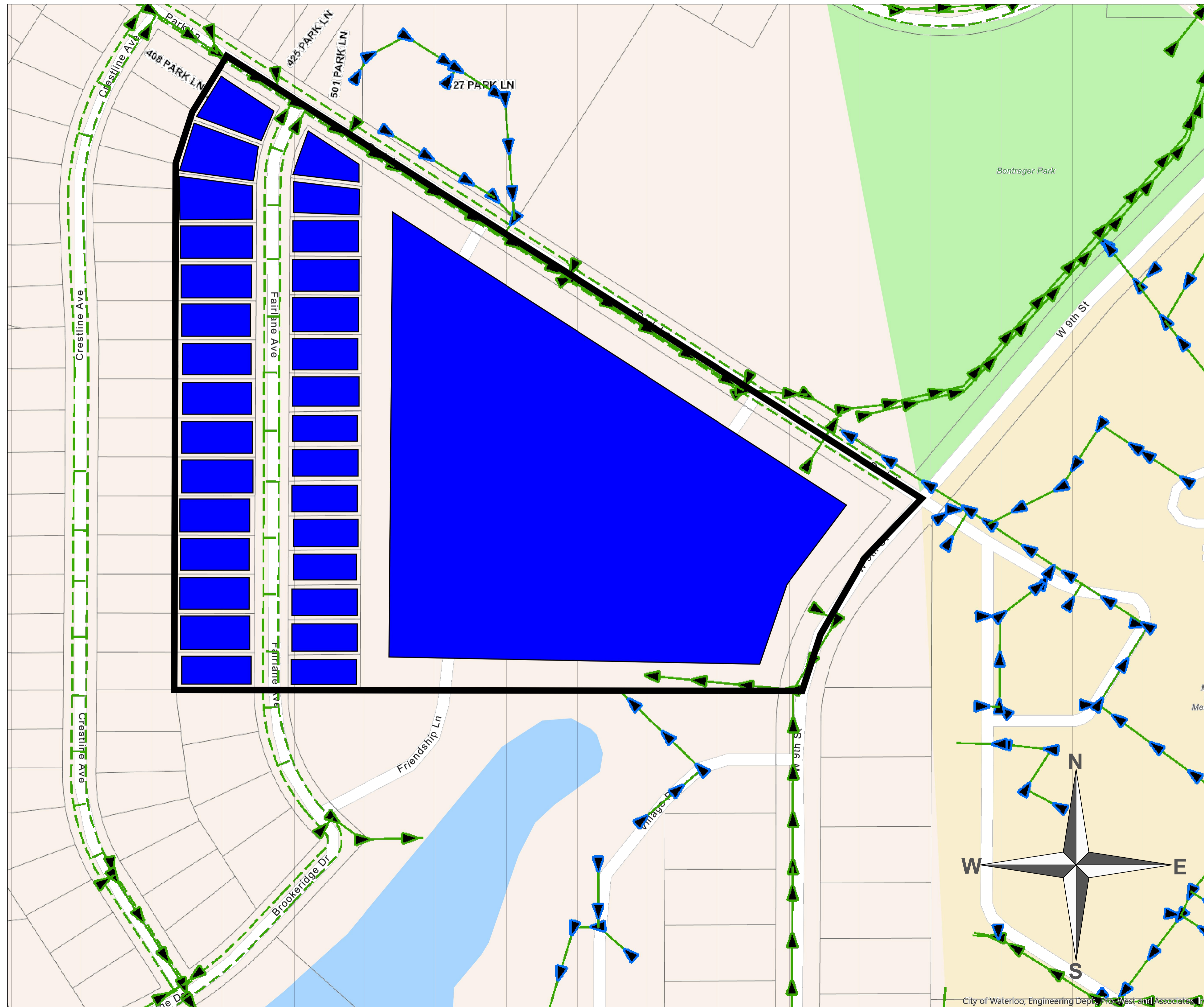
**SUMP PUMP PROJECT**  
 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**07**



# AREA 2.3



## NOTES

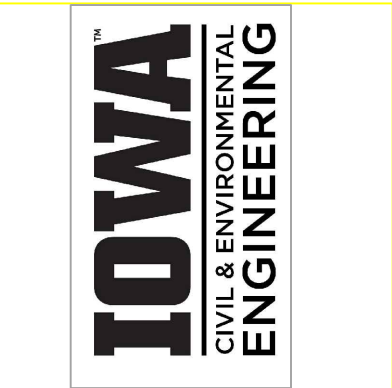
**NO MODIFICATIONS NEEDED**

## KEY

- NEW DRAIN TILE
- EXISTING DRAIN TILE
- CITY STORM SEWER
- PRIVATE STORM SEWER
- CONNECT TO EXISTING STORM SEWER OR TILE
- RAIN GARDEN
- OUTLET TO EXISTING WATERWAY

PROJECT:	CEE- 4850
DATE :	12/11/2020
DRAWN BY:	JAB/TDA
REVISION:	

**THE UNIVERSITY OF IOWA**  
**CIVIL AND ENVIRONMENTAL ENGINEERING**  
 4105 SEAMANS CENTER FOR THE  
 ENGINEERING ARTS AND SCIENCES  
 103 S CAPITOL ST  
 IOWA CITY, IOWA 52242  
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## SUMP PUMP PROJECT

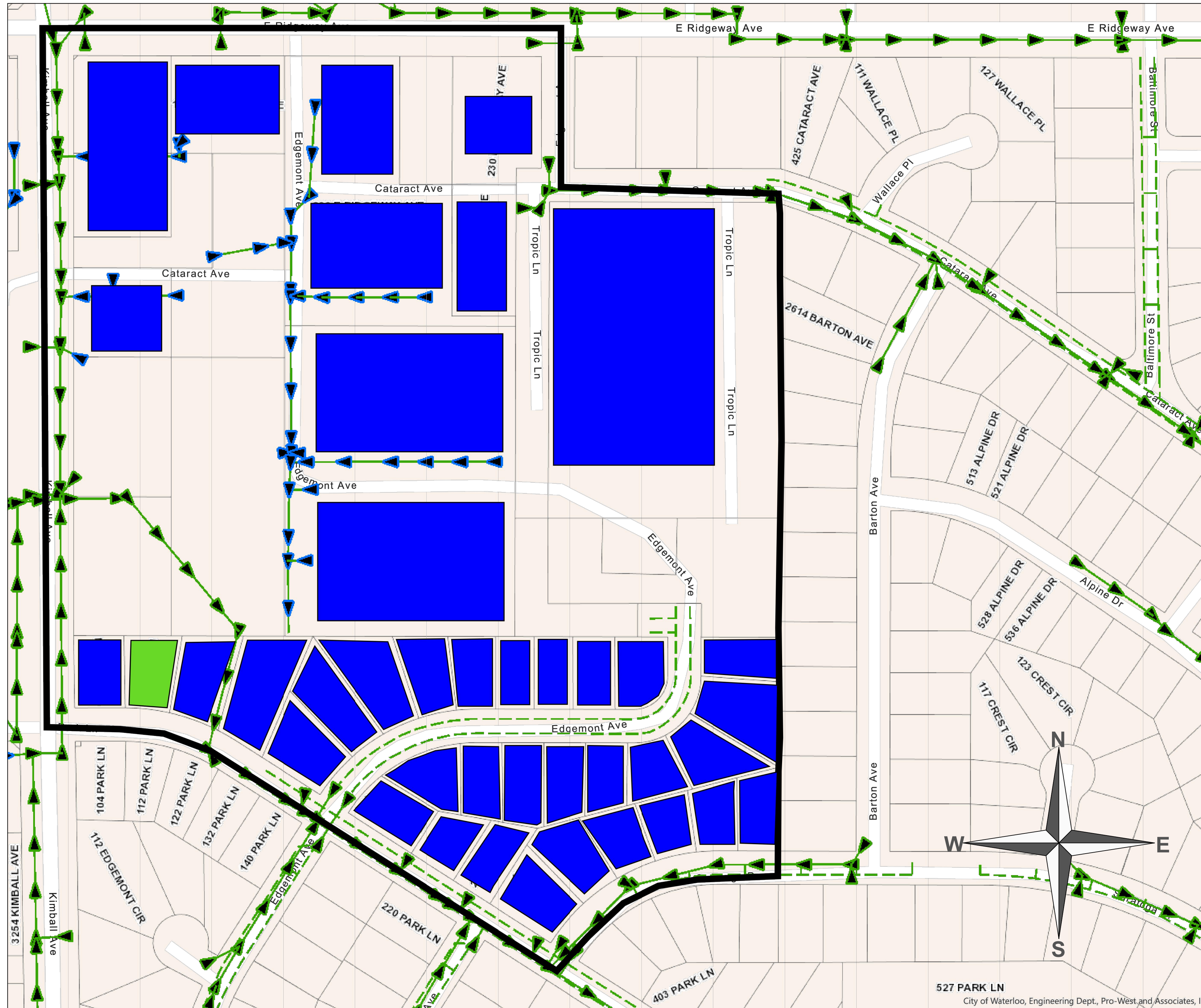
WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**08**










# AREA 3.1



## NOTES

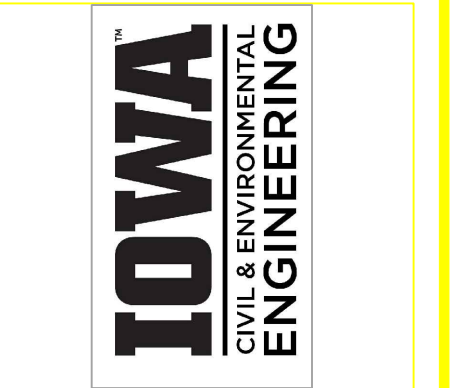
### RAIN GARDEN PROPOSED

#### KEY

- NEW DRAIN TILE 
- EXISTING DRAIN TILE 
- CITY STORM SEWER 
- PRIVATE STORM SEWER 
- CONNECT TO EXISTING STORM SEWER OR TILE 
- RAIN GARDEN 
- OUTLET TO EXISTING WATERWAY 

PROJECT:	CEE- 4850
DATE :	12/11/2020
DRAWN BY:	JAB/TDA
REVISION:	

**THE UNIVERSITY OF IOWA**  
**CIVIL AND ENVIRONMENTAL ENGINEERING**  
 4105 SEAMANS CENTER FOR THE  
 ENGINEERING ARTS AND SCIENCES  
 103 S CAPITOL ST  
 IOWA CITY, IOWA 52242  
 PHONE: 319.335.5647  
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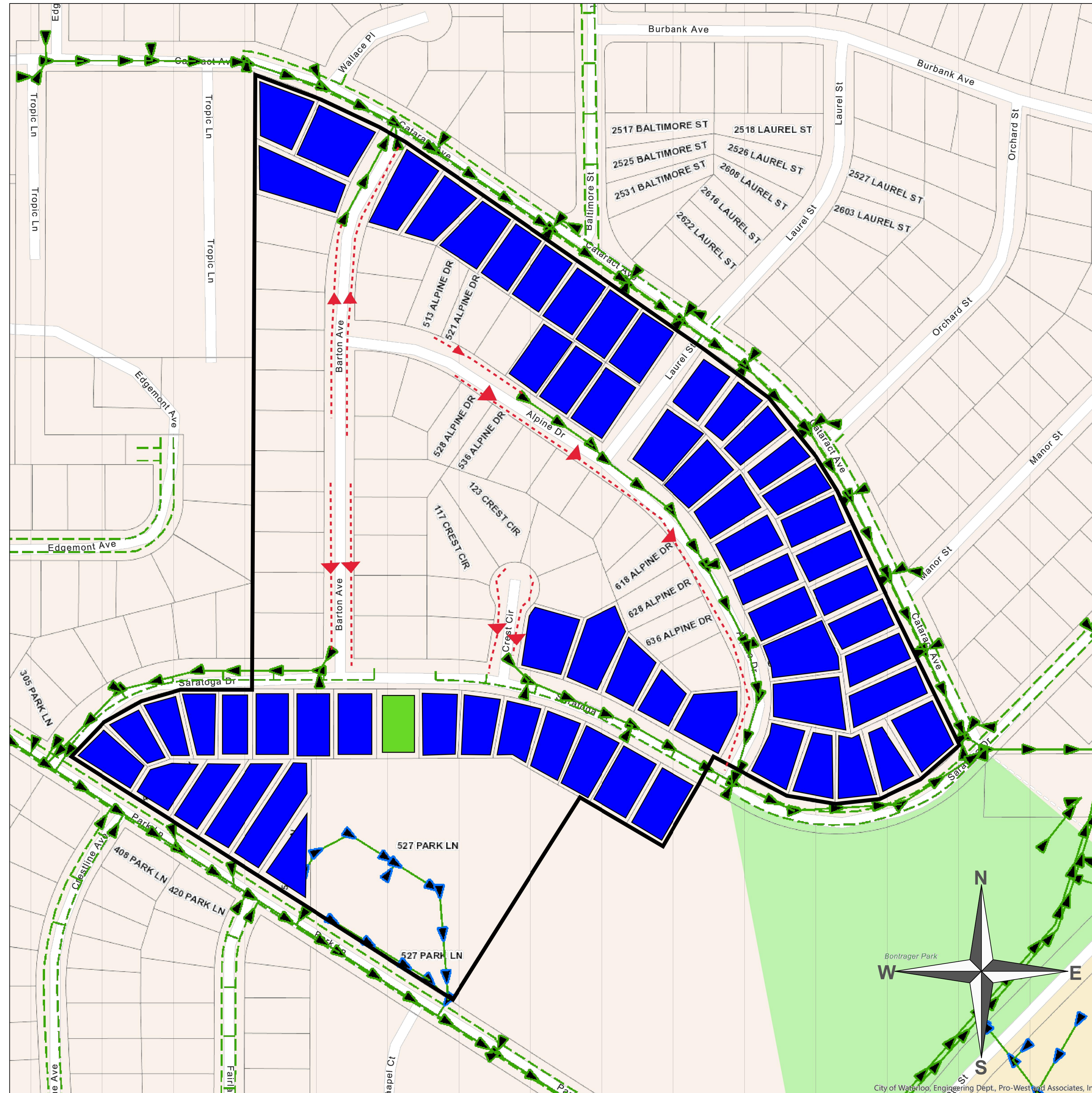
**SUMP PUMP PROJECT**  
 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**09**



# AREA 3.2



## NOTES

**DRAIN TILE AND RAIN GARDEN PROPOSED**

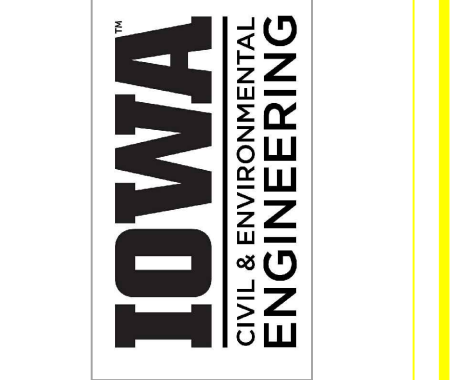
**DRAIN TILE LENGTH: 3125 FT**

## KEY

- NEW DRAIN TILE
- EXISTING DRAIN TILE
- CITY STORM SEWER ▶
- PRIVATE STORM SEWER ▶
- CONNECT TO EXISTING STORM SEWER OR TILE
- RAIN GARDEN
- OUTLET TO EXISTING WATERWAY

PROJECT:	CEE- 4850
DATE :	12/11/2020
DRAWN BY:	JAB/TDA
REVISION:	

**THE UNIVERSITY OF IOWA**  
**CIVIL AND ENVIRONMENTAL ENGINEERING**  
 4105 SEAMANS CENTER FOR THE  
 ENGINEERING ARTS AND SCIENCES  
 103 S CAPITOL ST  
 IOWA CITY, IOWA 52242  
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**SUMP PUMP PROJECT**  
 WATERLOO, IA  
 BLACK HAWK COUNTY

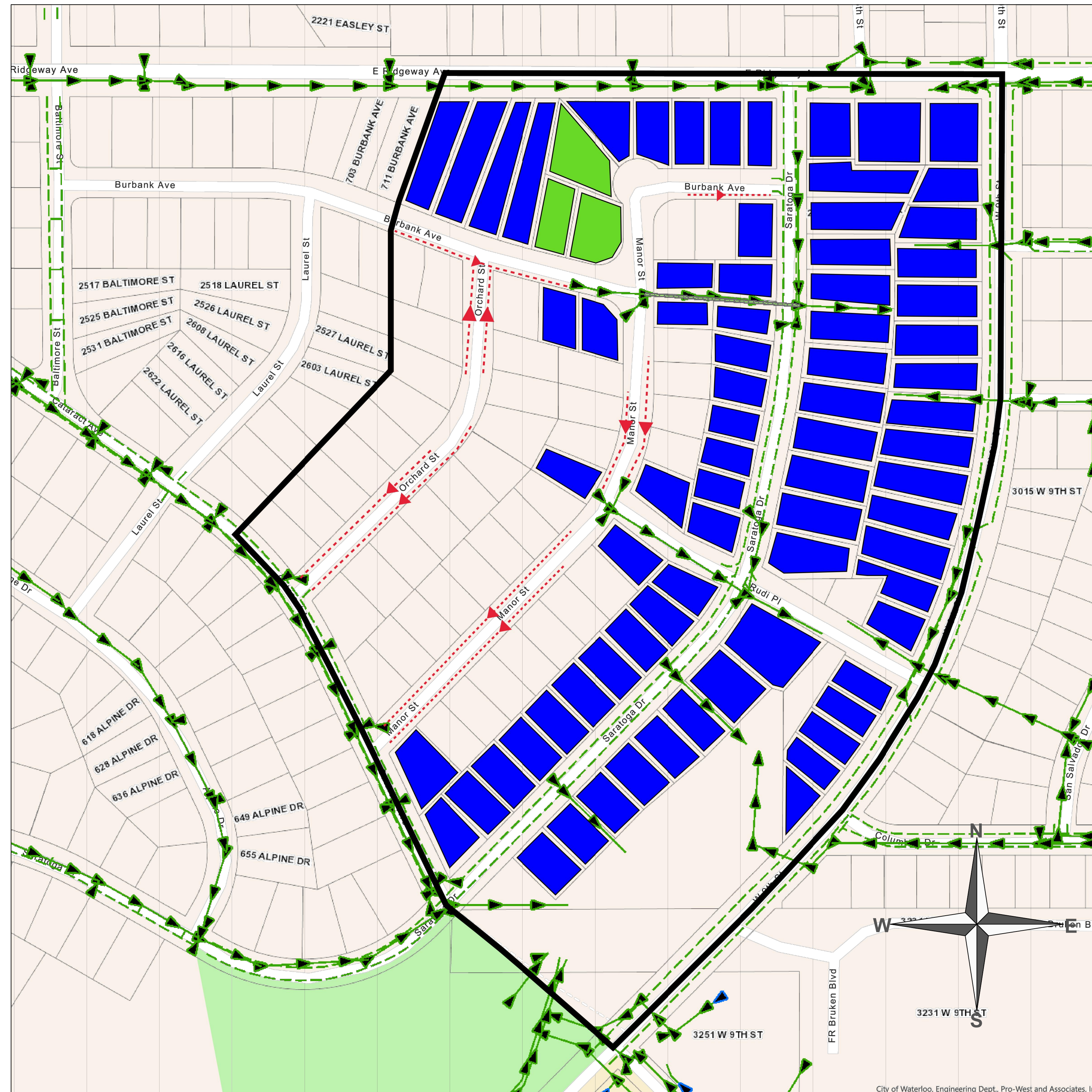
SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**10**

City of Waterloo, Engineering Dept., Pro-Westland Associates, Inc.



# AREA 4.1



## NOTES

**DRAIN TILE AND RAIN GARDEN PROPOSED**

**DRAIN TILE LENGTH: 3295 FT**

## KEY

- NEW DRAIN TILE ---
- EXISTING DRAIN TILE ---
- CITY STORM SEWER ▶
- PRIVATE STORM SEWER ▶
- CONNECT TO EXISTING STORM SEWER OR TILE
- RAIN GARDEN
- OUTLET TO EXISTING WATERWAY

City of Waterloo, Engineering Dept., Pro-West and Associates, Inc.

