

IOWA DEPARTMENT OF NATURAL RESOURCES

**CONSTRUCTION DOCUMENTS  
FOR  
RED ROCK WMU/LAKE KEOMAH  
ROAD MAINTENANCE**

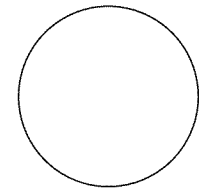
**MARION/WARREN/MAHASKA COUNTIES,  
IOWA**

DOT PROJECT # SP-00SP(5,7,9)--7C-00  
DNR PROJECT #23-05-63-04

SHEET INDEX

A.01	COVER SHEET
A.02	LOCATION MAP
A.03	LOCATION MAP
A.04	LOCATION MAP
A.05	LOCATION MAP
A.06	LOCATION MAP
A.07	LOCATION MAP
A.08	LOCATION MAP
B.01	TYPICAL CROSS SECTIONS AND DETAILS
B.02	TYPICAL CROSS SECTIONS AND DETAILS
B.03	TYPICAL CROSS SECTIONS AND DETAILS
B.04	TYPICAL CROSS SECTIONS AND DETAILS
B.05	TYPICAL CROSS SECTIONS AND DETAILS
B.06	TYPICAL CROSS SECTIONS AND DETAILS
B.07	TYPICAL CROSS SECTIONS AND DETAILS
C.01	QUANTITIES AND GENERAL INFORMATION
D.01	SITE PLAN
D.02	SITE PLAN
D.03	SITE PLAN
D.04	SITE PLAN
D.05	SITE PLAN
D.06	SITE PLAN
D.07	SITE PLAN

CONSULTANT:



**IOWA DEPARTMENT OF  
NATURAL RESOURCES**  
ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034

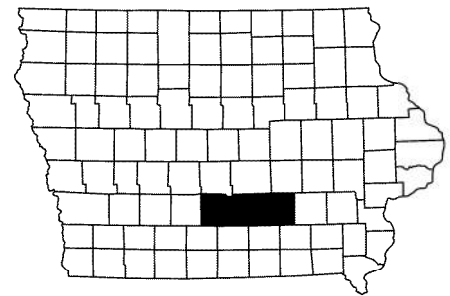


**COVER SHEET**  
ROAD MAINTENANCE FOR:  
**RED ROCK WMU/LAKE KEOMAH**  
MARION/WARREN/MAHASKA COUNTIES

NO.	BY	DATE	REVISION

SHEET NO:  
**A.01**

	I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED UNDER MY SUPERVISION AND THAT ENGINEERING DECISIONS WITH REGARD TO THE DESIGN WERE MADE BY ME UNDER THE LAWS OF THE STATE OF IOWA.	
	SIGNATURE: Bruce L. Flippin	DATE: _____
	BRUCE L. FLIPPIN PRINTED OR TYPED NAME	
	MY LICENCE RENEWAL DATE IS DECEMBER 31, 20 <u>24</u>	
	PAGES COVERED BY THIS SEAL: _____	



**IOWA ONE CALL**  
1-800-292-8989  
www.iowaonecall.com  
811 Know what's below. Call before you dig.

**AUTHORIZATION TO BID**

AUTHORIZATION - PARKS | WILDLIFE | FISHERIES | LAW ENFORCEMENT | FORESTRY DATE \_\_\_\_\_

AUTHORIZATION - PARKS | WILDLIFE | FISHERIES | LAW ENFORCEMENT | FORESTRY DATE \_\_\_\_\_

ENGINEERING BUREAU CHIEF \_\_\_\_\_ DATE \_\_\_\_\_

PROJECT MANAGER		CONSTRUCTION INSPECTOR	
COMPANY	IOWA DEPARTMENT OF NATURAL RESOURCES	COMPANY	IOWA DEPARTMENT OF NATURAL RESOURCES
ADDRESS	502 EAST 9TH STREET	ADDRESS	
CITY, STATE, ZIP	DES MOINES, IA, 50319	CITY, STATE, ZIP	
CONTACT	BRUCE L. FLIPPIN	CONTACT	JASON KRUSE
TELEPHONE	515-689-8009	TELEPHONE	515-250-3707
FAX	515-281-8685	FAX	
EMAIL	bruce.flippin@dnr.iowa.gov	EMAIL	jason.kruse@dnr.iowa.gov

**PROJECT DESCRIPTION**

This projects consists of granular roadway maintenance. Blading/shaping, culvert replacement, ditch cleaning and spreading new rock.