PROJECT:	CEE- 4850
DATE :	12/11/2020
DRAWN BY:	JAB/TDA
REVISION:	

**THE UNIVERSITY OF IOWA**  
**CIVIL AND ENVIRONMENTAL ENGINEERING**  
 4105 SEAMANS CENTER FOR THE  
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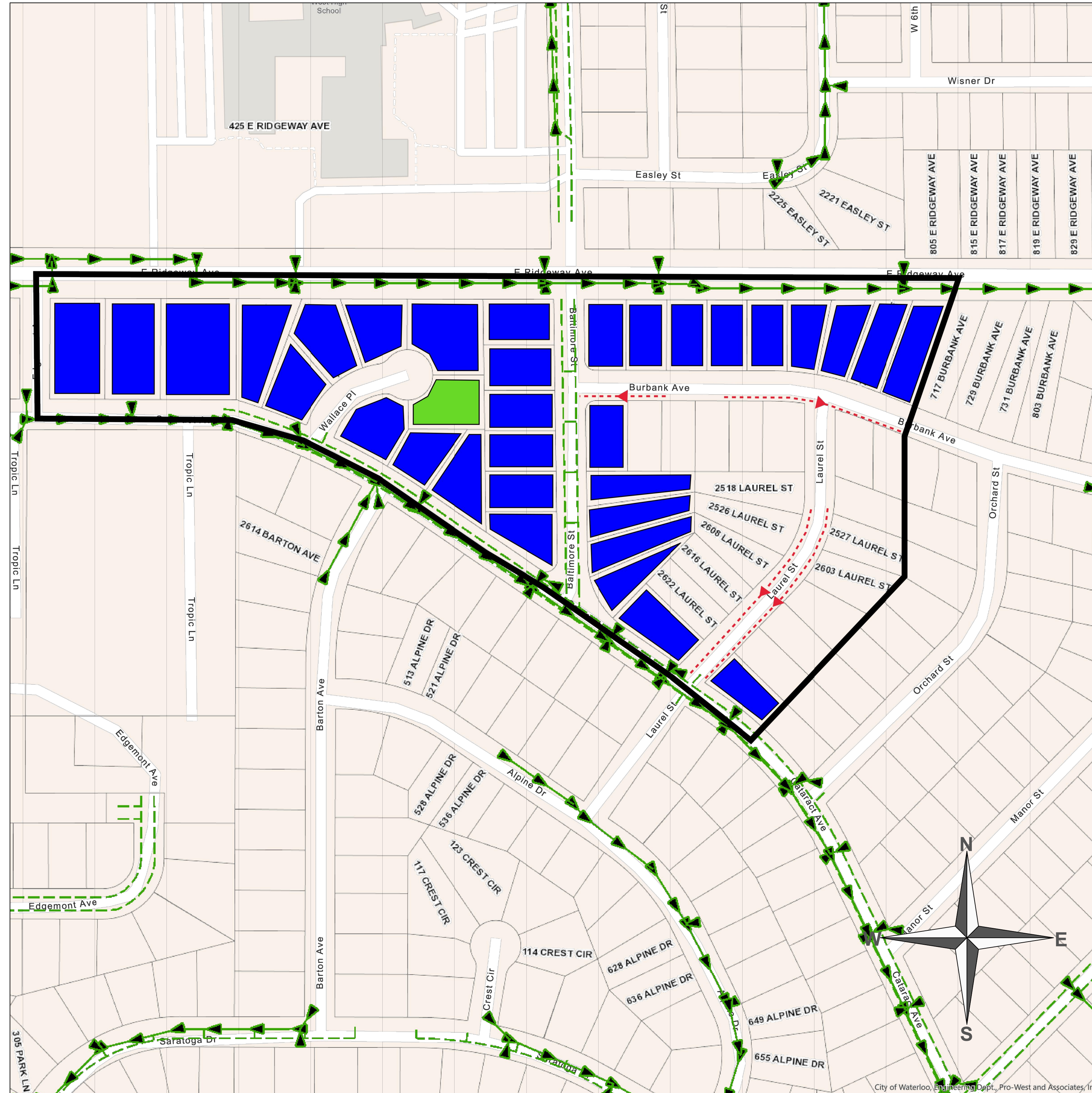
**SUMP PUMP PROJECT**  
 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**11**



# AREA 4.2



## NOTES

**DRAIN TILE AND RAIN GARDEN PROPOSED**

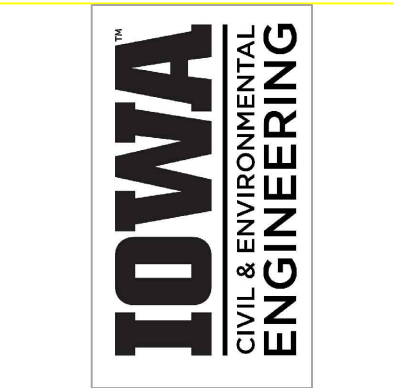
**DRAIN TILE LENGTH: 1410 FT**

## KEY

- NEW DRAIN TILE
- EXISTING DRAIN TILE
- CITY STORM SEWER
- PRIVATE STORM SEWER
- CONNECT TO EXISTING STORM SEWER OR TILE
- RAIN GARDEN
- OUTLET TO EXISTING WATERWAY

PROJECT:	CEE- 4850
DATE :	12/11/2020
DRAWN BY:	JAB/TDA
REVISION:	

**THE UNIVERSITY OF IOWA**  
**CIVIL AND ENVIRONMENTAL ENGINEERING**  
 4105 SEAMANS CENTER FOR THE  
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 IOWA CITY, IOWA 52242  
 PHONE: 319.335.5647  
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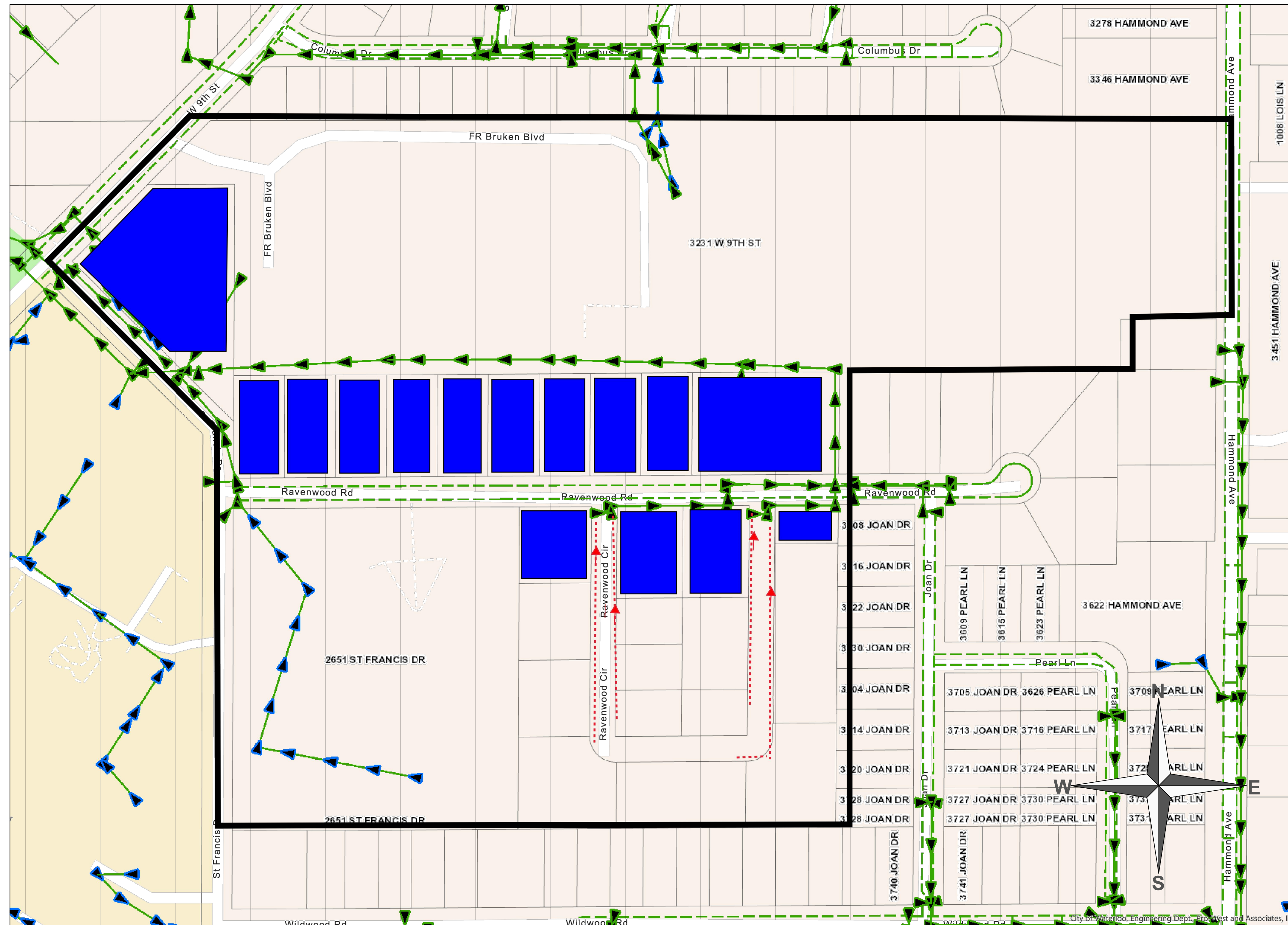
**SUMP PUMP PROJECT**  
 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**12**



# AREA 5.1



## NOTES

**DRAIN TILE PROPOSED**

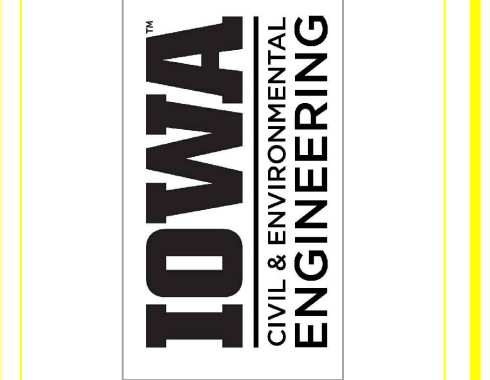
**DRAIN TILE LENGTH: 1810 FT**

## KEY

- NEW DRAIN TILE
- EXISTING DRAIN TILE
- CITY STORM SEWER ▶
- PRIVATE STORM SEWER ▶
- CONNECT TO EXISTING STORM SEWER OR TILE
- RAIN GARDEN
- OUTLET TO EXISTING WATERWAY

PROJECT:	CEE- 4850
DATE :	12/11/2020
DRAWN BY:	JAB/TDA
REVISION:	

**THE UNIVERSITY OF IOWA**  
**CIVIL AND ENVIRONMENTAL ENGINEERING**  
 4105 SEAMANS CENTER FOR THE  
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 103 S CAPITOL ST  
 IOWA CITY, IOWA 52242  
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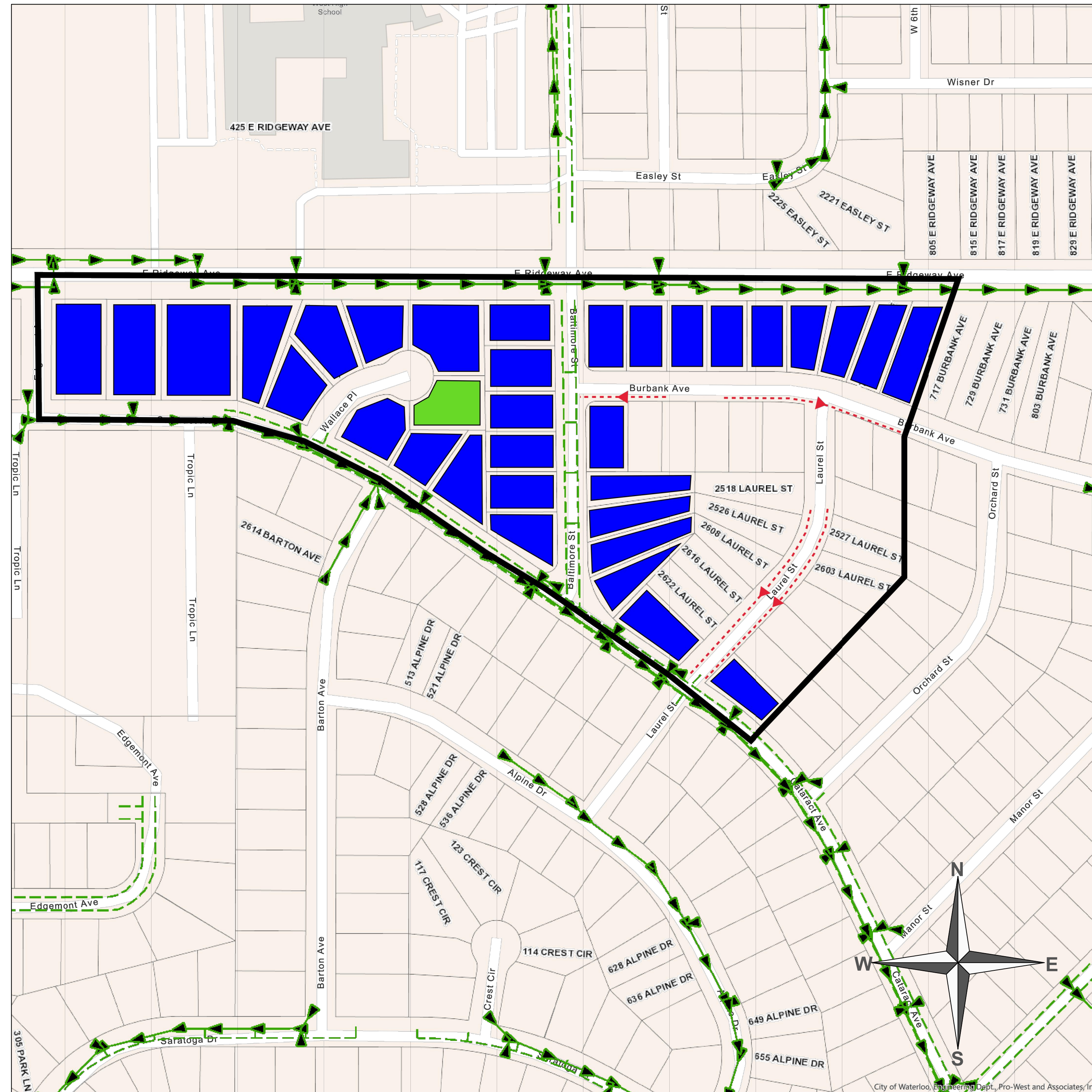
**SUMP PUMP PROJECT**  
 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**13**



# AREA 5.2



## NOTES

**DRAIN TILE AND RAIN GARDEN PROPOSED**

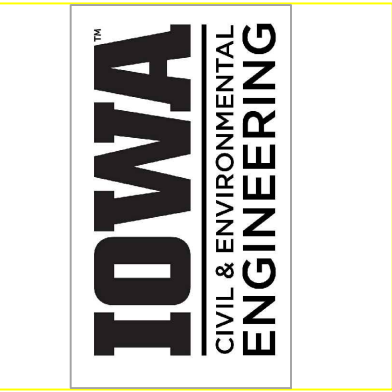
**DRAIN TILE LENGTH: 825 FT**

## KEY

- NEW DRAIN TILE - - -
- EXISTING DRAIN TILE - - -
- CITY STORM SEWER →
- PRIVATE STORM SEWER →
- CONNECT TO EXISTING STORM SEWER OR TILE
- RAIN GARDEN
- OUTLET TO EXISTING WATERWAY

PROJECT:	CEE- 4850
DATE :	12/11/2020
DRAWN BY:	JAB/TDA
REVISION:	

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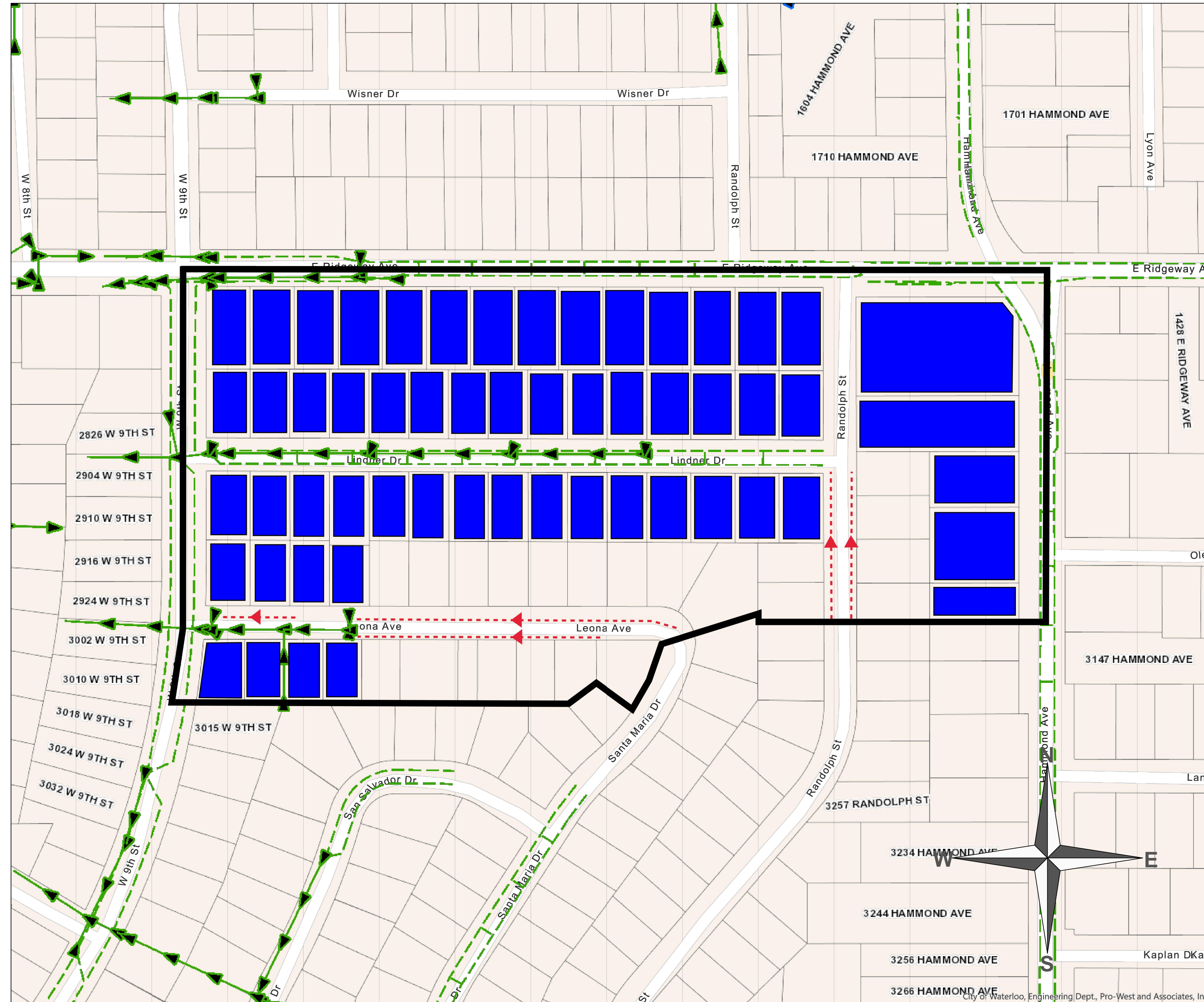
**SUMP PUMP PROJECT**  
 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**14**



# AREA 6.1



## NOTES

**DRAIN TILE PROPOSED**

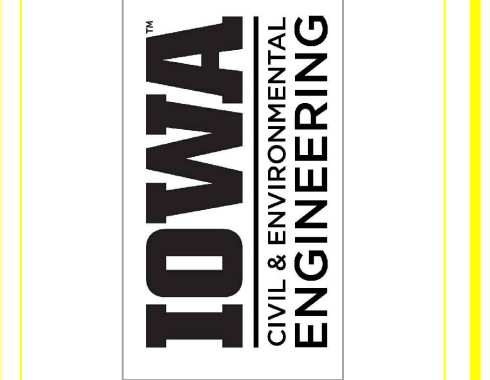
**DRAIN TILE LENGTH: 1640 FT**

## KEY

- NEW DRAIN TILE
- EXISTING DRAIN TILE
- CITY STORM SEWER
- PRIVATE STORM SEWER
- CONNECT TO EXISTING STORM SEWER OR TILE
- RAIN GARDEN
- OUTLET TO EXISTING WATERWAY

PROJECT:	CEE- 4850
DATE :	12/11/2020
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REVISION:	

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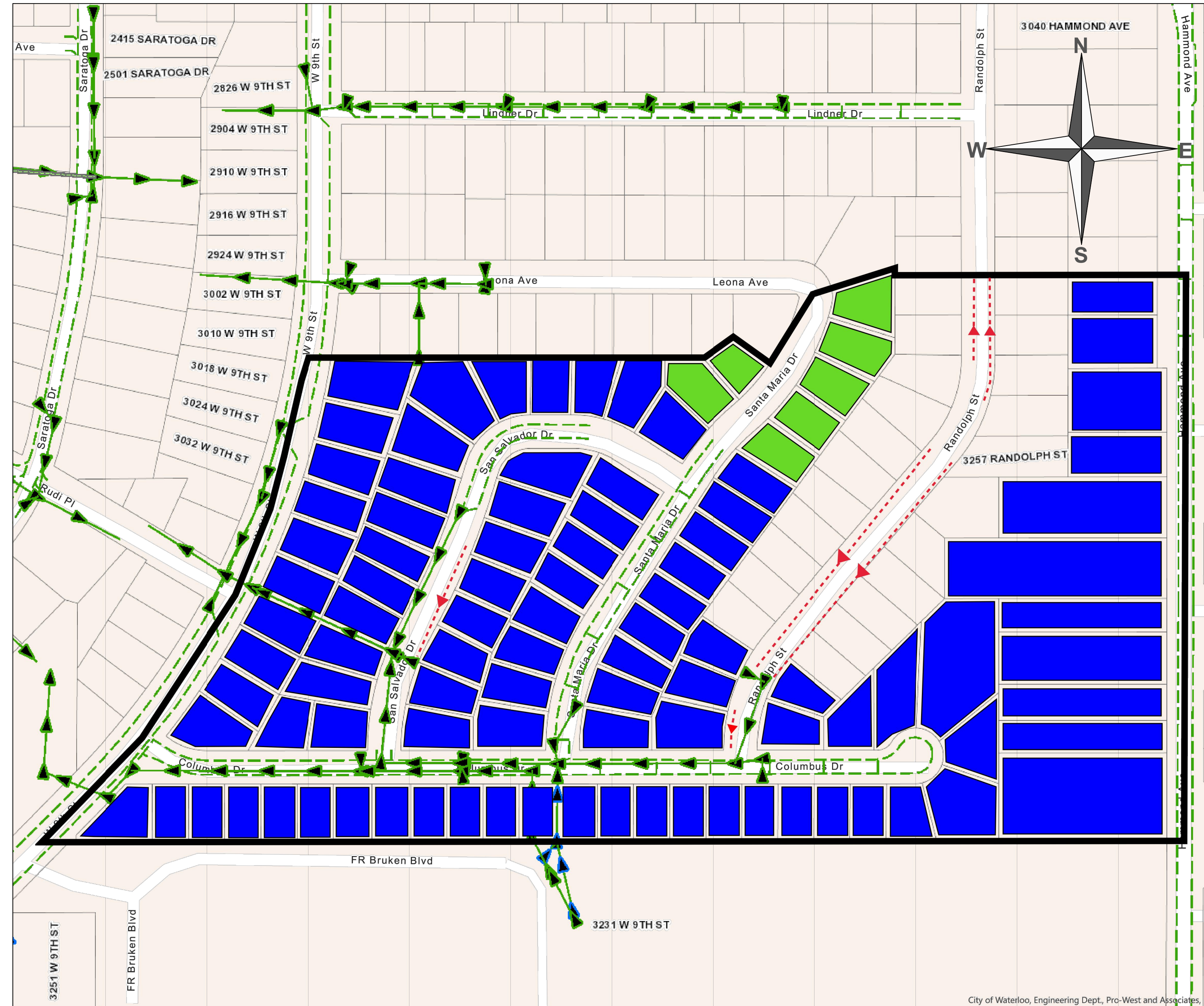
**SUMP PUMP PROJECT**  
 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**15**



# AREA 6.2



## NOTES

**DRAIN TILE AND RAIN GARDEN PROPOSED**

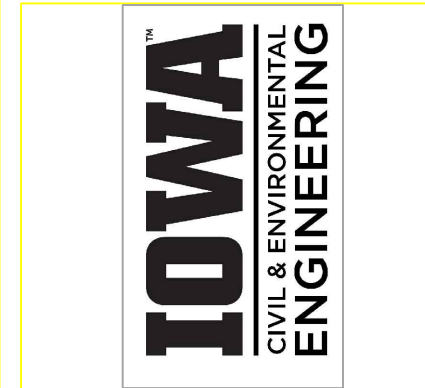
**DRAIN TILE LENGTH: 1360**

## KEY

- NEW DRAIN TILE - - -
- EXISTING DRAIN TILE - - -
- CITY STORM SEWER —▶
- PRIVATE STORM SEWER —▶
- CONNECT TO EXISTING STORM SEWER OR TILE ■
- RAIN GARDEN ■
- OUTLET TO EXISTING WATERWAY ■

PROJECT:	CEE- 4850
DATE :	12/11/2020
DRAWN BY:	JAB/TDA
REVISION:	

**THE UNIVERSITY OF IOWA**  
**CIVIL AND ENVIRONMENTAL ENGINEERING**  
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 IOWA CITY, IOWA 52242  
 PHONE: 319.335.5647  
 FAX: 319.335.5660  
 EMAIL: civil-hawks@iowa.edu



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**SUMP PUMP PROJECT**  
 WATERLOO, IA  
 BLACK HAWK COUNTY

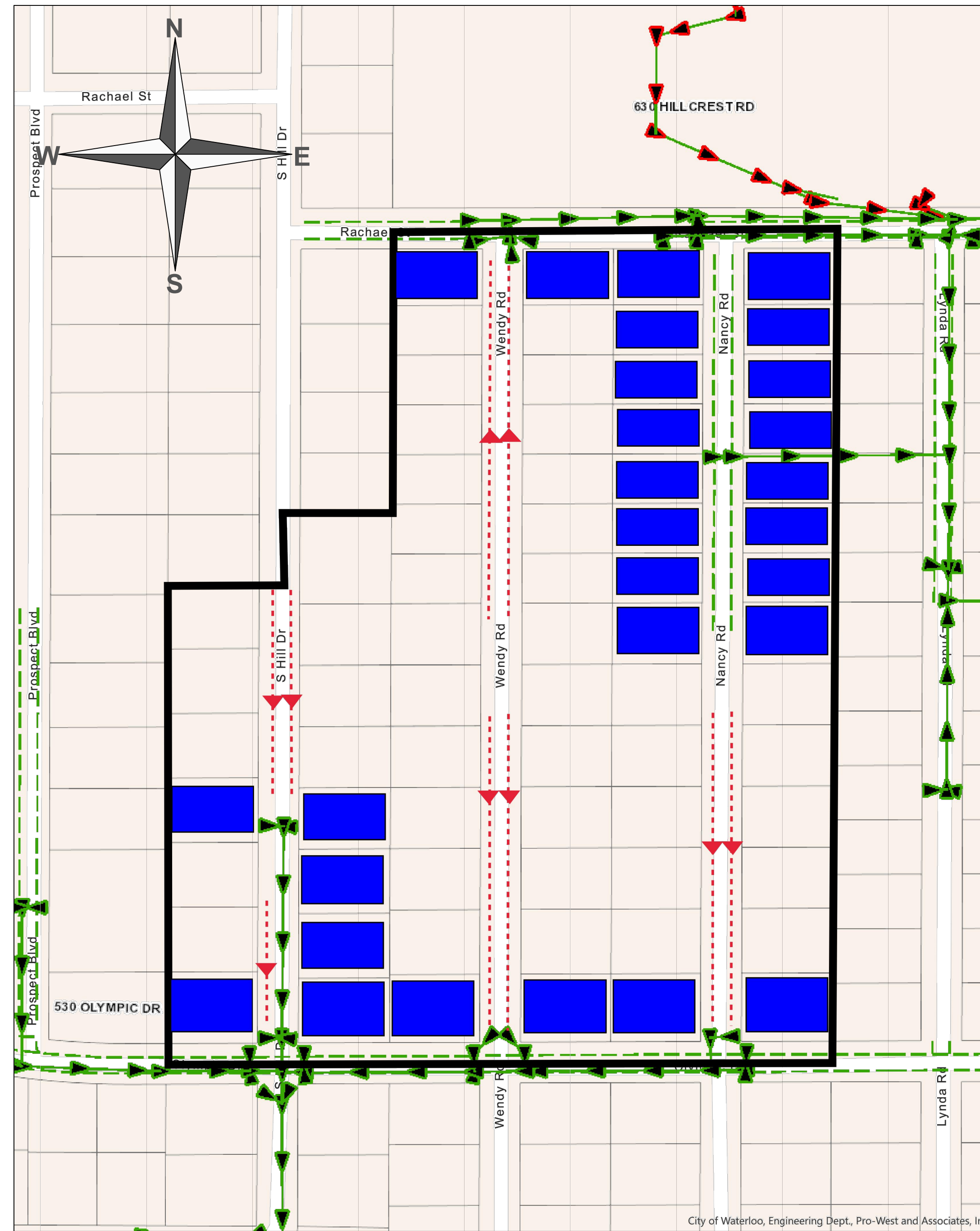
SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**16**

City of Waterloo, Engineering Dept., Pro-West and Associates, Inc.



# AREA 7.1



## NOTES

**DRAIN TILE PROPOSED**

**DRAIN TILE LENGTH: 4000 FT**

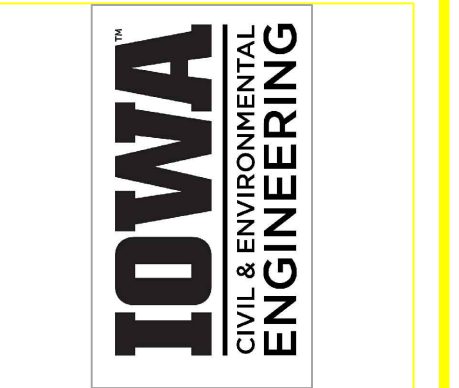
## KEY

- NEW DRAIN TILE
- EXISTING DRAIN TILE
- CITY STORM SEWER
- PRIVATE STORM SEWER
- CONNECT TO EXISTING STORM SEWER OR TILE
- RAIN GARDEN
- OUTLET TO EXISTING WATERWAY

City of Waterloo, Engineering Dept., Pro-West and Associates, Inc.

PROJECT:	CEE- 4850
DATE :	12/11/2020
DRAWN BY:	JAB/TDA
REVISION:	

**THE UNIVERSITY OF IOWA**  
**CIVIL AND ENVIRONMENTAL ENGINEERING**  
 4105 SEAMANS CENTER FOR THE  
 ENGINEERING ARTS AND SCIENCES  
 103 S CAPITOL ST  
 IOWA CITY, IOWA 52242  
 PHONE: 319.335.5647  
 FAX: 319.335.5660  
 EMAIL: [civil-hawks@iowa.edu](mailto:civil-hawks@iowa.edu)



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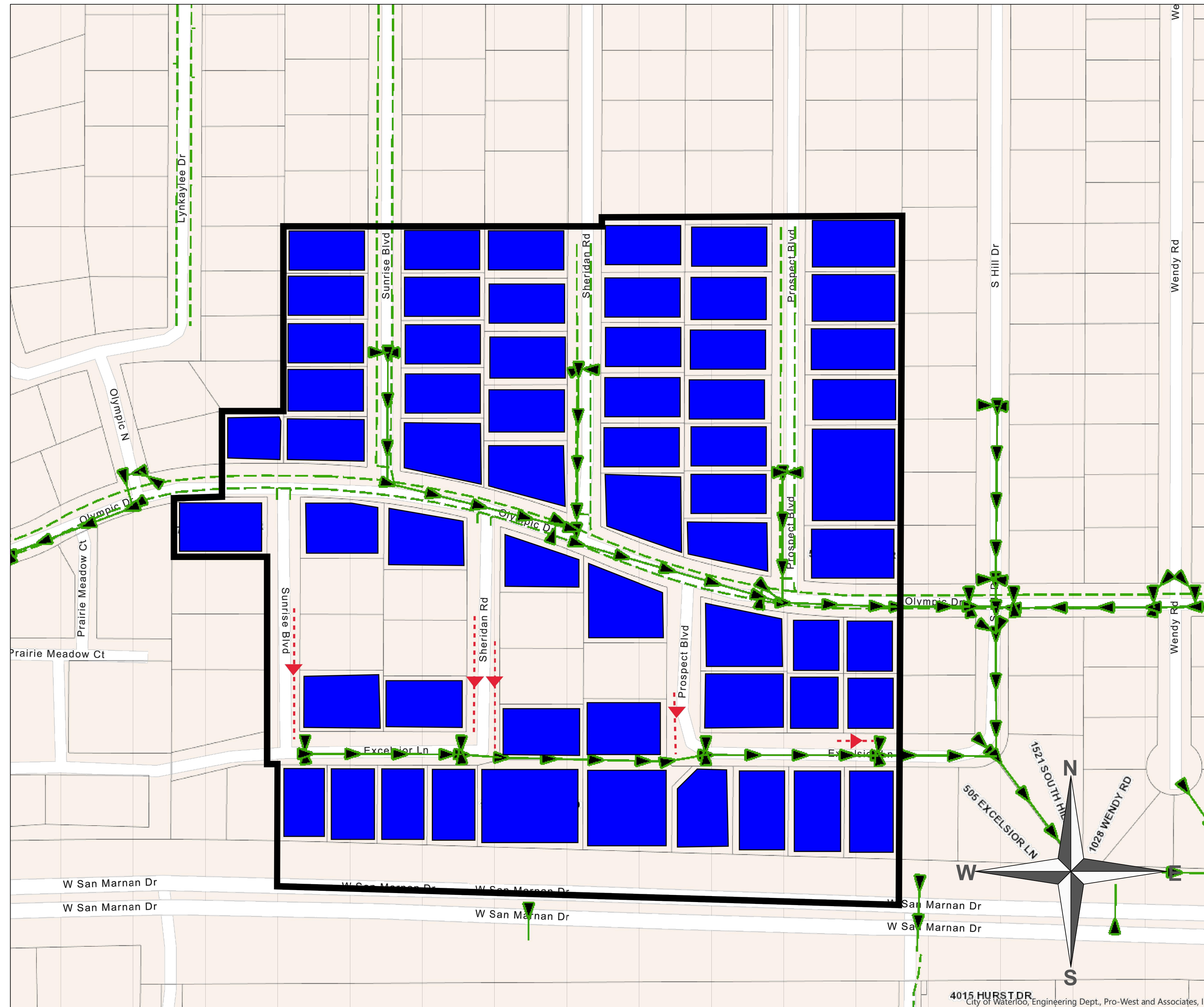
**SUMP PUMP PROJECT**  
 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**17**



# AREA 7.2



## NOTES

**DRAIN TILE PROPOSED**

**DRAIN TILE LENGTH: 730 FT**

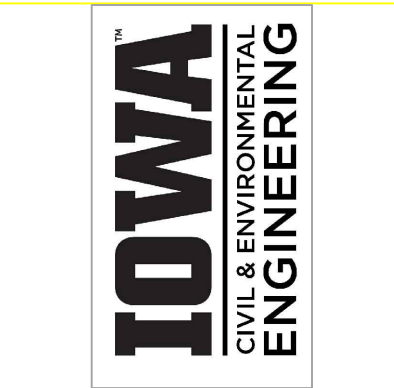
## KEY

- NEW DRAIN TILE
- EXISTING DRAIN TILE
- CITY STORM SEWER ▶
- PRIVATE STORM SEWER ▶
- CONNECT TO EXISTING STORM SEWER OR TILE
- RAIN GARDEN
- OUTLET TO EXISTING WATERWAY

4015 HURST DR  
City of Waterloo, Engineering Dept., Pro-West and Associates, Inc.

PROJECT:	CEE- 4850
DATE :	12/11/2020
DRAWN BY:	JAB/TDA
REVISION:	

**THE UNIVERSITY OF IOWA**  
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 103 S CAPITOL ST  
 IOWA CITY, IOWA 52242  
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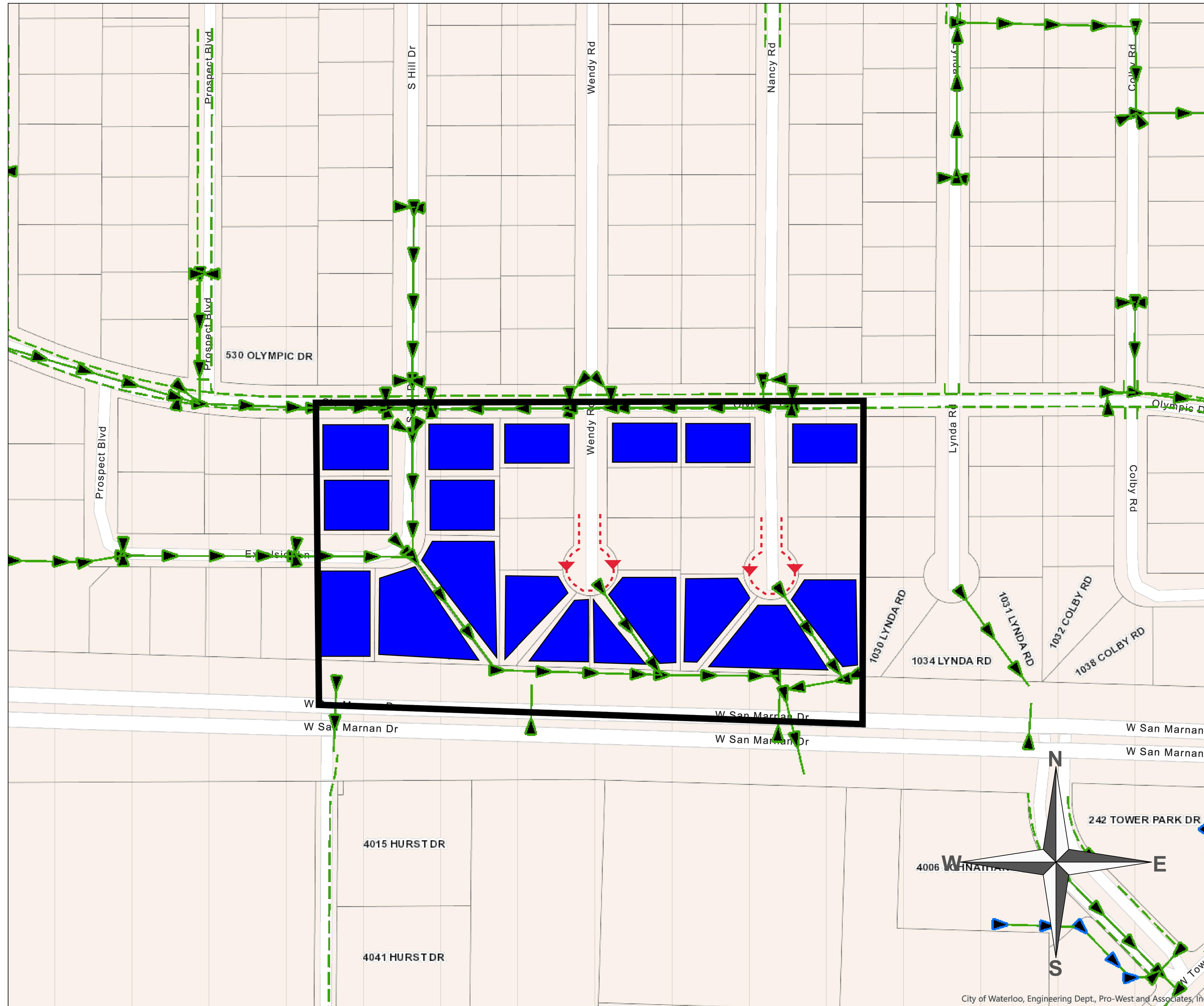
**SUMP PUMP PROJECT**  
 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**18**



# AREA 7.3



## NOTES

**DRAIN TILE PROPOSED**

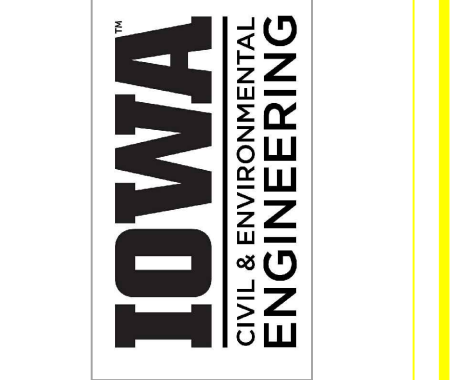
**DRAIN TILE LENGTH: 700 FT**

## KEY

- NEW DRAIN TILE
- EXISTING DRAIN TILE
- CITY STORM SEWER ▶
- PRIVATE STORM SEWER ▶
- CONNECT TO EXISTING STORM SEWER OR TILE
- RAIN GARDEN
- OUTLET TO EXISTING WATERWAY

PROJECT:	CEE- 4850
DATE :	12/11/2020
DRAWN BY:	JAB/TDA
REVISION:	

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 103 S CAPITOL ST  
 IOWA CITY, IOWA 52242  
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 FAX: 319.335.5660  
 EMAIL: civil-hawks@iowa.edu



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 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**19**



# AREA 8.1



## NOTES

**DRAIN TILE PROPOSED**

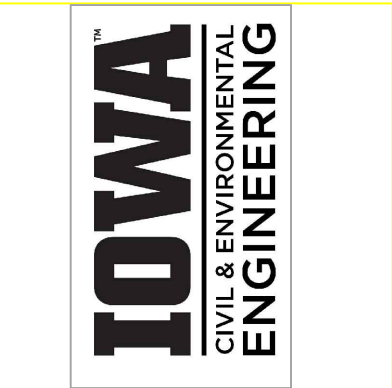
**DRAIN TILE LENGTH: 2160 FT**

## KEY

- NEW DRAIN TILE
- EXISTING DRAIN TILE
- CITY STORM SEWER
- PRIVATE STORM SEWER
- CONNECT TO EXISTING STORM SEWER OR TILE
- RAIN GARDEN
- OUTLET TO EXISTING WATERWAY

PROJECT:	CEE- 4850
DATE :	12/11/2020
DRAWN BY:	JAB/TDA
REVISION:	

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## SUMP PUMP PROJECT

WATERLOO, IA  
 BLACK HAWK COUNTY

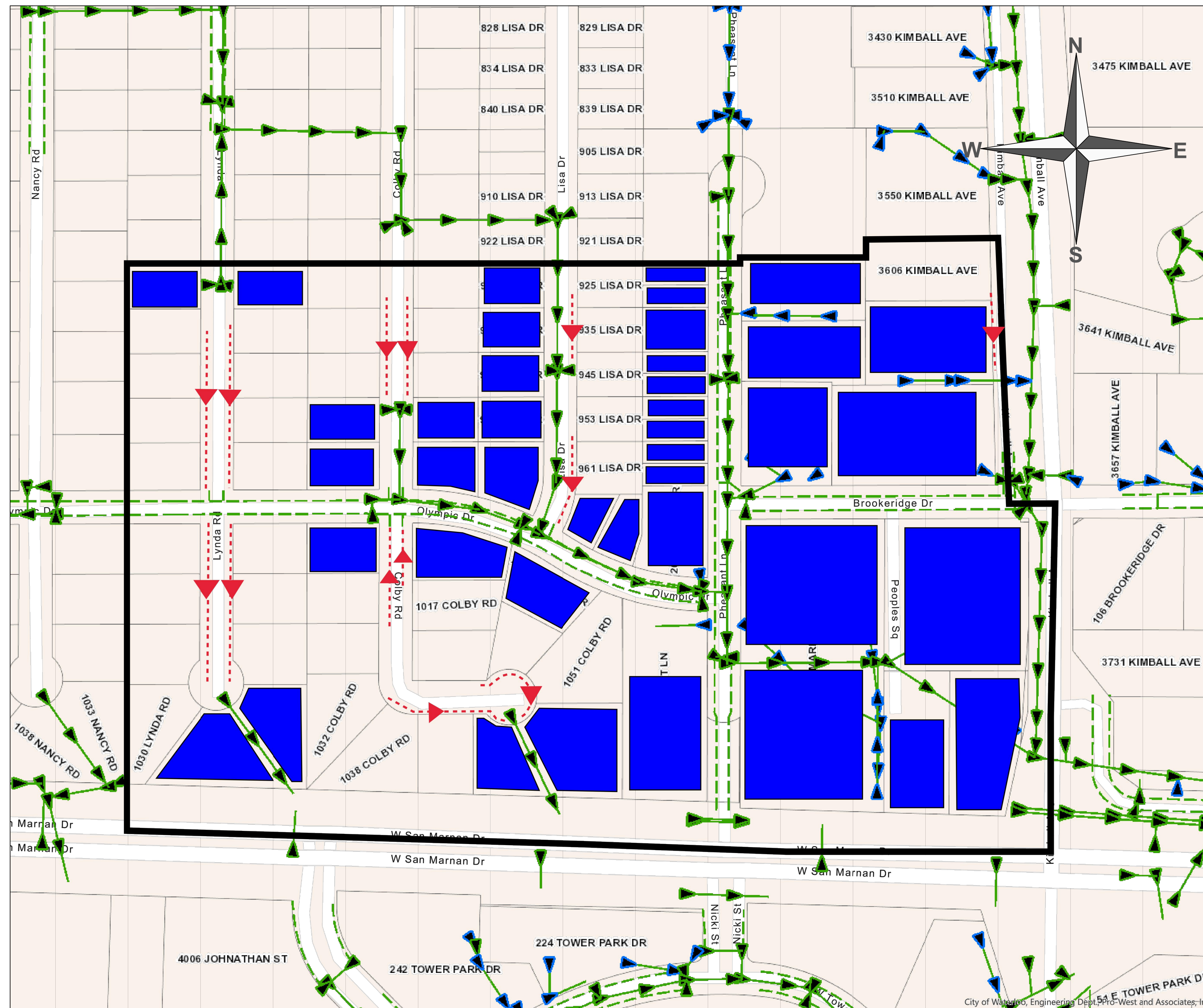
SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**20**

City of Waterloo Engineering Dept., Pro-West and Associates, Inc.



# AREA 8.2



## NOTES

**DRAIN TILE PROPOSED**

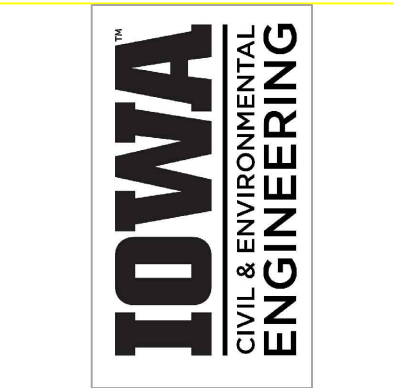
**DRAIN TILE LENGTH: 2790 FT**

## KEY

- NEW DRAIN TILE
- EXISTING DRAIN TILE
- CITY STORM SEWER
- PRIVATE STORM SEWER
- CONNECT TO EXISTING STORM SEWER OR TILE
- RAIN GARDEN
- OUTLET TO EXISTING WATERWAY

PROJECT:	CEE- 4850
DATE :	12/11/2020
DRAWN BY:	JAB/TDA
REVISION:	

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 103 S CAPITOL ST  
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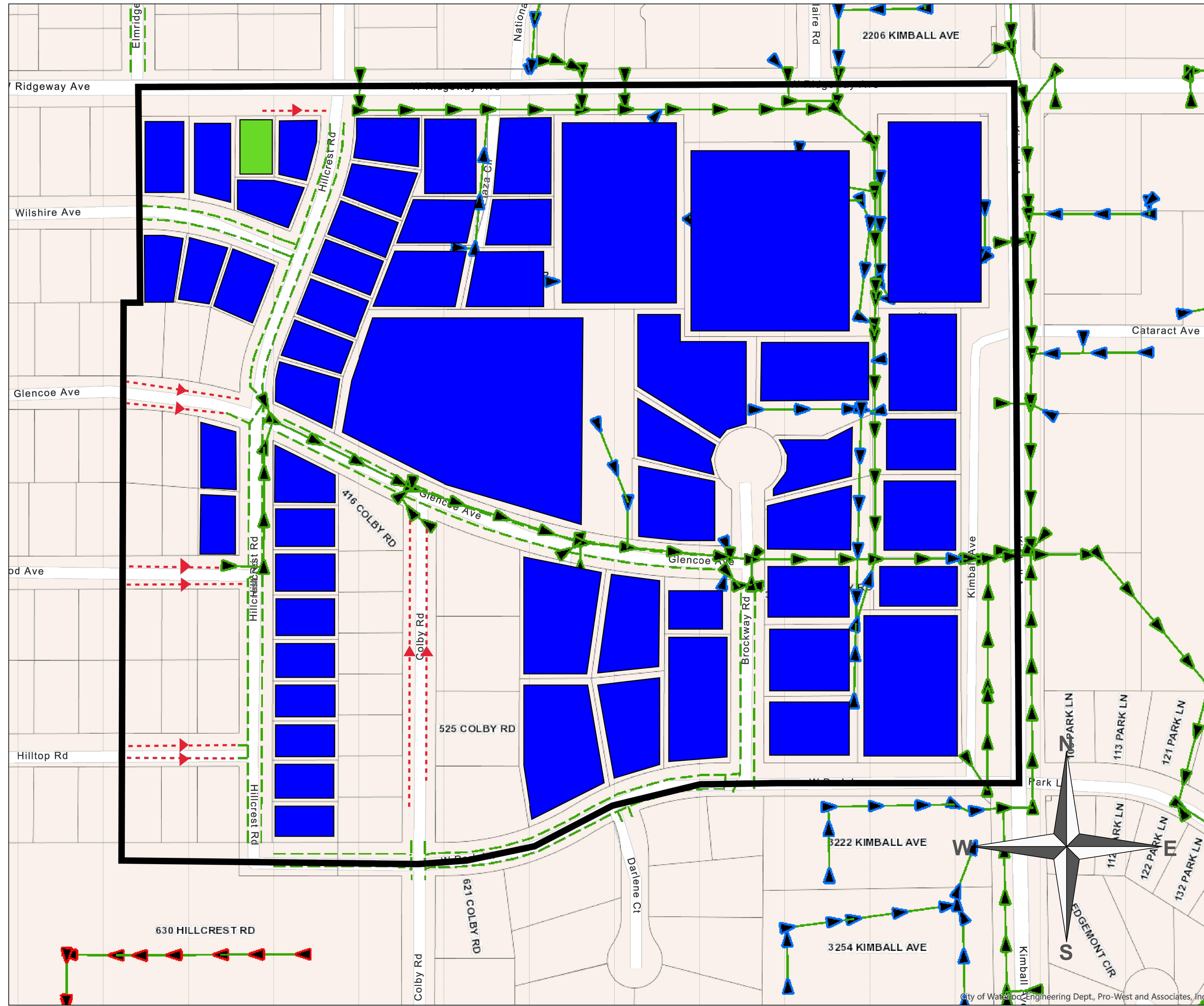
WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**21**



# AREA 9.1



## NOTES

**DRAIN TILE AND RAIN GARDEN PROPOSED**

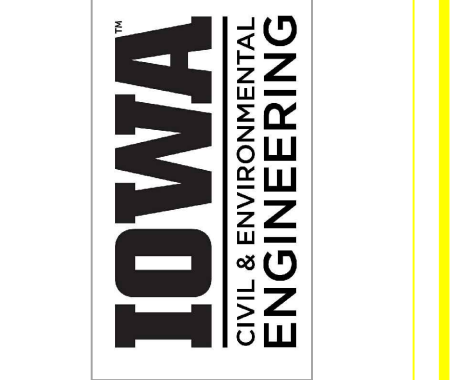
**DRAIN TILE LENGTH: 2366 FT**

## KEY

- NEW DRAIN TILE
- EXISTING DRAIN TILE
- CITY STORM SEWER ▶
- PRIVATE STORM SEWER ▶
- CONNECT TO EXISTING STORM SEWER OR TILE
- RAIN GARDEN
- OUTLET TO EXISTING WATERWAY

PROJECT:	CEE- 4850
DATE :	12/11/2020
DRAWN BY:	JAB/TDA
REVISION:	

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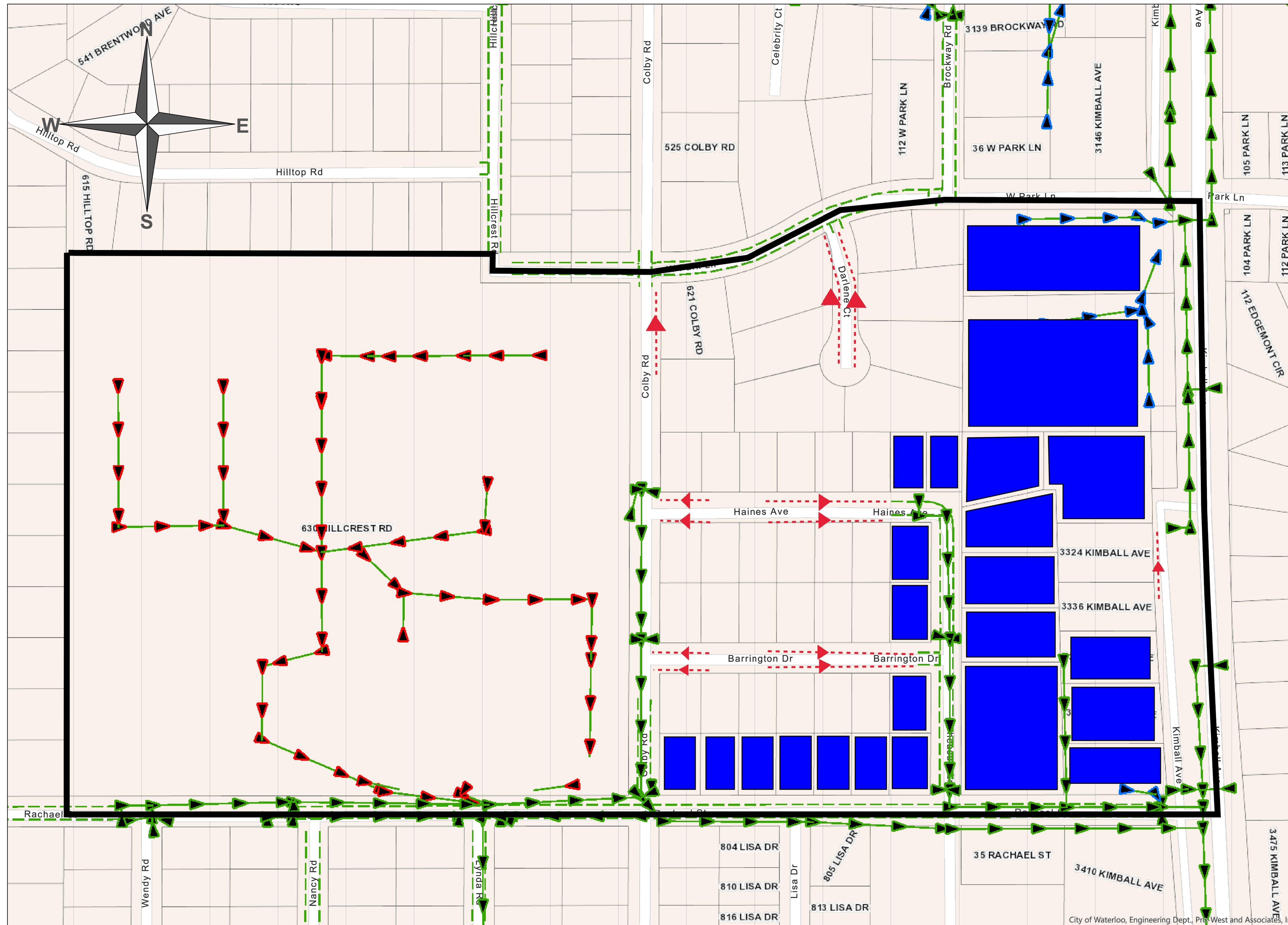
**SUMP PUMP PROJECT**  
 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**22**



# AREA 9.2



## NOTES

**DRAIN TILE PROPOSED**

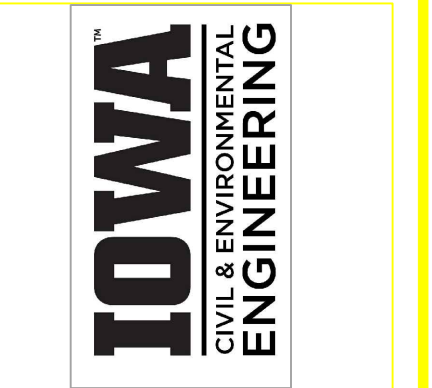
**DRAIN TILE LENGTH: 2530 FT**

## KEY

- NEW DRAIN TILE
- EXISTING DRAIN TILE
- CITY STORM SEWER ▶
- PRIVATE STORM SEWER ▶
- CONNECT TO EXISTING STORM SEWER OR TILE
- RAIN GARDEN
- OUTLET TO EXISTING WATERWAY

PROJECT:	CEE- 4850
DATE :	12/11/2020
DRAWN BY:	JAB/TDA
REVISION:	

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 IOWA CITY, IOWA 52242  
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 FAX: 319.335.5660  
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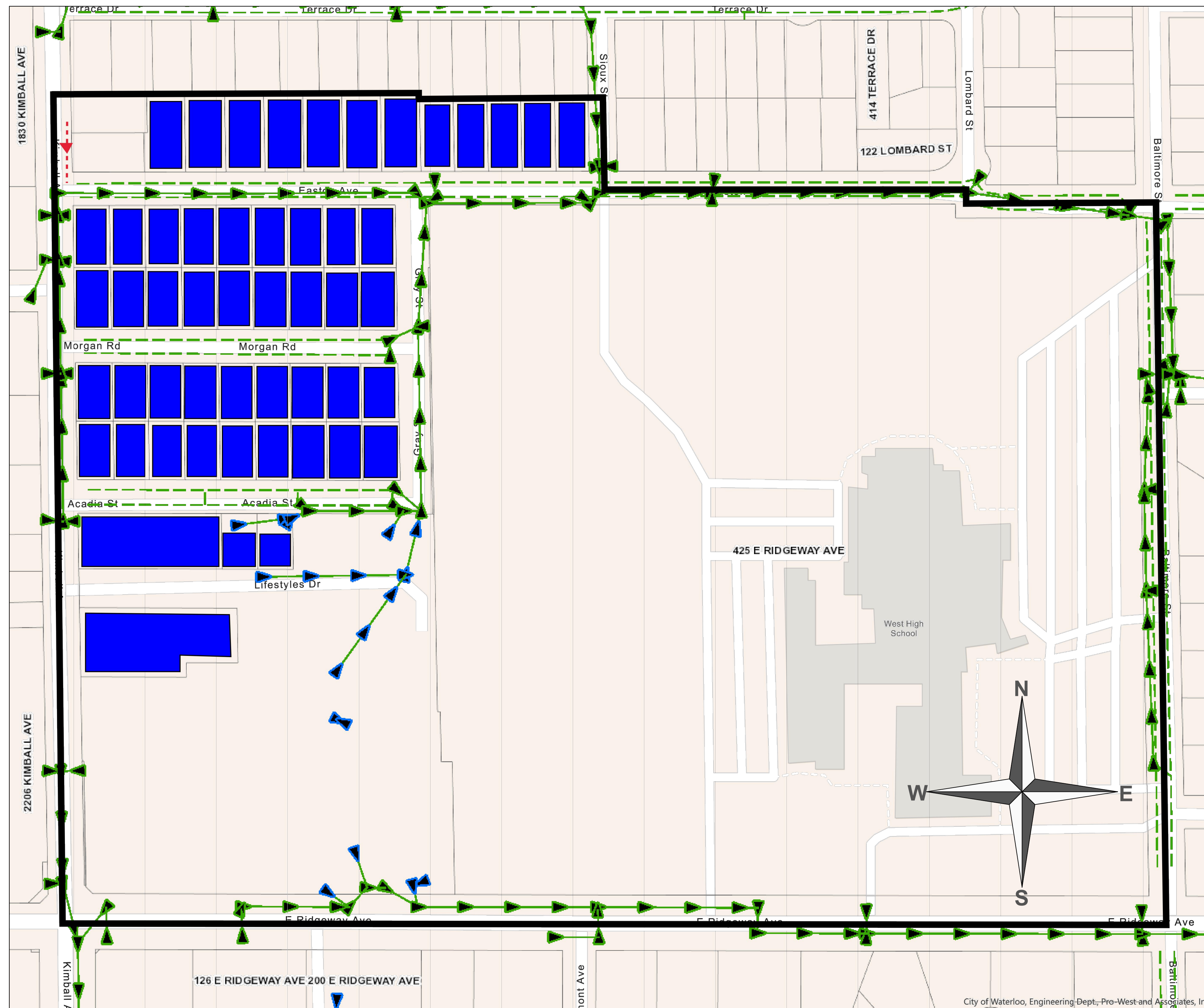
SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**23**

City of Waterloo, Engineering Dept., Pro-West and Associates, Inc.



# AREA 10



## NOTES

**DRAIN TILE PROPOSED**

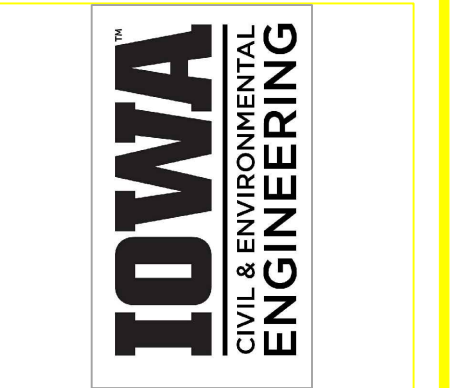
**DRAIN TILE LENGTH: 130 FT**

## KEY

- NEW DRAIN TILE
- EXISTING DRAIN TILE
- CITY STORM SEWER ▶
- PRIVATE STORM SEWER ▶
- CONNECT TO EXISTING STORM SEWER OR TILE
- RAIN GARDEN
- OUTLET TO EXISTING WATERWAY

PROJECT:	CEE- 4850
DATE :	12/11/2020
DRAWN BY:	JAB/TDA
REVISION:	

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 4105 SEAMANS CENTER FOR THE  
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 103 S CAPITOL ST  
 IOWA CITY, IOWA 52242  
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 EMAIL: civil-hawks@iowa.edu



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## SUMP PUMP PROJECT

WATERLOO, IA  
 BLACK HAWK COUNTY

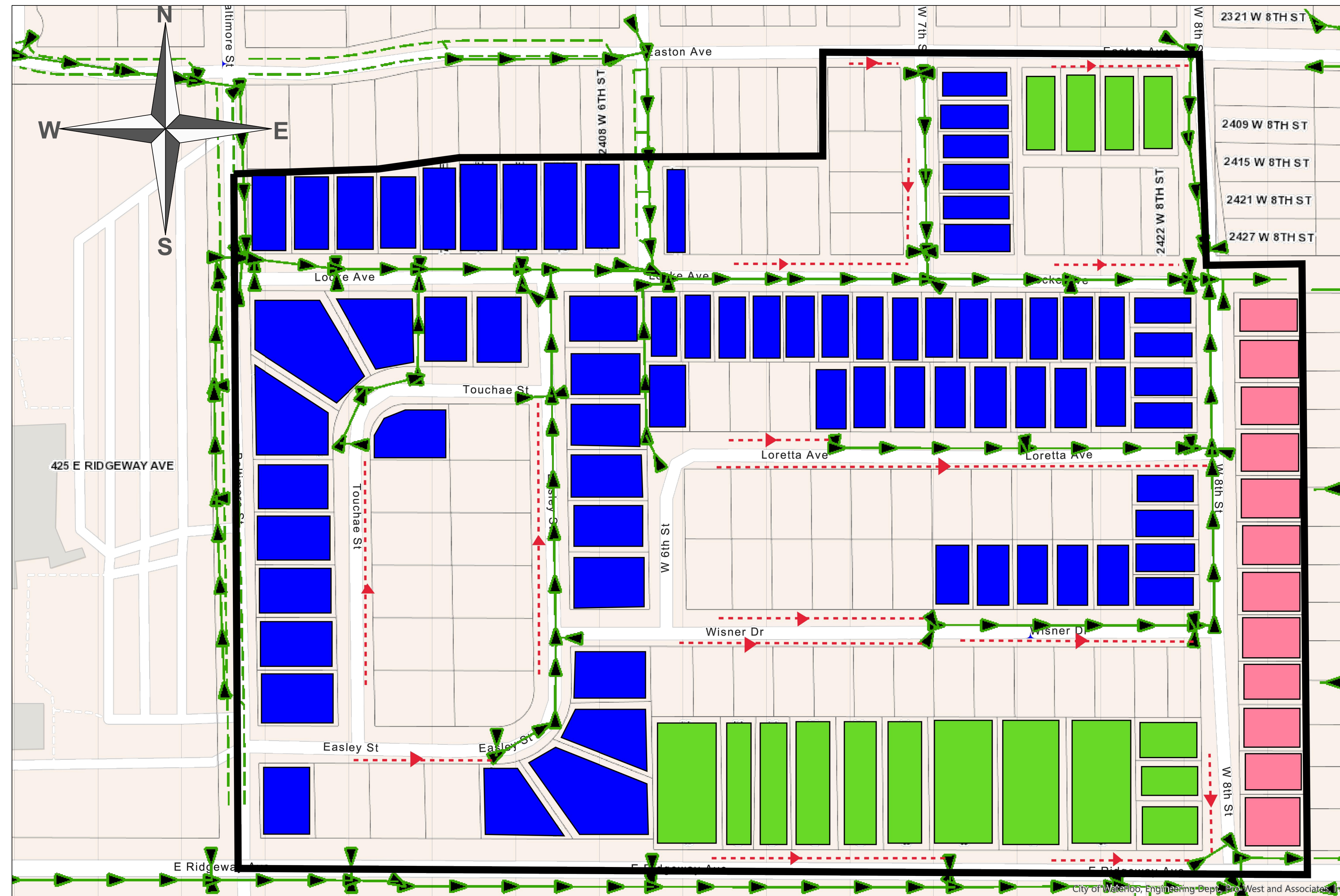
SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**24**

City of Waterloo, Engineering Dept., Pro-West and Associates, Inc.



# AREA 11



## NOTES

**DRAIN TILE, RAIN GARDEN,  
AND OUTLET TO CREEK  
PROPOSED**

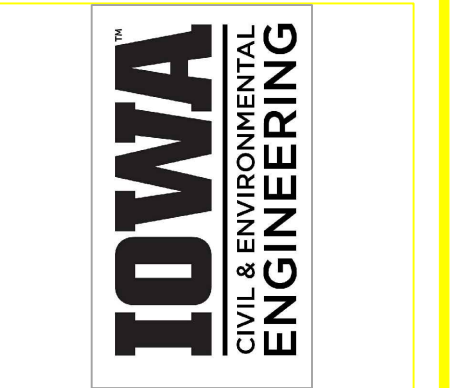
**DRAIN TILE LENGTH: 4050 FT**

## KEY

- NEW DRAIN TILE
- EXISTING DRAIN TILE
- CITY STORM SEWER ▶
- PRIVATE STORM SEWER ▶
- CONNECT TO EXISTING STORM SEWER OR TILE
- RAIN GARDEN
- OUTLET TO EXISTING WATERWAY

PROJECT:	CEE- 4850
DATE :	12/11/2020
DRAWN BY:	JAB/TDA
REVISION:	

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**CIVIL AND ENVIRONMENTAL ENGINEERING**  
 4105 SEAMANS CENTER FOR THE  
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 103 S CAPITOL ST  
 IOWA CITY, IOWA 52242  
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 FAX: 319.335.5660  
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 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**25**



# AREA 12.1



## NOTES

**DRAIN TILE AND RAIN GARDEN PROPOSED**

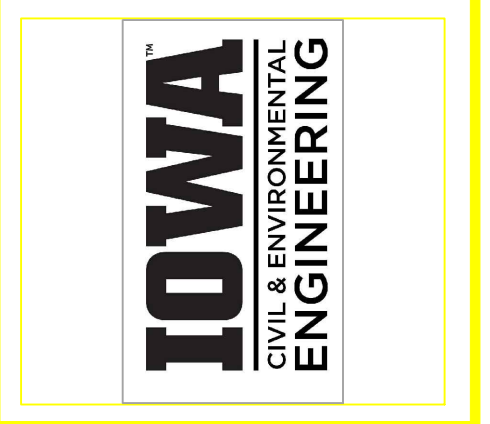
**DRAIN TILE LENGTH: 500 FT**

## KEY

- NEW DRAIN TILE
- EXISTING DRAIN TILE
- CITY STORM SEWER
- PRIVATE STORM SEWER
- CONNECT TO EXISTING STORM SEWER OR TILE
- RAIN GARDEN
- OUTLET TO EXISTING WATERWAY

PROJECT:	CEE- 4850
DATE :	12/11/2020
DRAWN BY:	JAB/TDA
REVISION:	

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 FAX: 319.335.5660  
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 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**26**

City of Waterloo, Engineering Dept., Pro-West and Associates, Inc.



# AREA 12.2



## NOTES

**DRAIN TILE AND RAIN GARDEN PROPOSED**

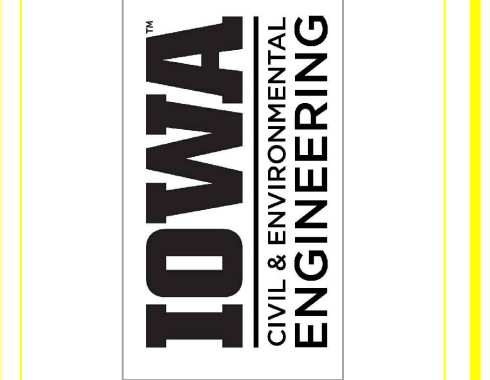
**DRAIN TILE LENGTH: 850 FT**

## KEY

- NEW DRAIN TILE - - -
- EXISTING DRAIN TILE - - -
- CITY STORM SEWER →
- PRIVATE STORM SEWER →
- CONNECT TO EXISTING STORM SEWER OR TILE ■
- RAIN GARDEN ■
- OUTLET TO EXISTING WATERWAY ■

PROJECT:	CEE- 4850
DATE :	12/11/2020
DRAWN BY:	JAB/TDA
REVISION:	

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**CIVIL AND ENVIRONMENTAL ENGINEERING**  
 4105 SEAMANS CENTER FOR THE  
 ENGINEERING ARTS AND SCIENCES  
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 PHONE: 319.335.5647  
 FAX: 319.335.5660  
 EMAIL: civil-hawks@iowa.edu



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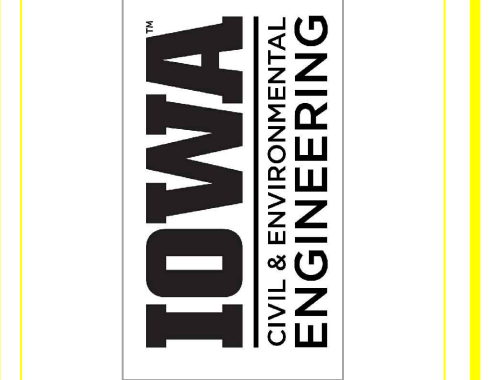
**SUMP PUMP PROJECT**  
 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 AREA SECTION  
 MAP VIEW

SHEET NO.  
**27**

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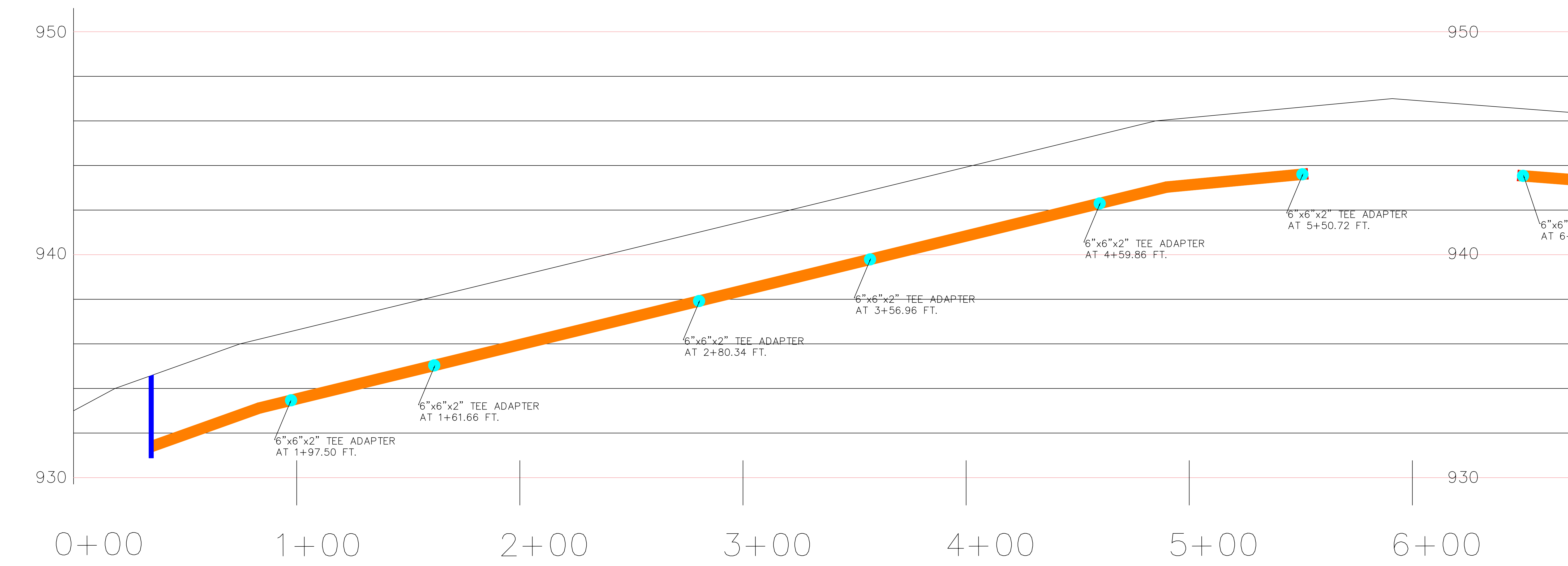


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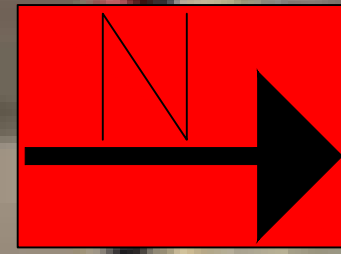
**SUMP PUMP PROJECT**  
 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 WENDY RD  
 PLAN & PROFILE

SHEET NO.  
**28**



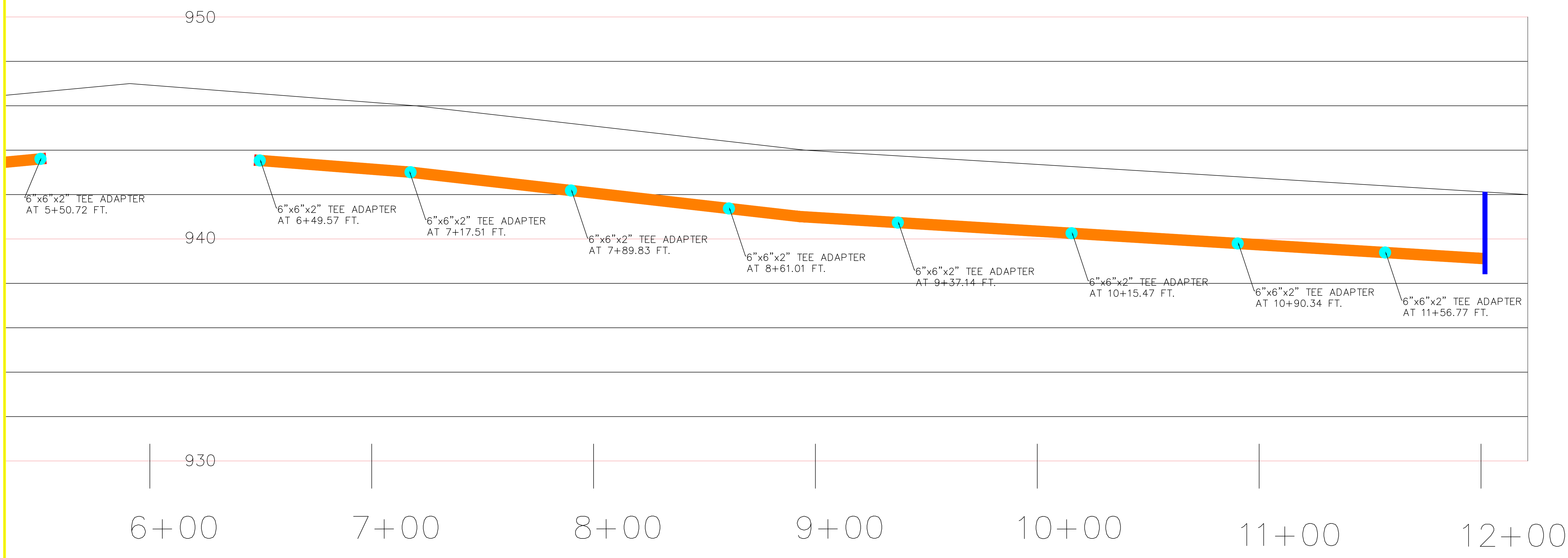
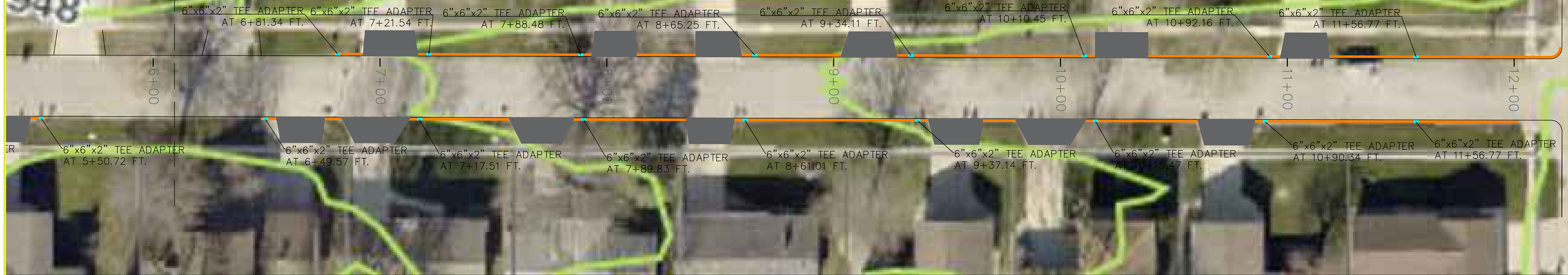




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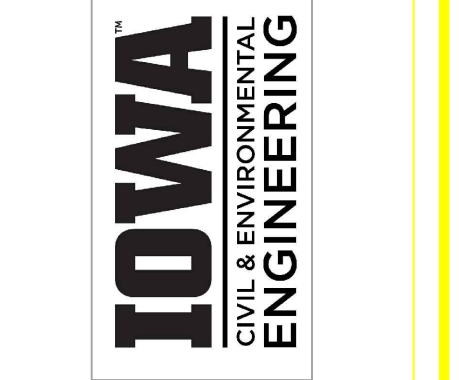
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Match Line,  
Page 28,29



PROJECT:	CEE: 4850
DATE :	11/20/2020
DRAWN BY:	JAB/TDA
REVISION:	

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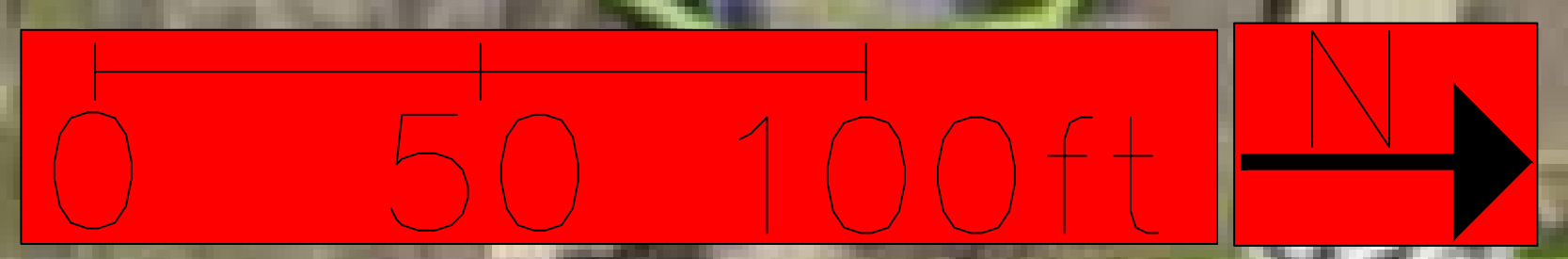
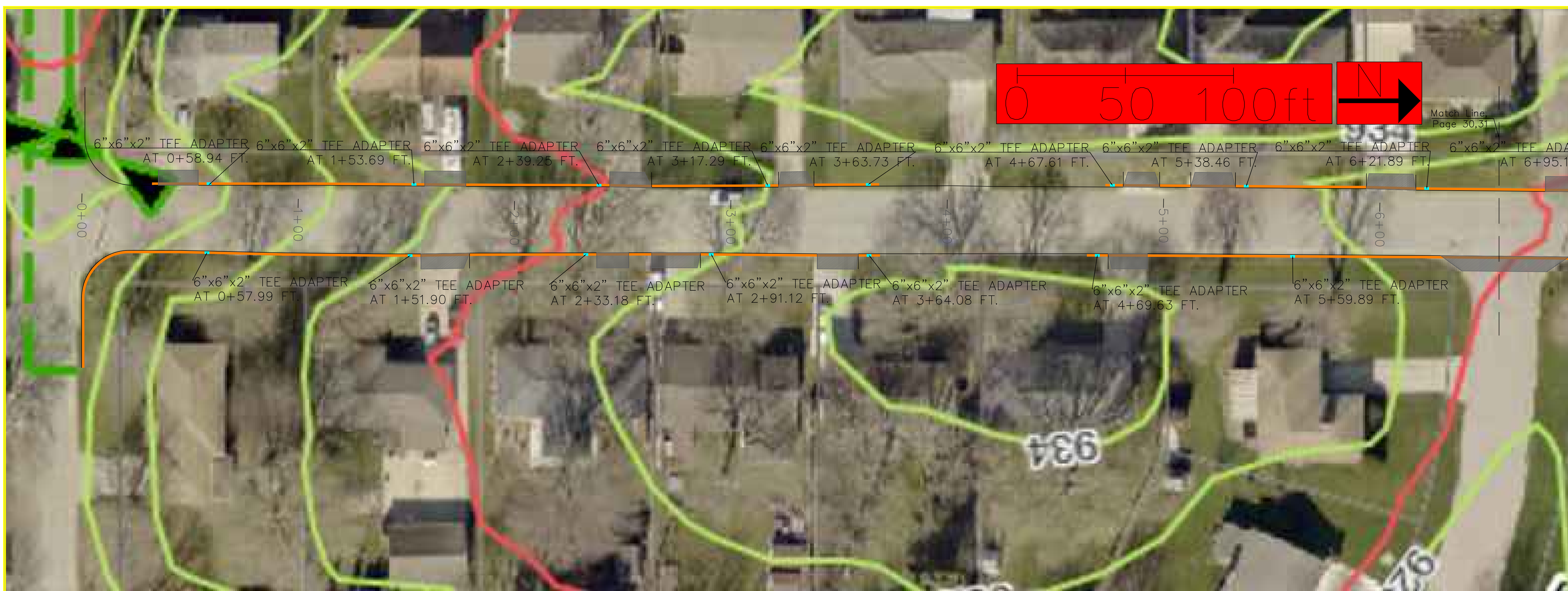
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**SUMP PUMP PROJECT**  
 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 WENDY RD  
 PLAN & PROFILE

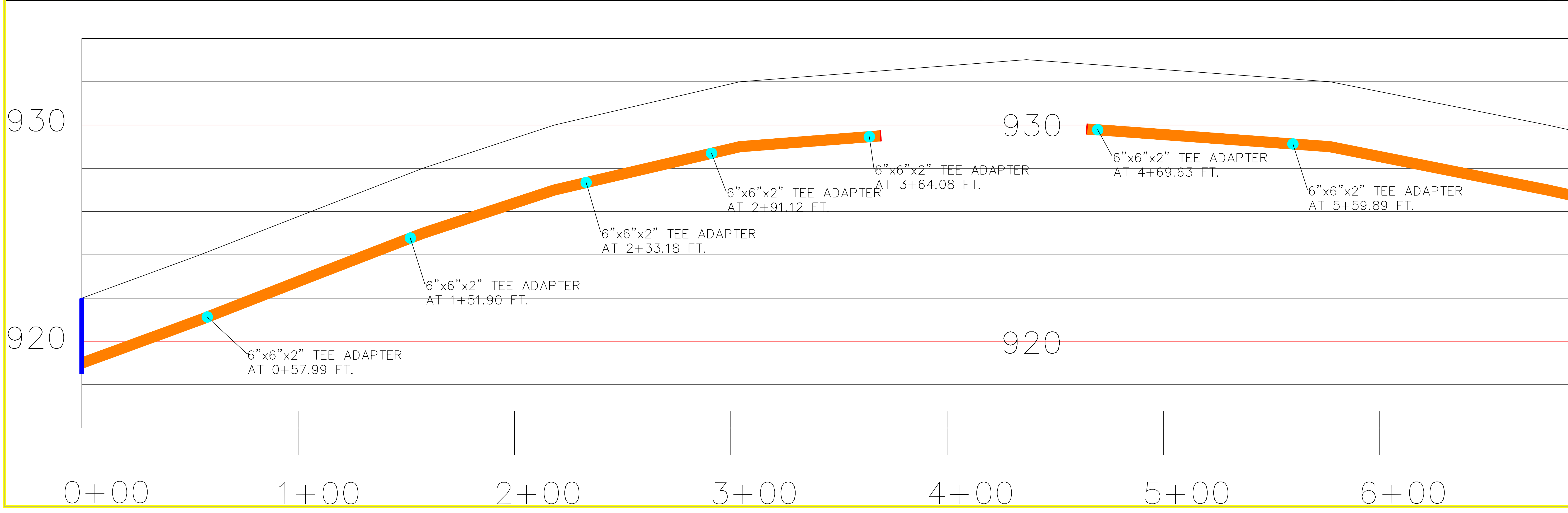
SHEET NO.  
**29**





PROJECT: CEE: 4850  
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 103 S CAPITOL ST  
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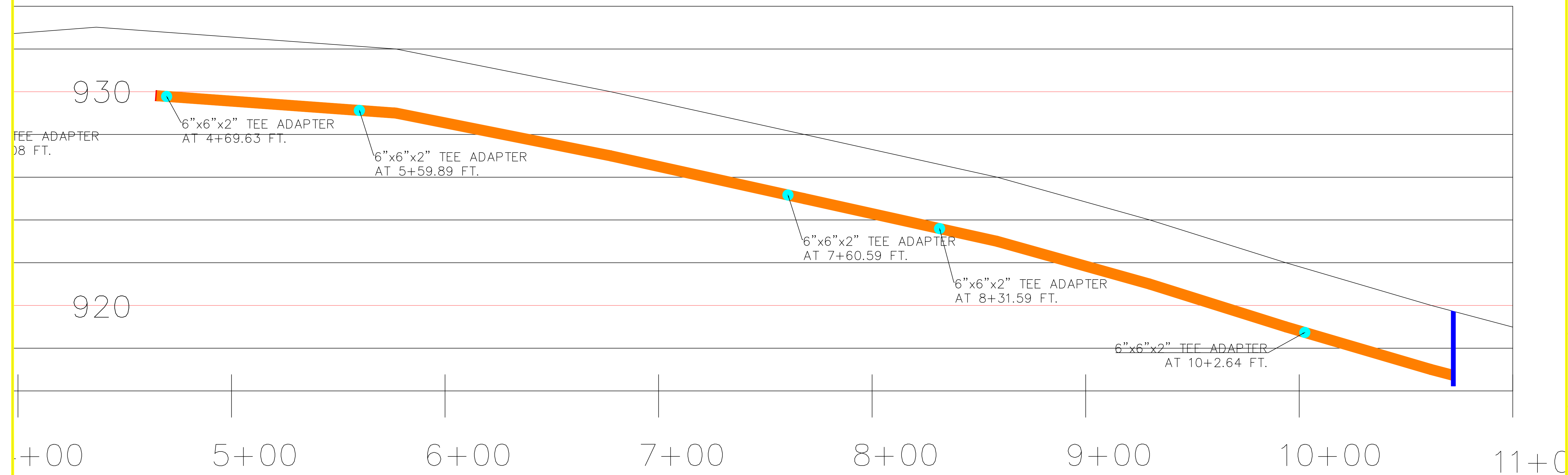
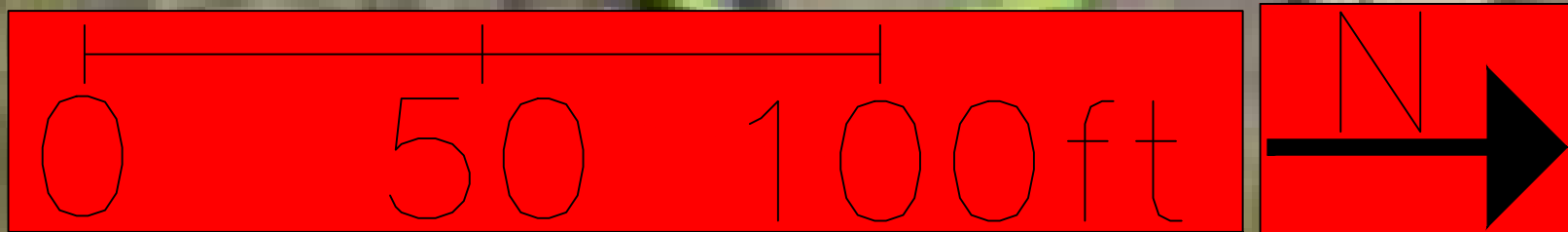
**SUMP PUMP PROJECT**

WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 BARTON AVE  
 PLAN & PROFILE

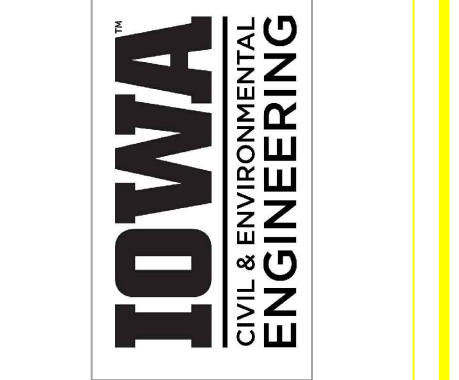
SHEET NO.  
**30**





PROJECT:	CEE: 4850
DATE :	11/20/2020
DRAWN BY:	JAB/TDA
REVISION:	

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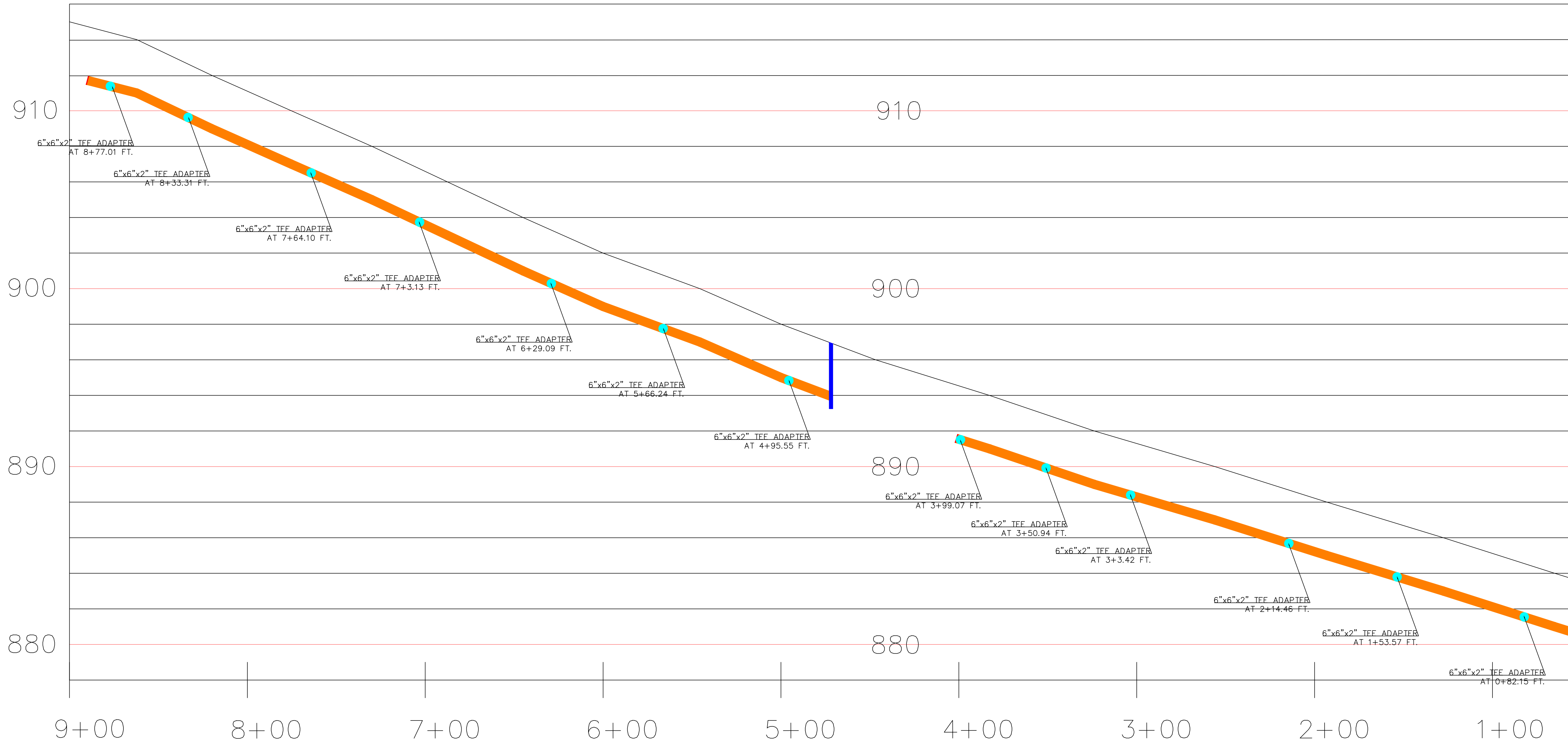
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**SUMP PUMP PROJECT**  
 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 BARTON AVE  
 PLAN & PROFILE

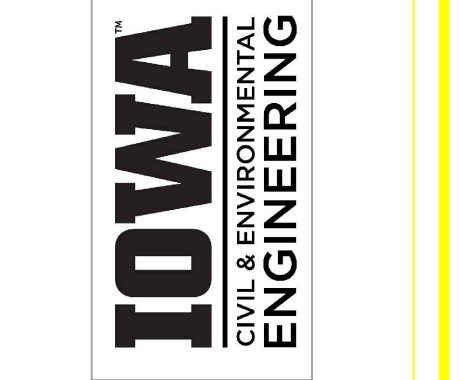
SHEET NO.  
**31**





PROJECT: CEE: 4850  
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 DRAWN BY: JAB/TDA  
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 EMAIL: civil-hawks@iowa.edu



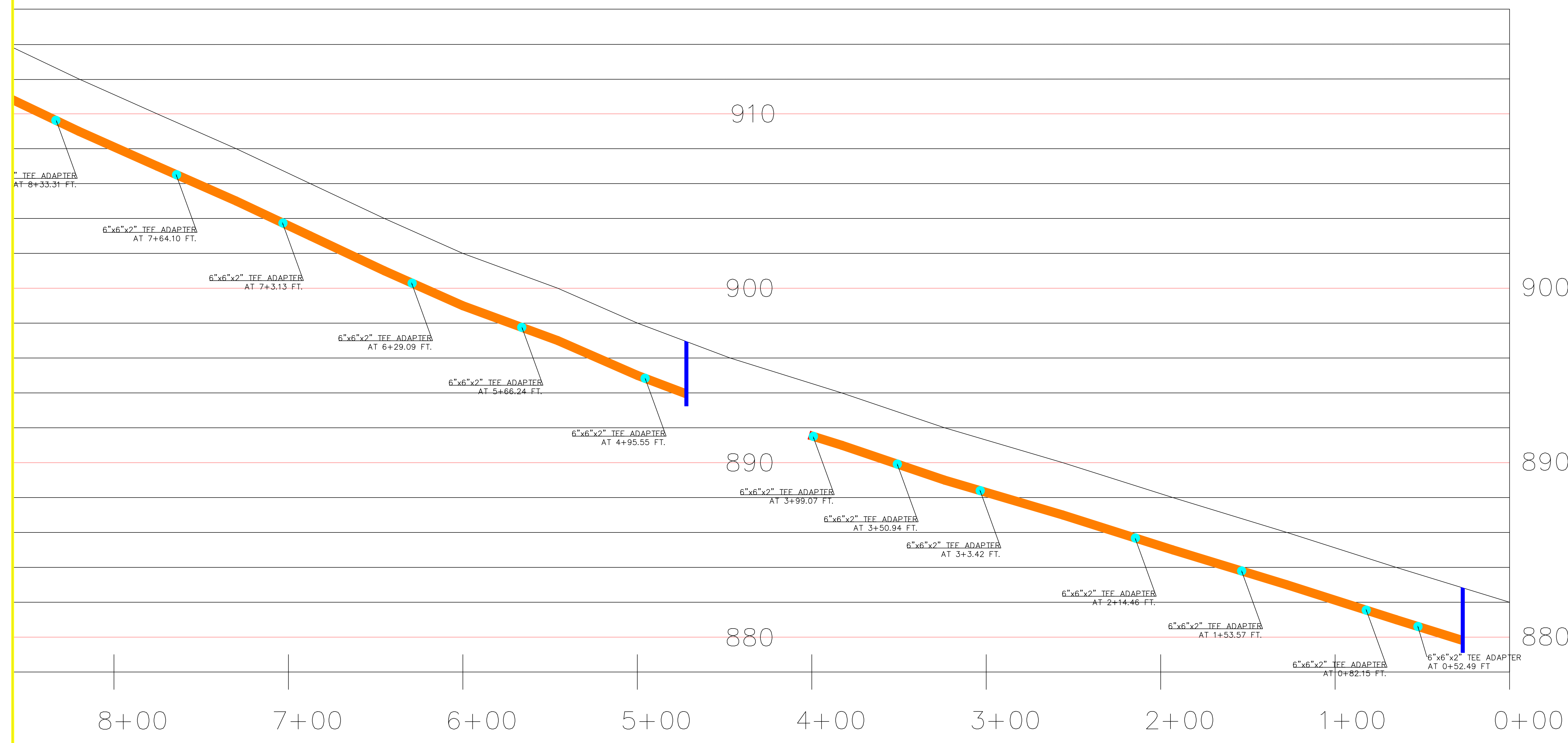
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**SUMP PUMP PROJECT**  
 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
**WISNER DR  
 PLAN & PROFILE**

SHEET NO.  
**32**





PROJECT: CEE: 4850  
 DATE: 11/20/2020  
 DRAWN BY: JAB/TDA  
 REVISION:

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**CIVIL AND ENVIRONMENTAL ENGINEERING**  
 4105 SEAMANS CENTER FOR THE  
 ENGINEERING ARTS AND SCIENCES  
 103 S CAPITOL ST  
 IOWA CITY, IOWA 52242  
 PHONE: 319.335.5647  
 FAX: 319.335.5660  
 EMAIL: civil-hawks@iowa.edu

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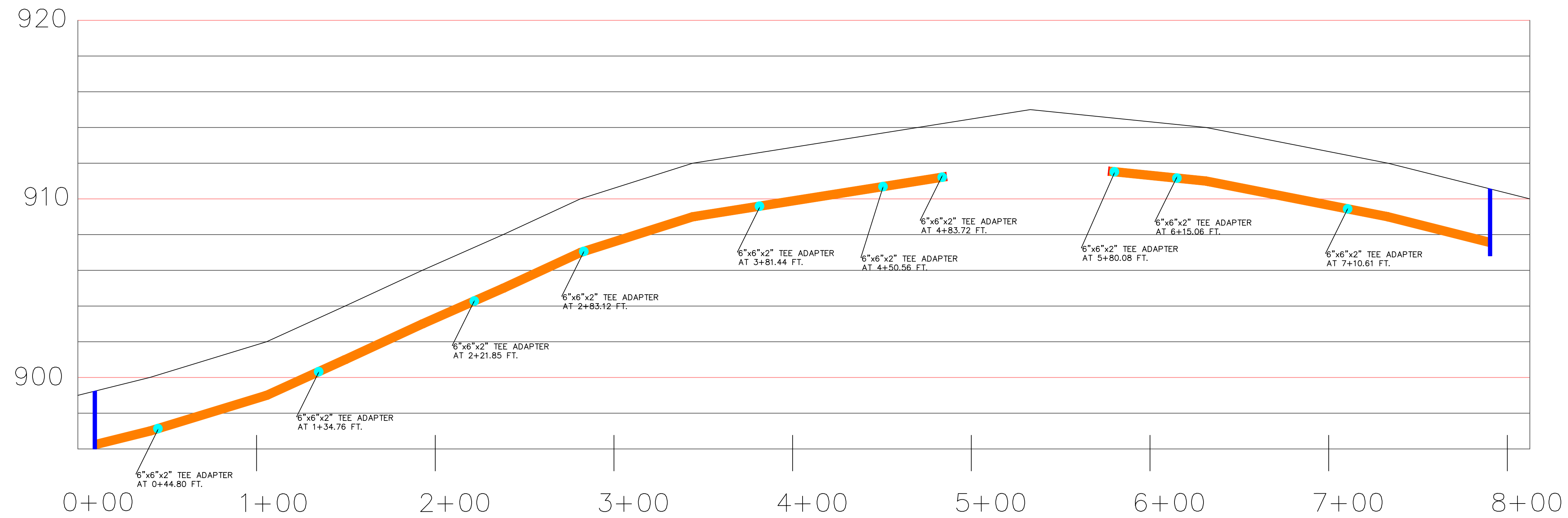
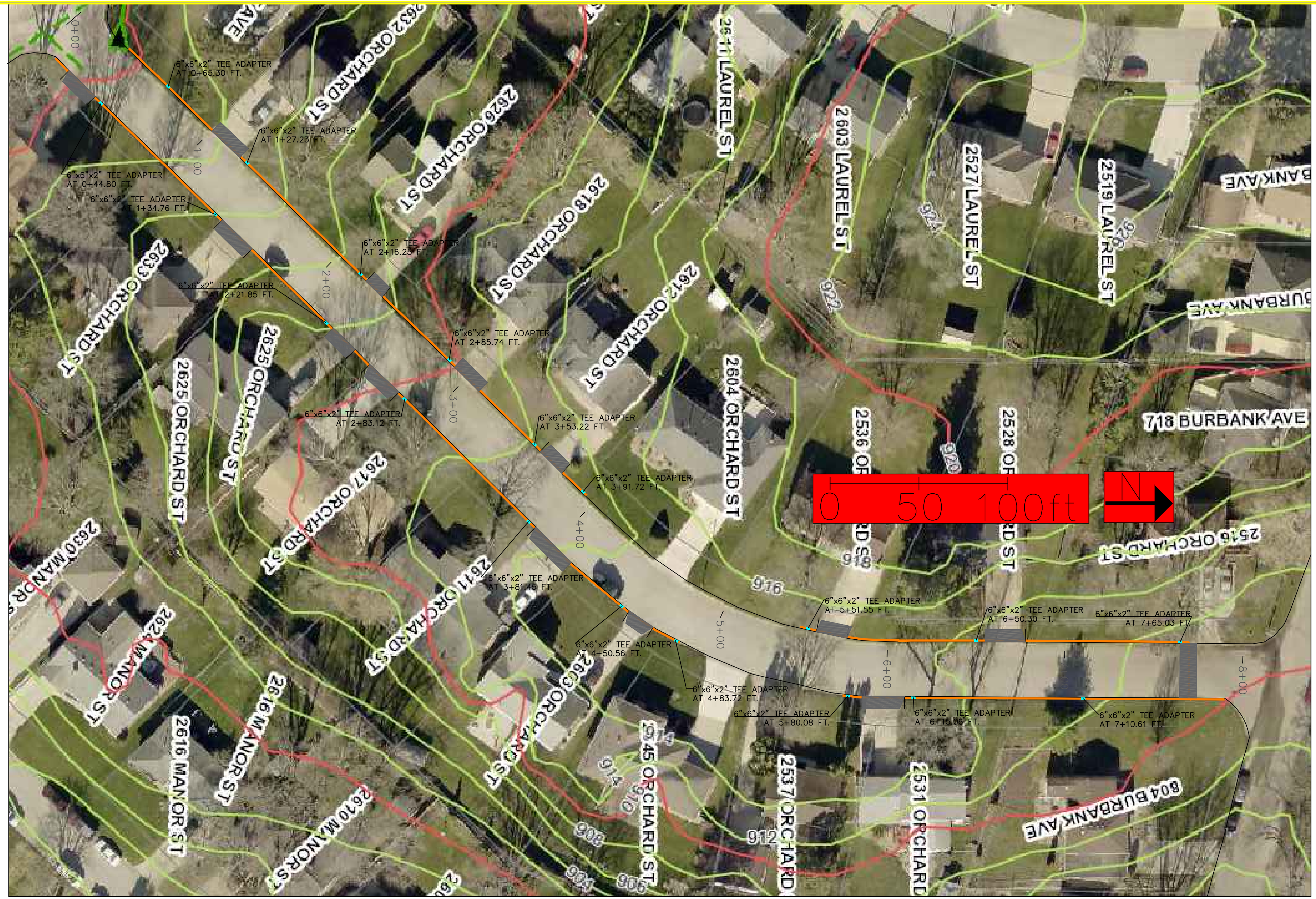
**SUMP PUMP PROJECT**

WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 WISNER DR  
 PLAN & PROFILE

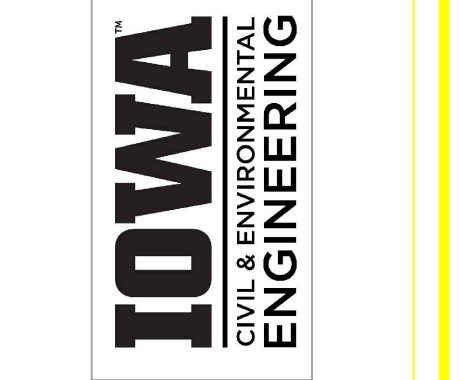
SHEET NO.  
**33**





PROJECT: CEE: 4850  
 DATE: 11/20/2020  
 DRAWN BY: JAB/TDA  
 REVISION:

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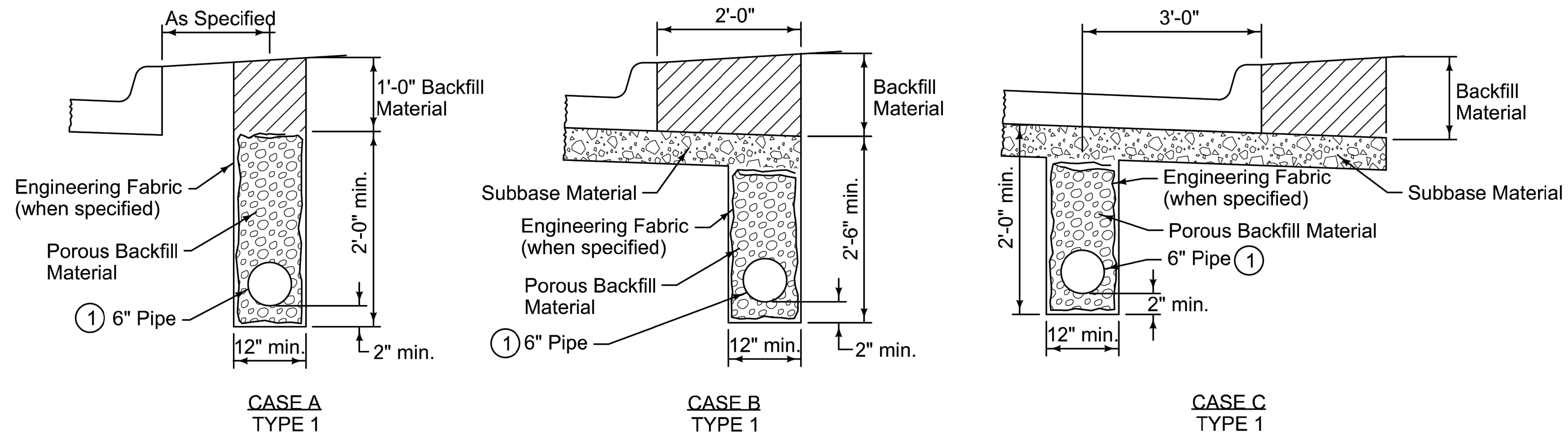
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**SUMP PUMP PROJECT**  
 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 ORCHARD ST  
 PLAN & PROFILE

SHEET NO.  
**34**

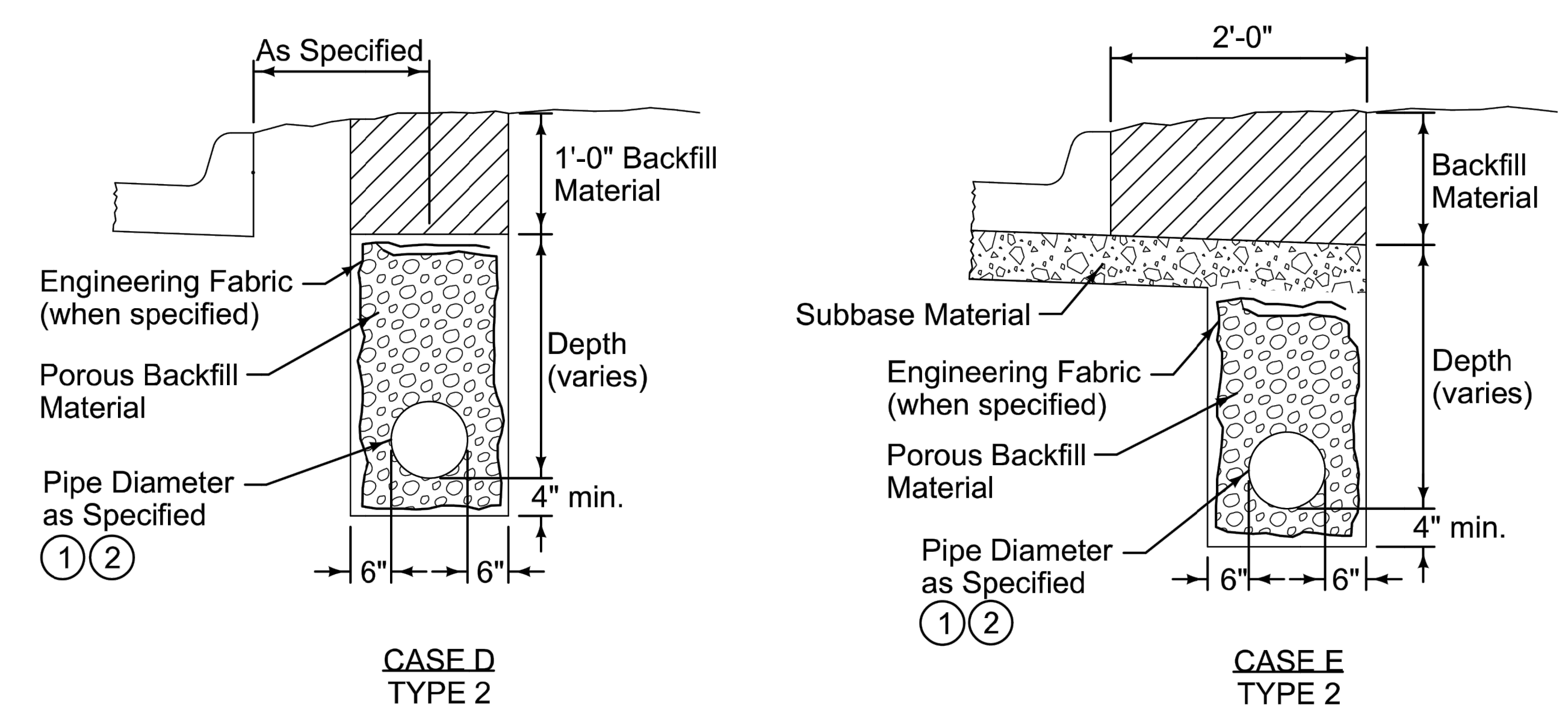




CASE A  
TYPE 1

CASE B  
TYPE 1

CASE C  
TYPE 1



CASE D  
TYPE 2

CASE E  
TYPE 2

Type 1 installation is for longitudinal subdrain only. Type 2 installation is for combination subdrain/footing drain collectors.

- ① Place perforations down for all installations.
- ② When concrete pipe is specified, wrap pipe joints with engineering fabric. Do not apply joint sealant. Comply with Figure 4020.211

	REVISION
	1 10-21-14
	SHEET 1 of 1
SUDAS Standard Specifications	
SUBDRAINS	

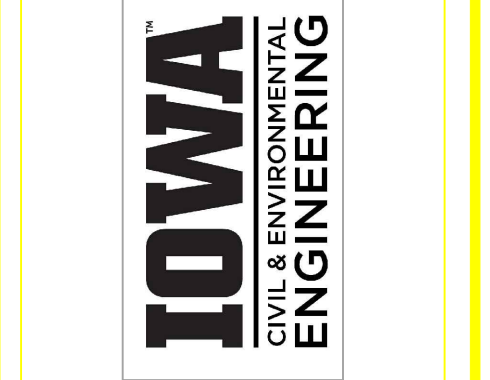
DETAILS

DESIGN UTILIZES CASE A,  
TYPE 1 SUBDRAIN

SUDAS STANDARD SPECIFICATIONS DIVISION 4:  
 - 3.02.C.02: PROVIDE FABRICATED OR PREFORMED WYE OR TEE SERVICE FITTING

PROJECT:	CEE: 4850
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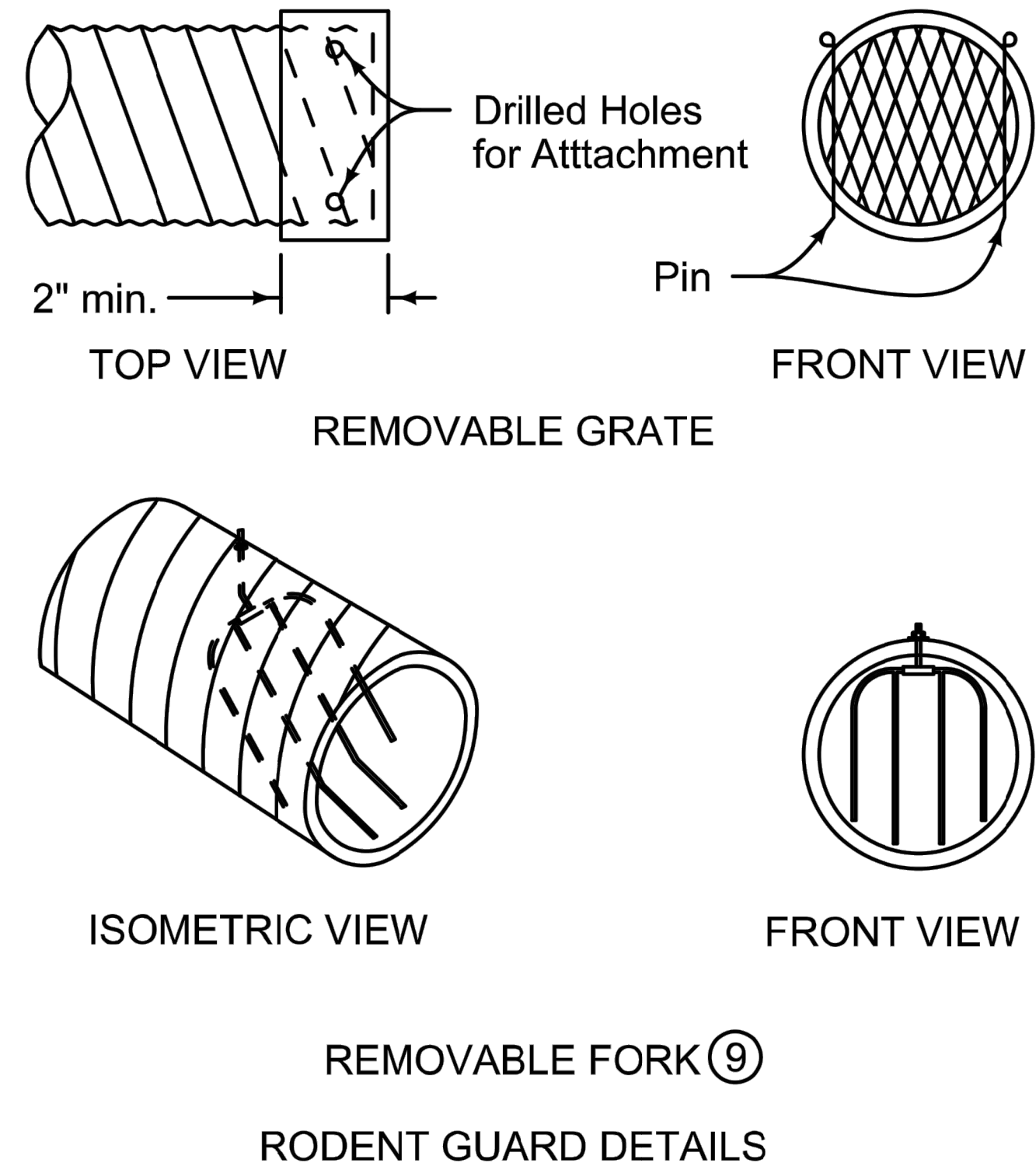
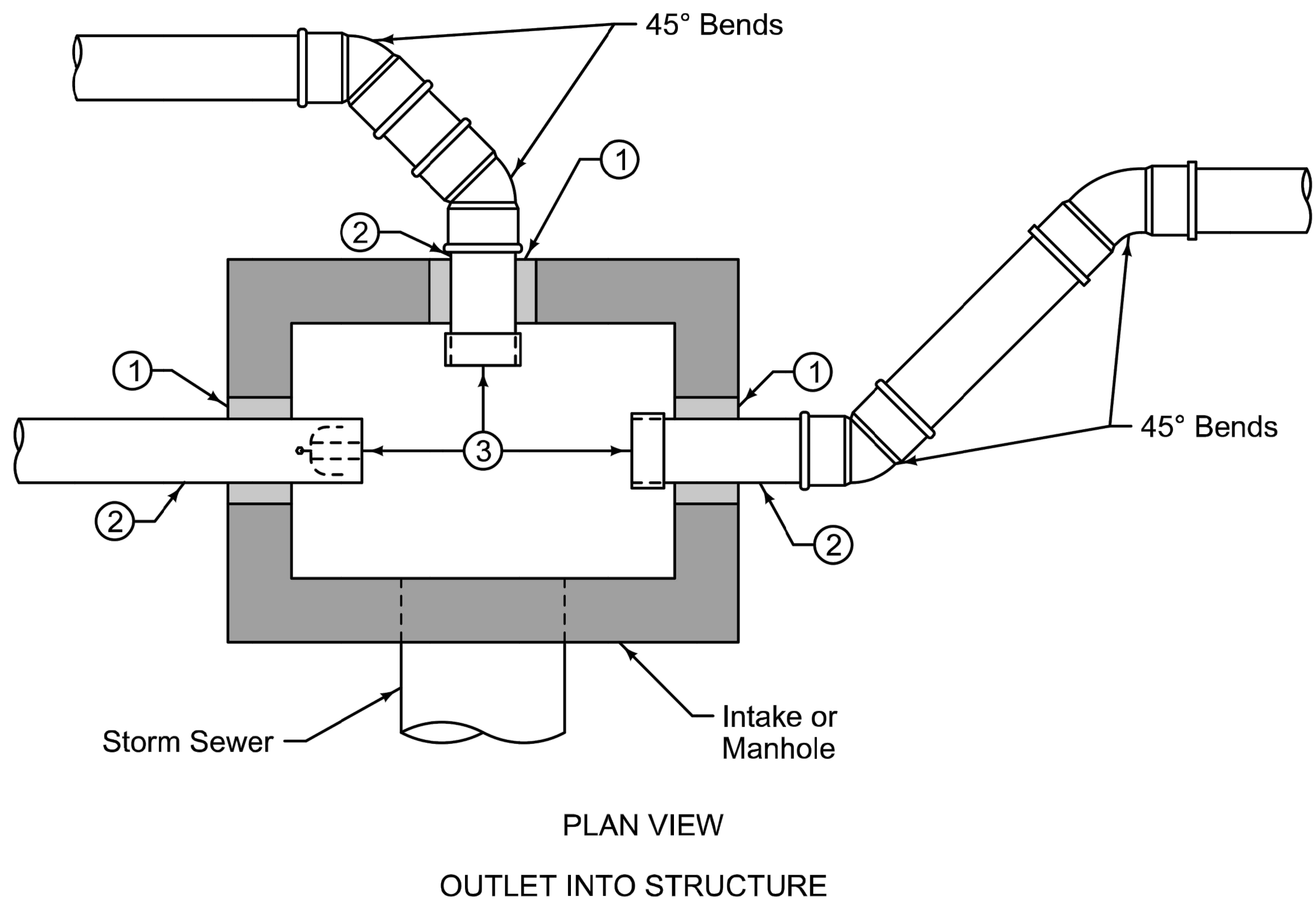
**SUMP PUMP PROJECT**  
 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 DRAIN TILE  
 DETAILS

SHEET NO.  
**35**

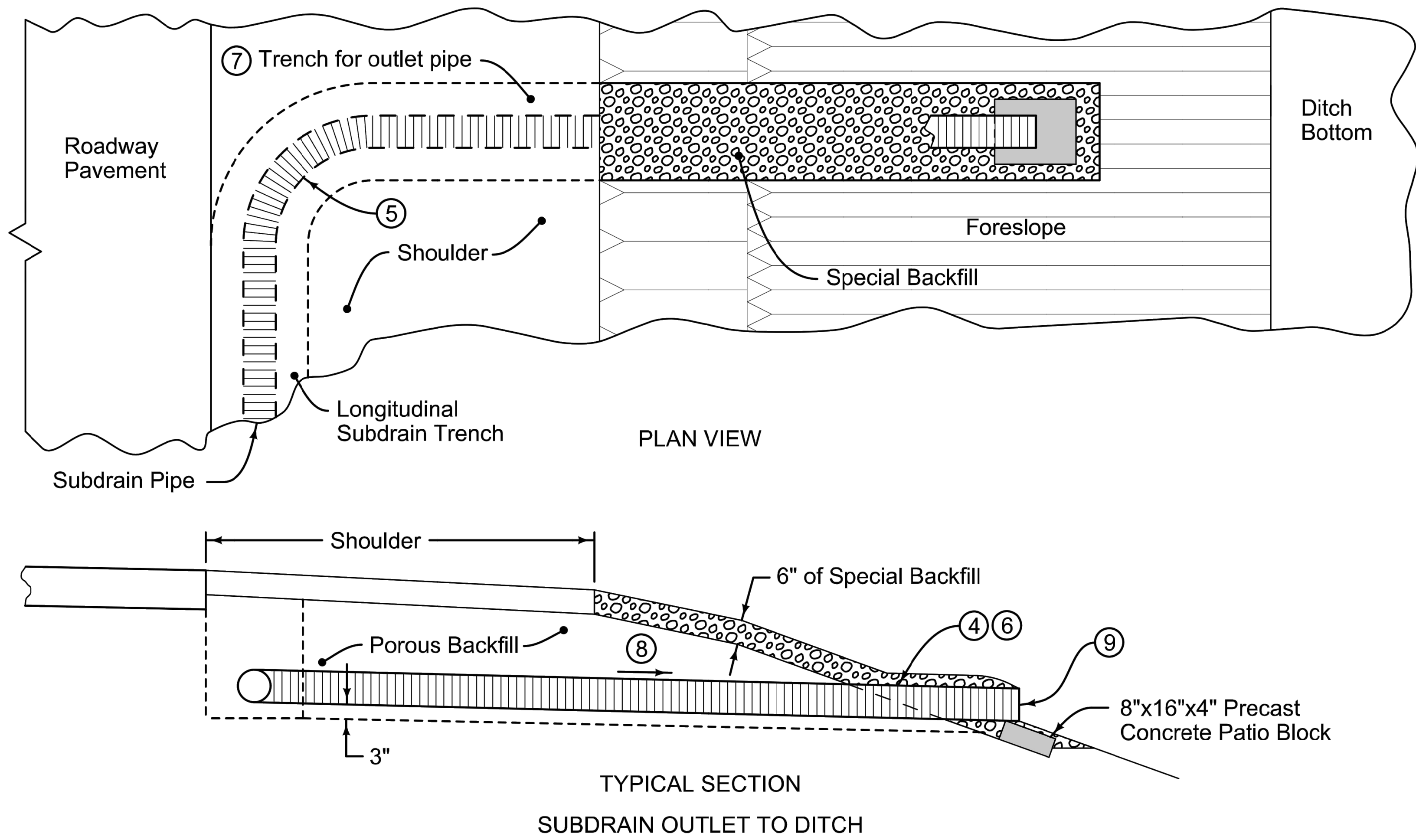
FIGURE 4040.231 SHEET 1 OF 1





Transverse and backslope subdrains require only single outlets. Install double outlet pipes on all longitudinal subdrain systems, except at the beginning and end of the system. At these locations, install a single outlet pipe.

- ① Fill annular space with non-shrink grout.
- ② Outlets through intake walls to be CMP; corrugated, double-walled HDPE; or PVC.
- ③ Extend outlet pipe into structure as required to install removable rodent guard.
- ④ Construct subdrain outlet to ditch with the same type and size of pipe as used for the subdrain.
- ⑤ Provide a minimum 1 foot radius for all bends or use two 45° fittings
- ⑥ If a CMP outlet is specified in the contract documents, construct the final 10 to 12 feet of the subdrain outlet to ditch with CMP 2 inches larger than the subdrain pipe. Connect pipes with a manufactured coupler or concrete collar.
- ⑦ Provide a minimum trench width of 12 inches for a single outlet and 24 inches for a double outlet.
- ⑧ Provide a 6 inch minimum drop in elevation between longitudinal subdrain and outlet.
- ⑨ Use only fork type rodent guard for subdrain outlet to ditch.



	REVISION
	3   10-18-16
	<b>4040.233</b>
SHEET 1 of 1	
SUDAS Standard Specifications	
SUBDRAIN OUTLETS	

FIGURE 4040.233 SHEET 1 OF 1

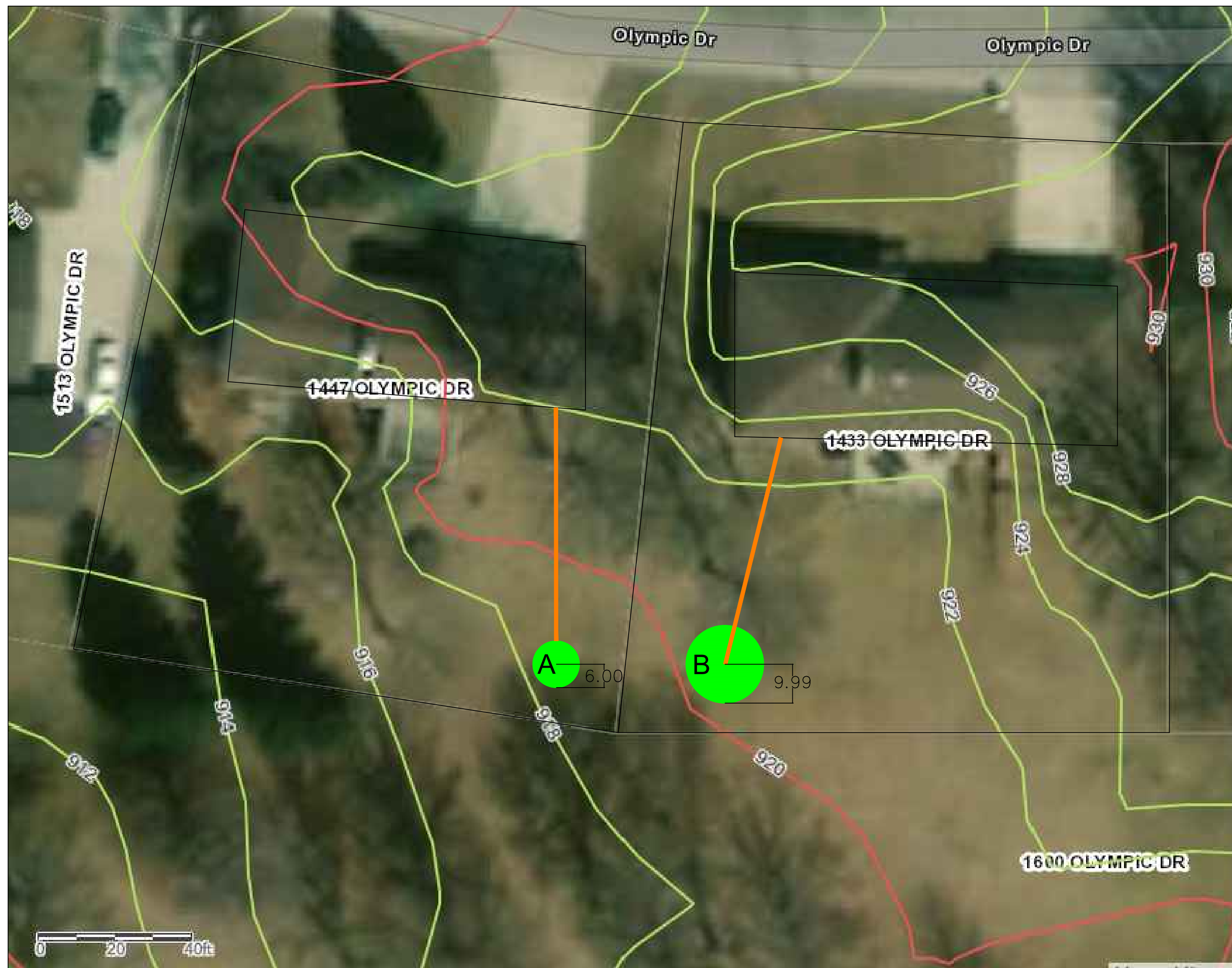
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 WATERLOO, IA  
 BLACK HAWK COUNTY

SHEET NAME  
 CONNECTION DETAIL  
 SHEET NO.





DETAILS:

RAIN GARDEN A: 6.0 FT DIAMETER

RAIN GARDEN B: 10.0 FT DIAMETER

RECOMMENDED PLANTS:

- BLUE GRAMA GRASS (BORDER)
- PRAIRIE SMOKE (BORDER)
- PRAIRIE BLAZING STAR (MIDDLE)
- PALE PURPLE CONEFLOWER (MIDDLE)

SLOPE:

- 1-12%

MINIMUM DISTANCE FROM HOUSE:

- 10 FEET

RODENT GUARD RECOMMENDED FOR PIPE OUTLET

INDIVIDUAL PROPERTIES RESPONSIBLE FOR RAIN GARDEN CONSTRUCTION AND MAINTENANCE

Water can be delivered through a swale lined with plants, a pipe or across a landscaped area.

## Create A Rain Garden

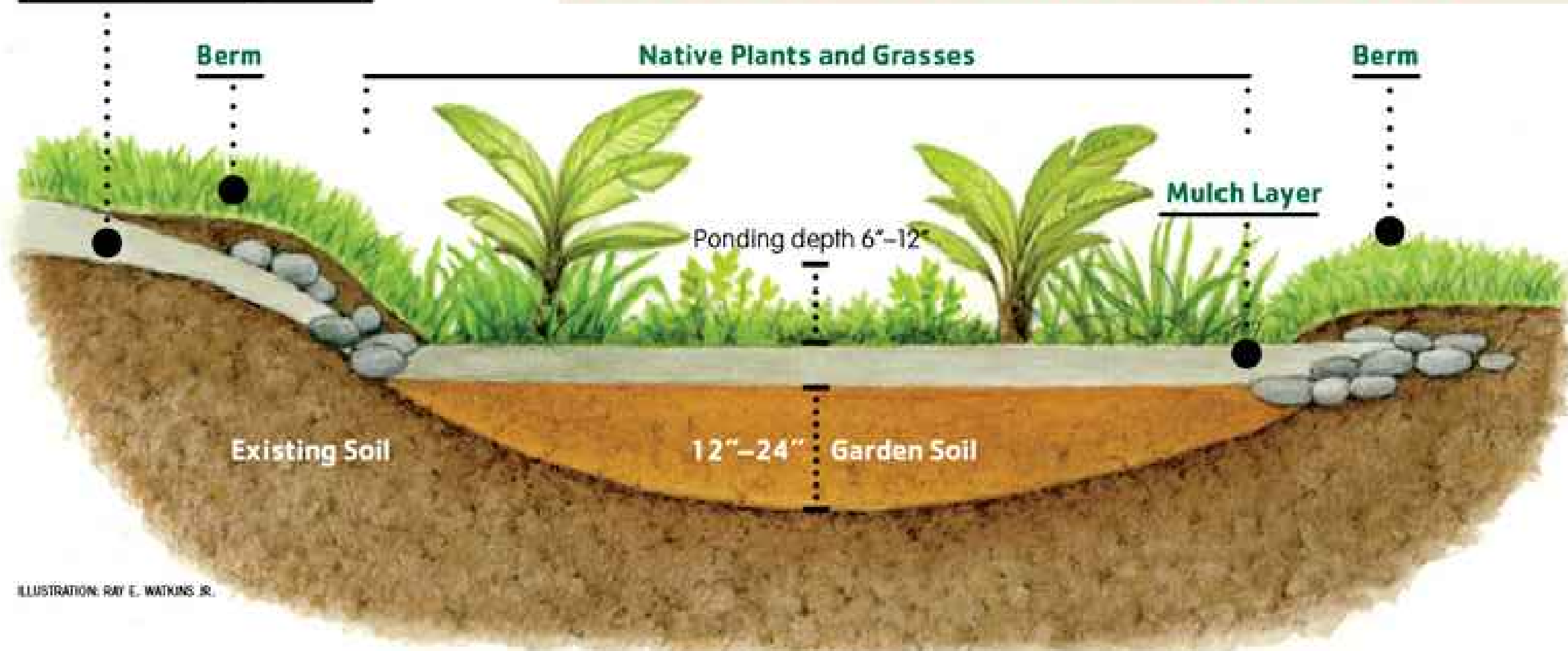


ILLUSTRATION: RAY E. WATKINS JR.

See the story at <http://myFarmLife.com/raingarden>

TYPICAL RAIN GARDEN

CROSS SECTION:

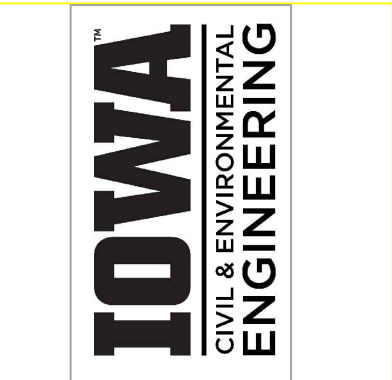
- SUMP PUMP DISCHARGE DELIVERED THROUGH 2" PVC PIPE

SOURCE:

How To Create a Rain Garden. Retrieved December 10, 2020, from <https://myfarmlife.com/home-garden/how-to-create-a-rain-garden/>

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WATERLOO, IA  
 BLACK HAWK COUNTY

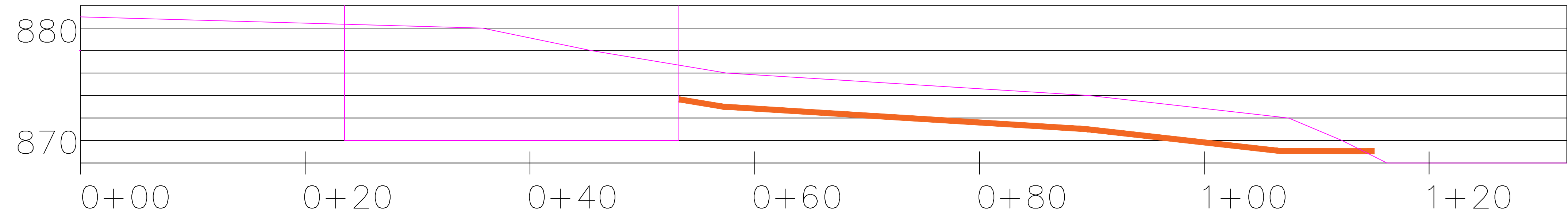
SHEET NAME

RAIN GARDEN  
 PLAN AND DETAILS

SHEET NO.

**37**





DETAILS:

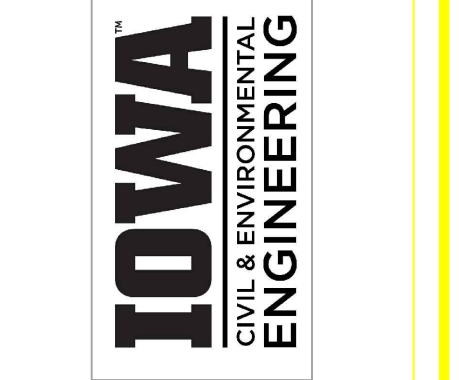
PIPING:  
 - 2" PVC PIPE

RODENT GUARD RECOMMENDED FOR  
 PIPE OUTLET

INDIVIDUAL PROPERTIES RESPONSIBLE  
 FOR CREEK DISCHARGE

PROJECT:	CEE: 4850
DATE :	11/20/2020
DRAWN BY:	JAB/TDA
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 WATERLOO, IA  
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SHEET NAME  
 EXISTING CREEK  
 PLAN & DETAILS

SHEET NO.  
**38**