POLK COUNTY

JASPER COUNTY

HARTFORD

223RD AVE

DUBUQUE DR

146TH AVE

PLEASANTVILLE

108TH PLACE

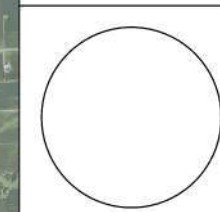
KNOXVILLE

WARREN COUNTY

MARION COUNTY

PROJECT LOCATION

CONSULTANT:



IOWA DEPARTMENT OF NATURAL RESOURCES

ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034



PROJECT LOCATION MAP

ROAD MAINTENANCE FOR:

RED ROCK WMU/LAKE KEOMAH

MARION/WARREN/MAHASKA COUNTIES

NO. BY REVISION

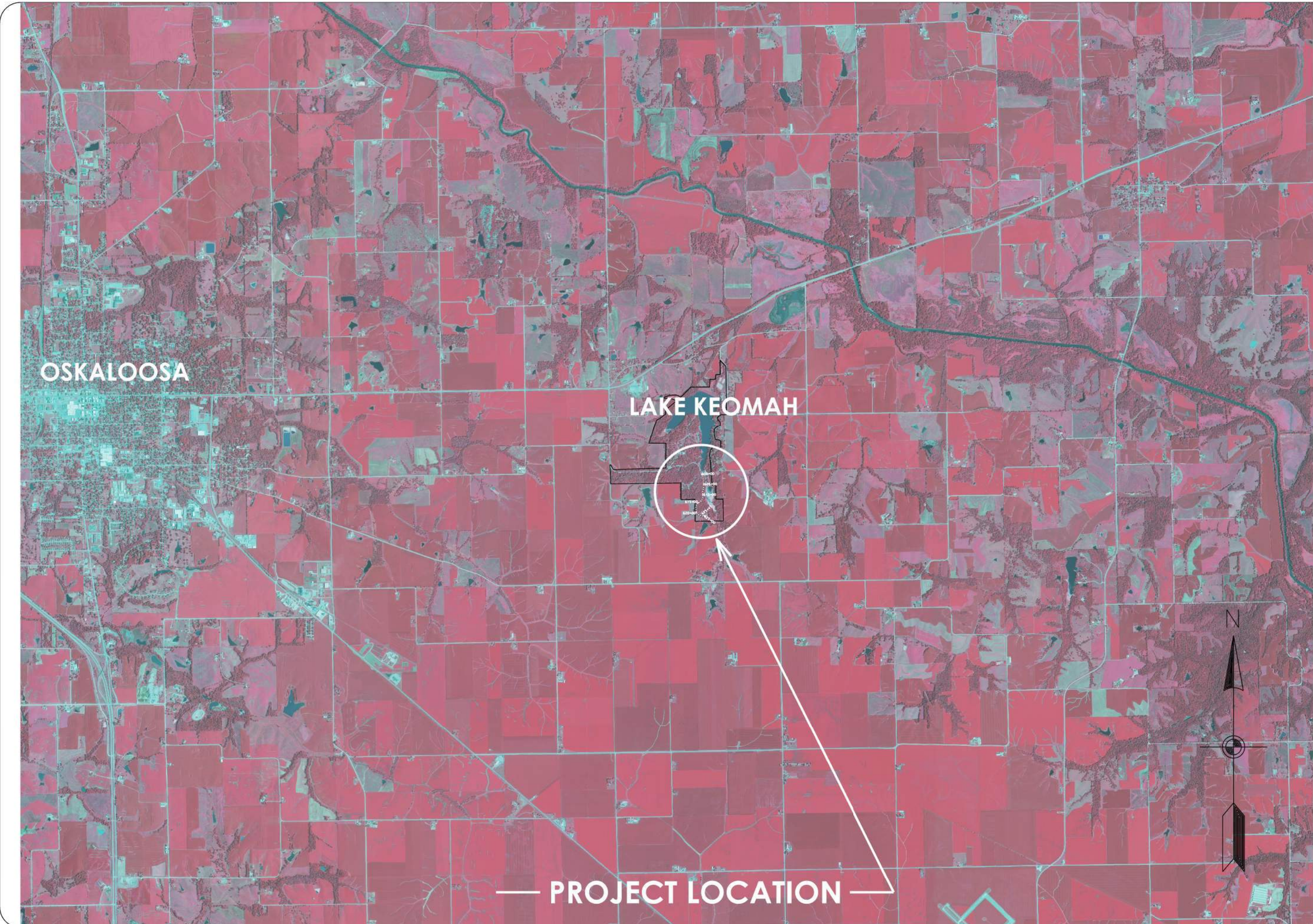

DRAWN BY: PROJECT NUMBER:  
BLF 23-05-63-04

CHK'D BY: DATE:  
AUG 2023

SHEET No:

**A.02**





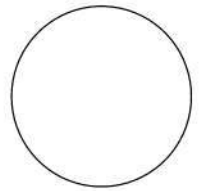
OSKALOOSA

LAKE KEOMAH

— PROJECT LOCATION —



CONSULTANT:



IOWA DEPARTMENT OF  
NATURAL RESOURCES

ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034



PROJECT LOCATION MAP

ROAD MAINTENANCE FOR:

RED ROCK WMU/LAKE KEOMAH

MARION/WARREN/MAHASKA COUNTIES

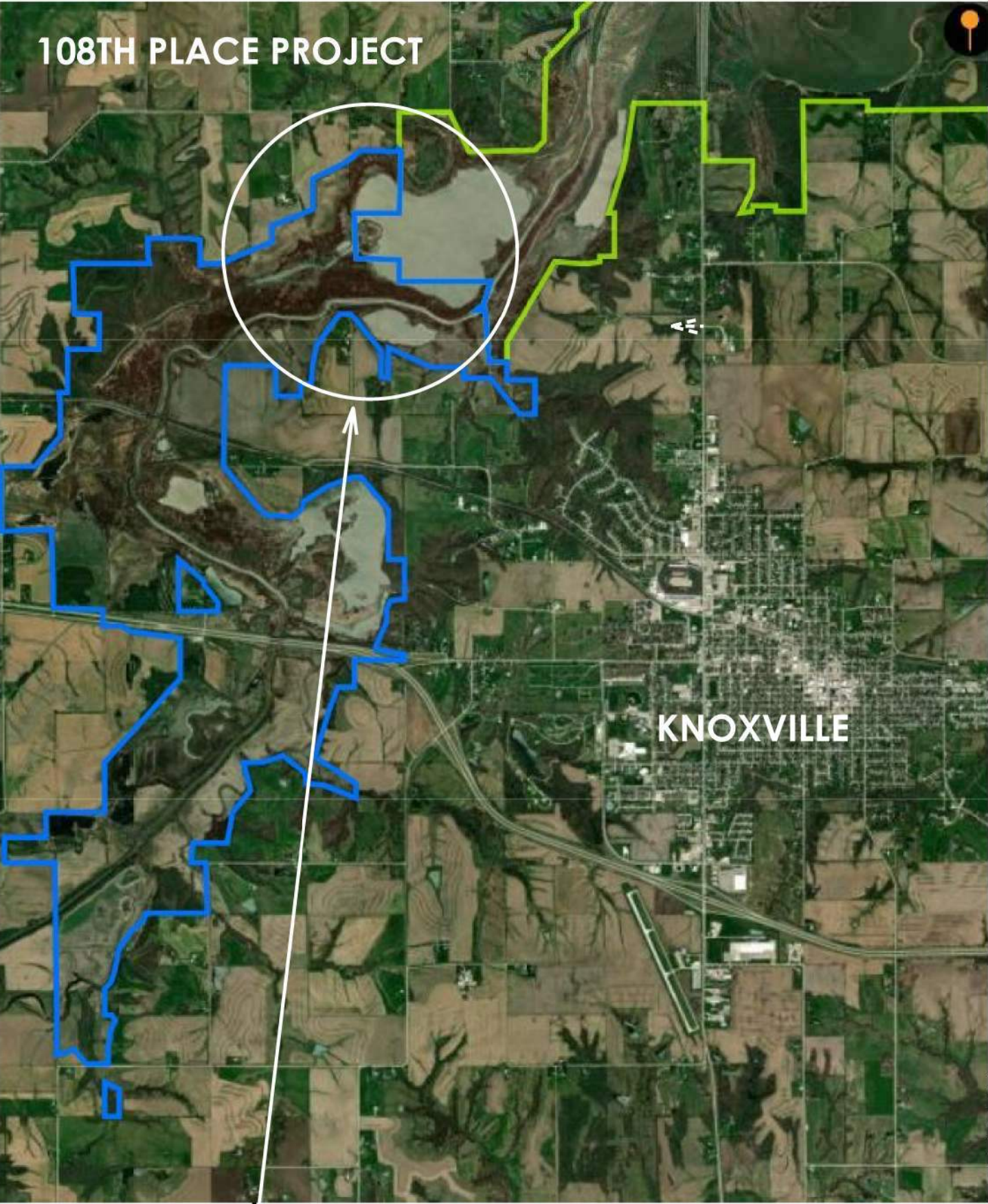
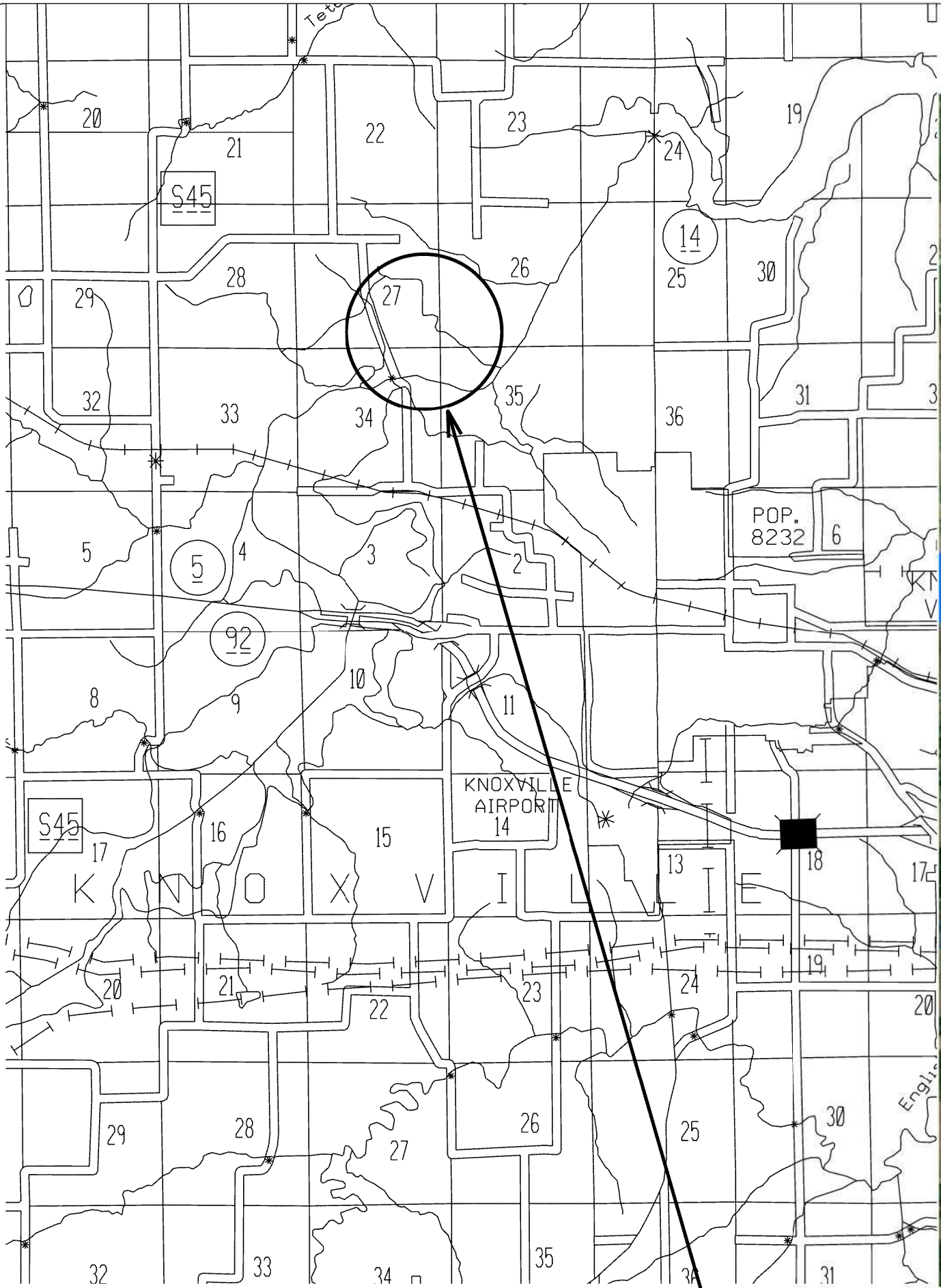
NO.	BY	REVISION

DRAWN BY:  
BLF PROJECT NUMBER:  
23-05-63-04

CHK'D BY: DATE:  
AUG 2023

SHEET No:

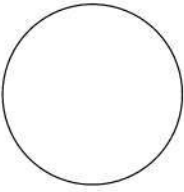
**A.03**



PROJECT LOCATION

108TH PLACE PROJECT

CONSULTANT:



**IOWA DEPARTMENT OF  
NATURAL RESOURCES**

ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034



PROJECT LOCATION MAP

ROAD MAINTENANCE FOR:

RED ROCK WMU/LAKE KEOMAH

MARION/WARREN/MAHASKA COUNTIES

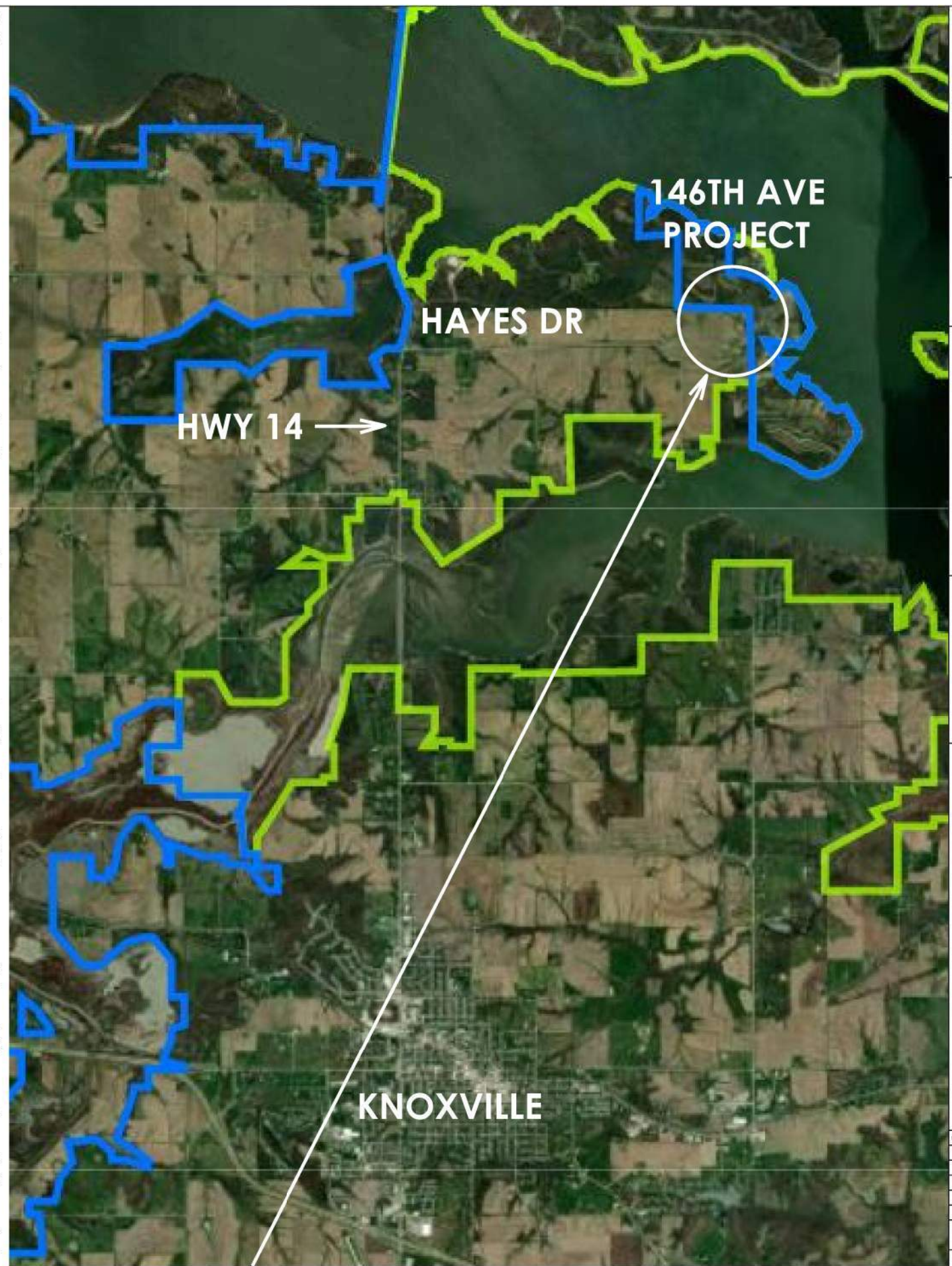
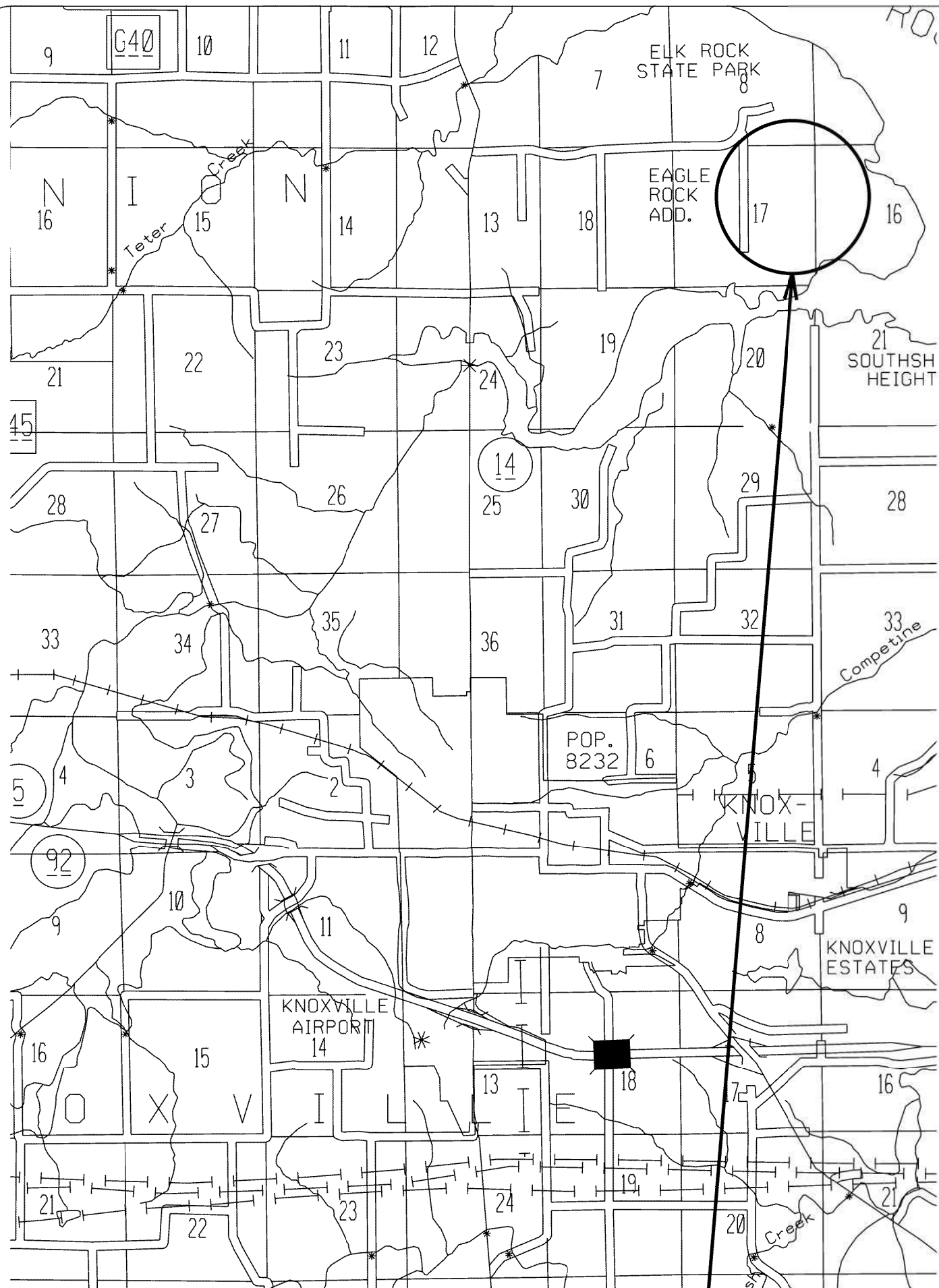
NO.	DATE	REVISION

DRAWN BY: PROJECT NUMBER:  
BLF 23-05-63-04

CHK'D BY: DATE:  
AUG 2023

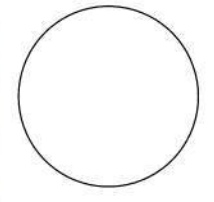
SHEET No:

**A.04**



PROJECT LOCATION

CONSULTANT:



IOWA DEPARTMENT OF NATURAL RESOURCES

ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034



PROJECT LOCATION MAP

ROAD MAINTENANCE FOR:

RED ROCK WMU/LAKE KEOMAH

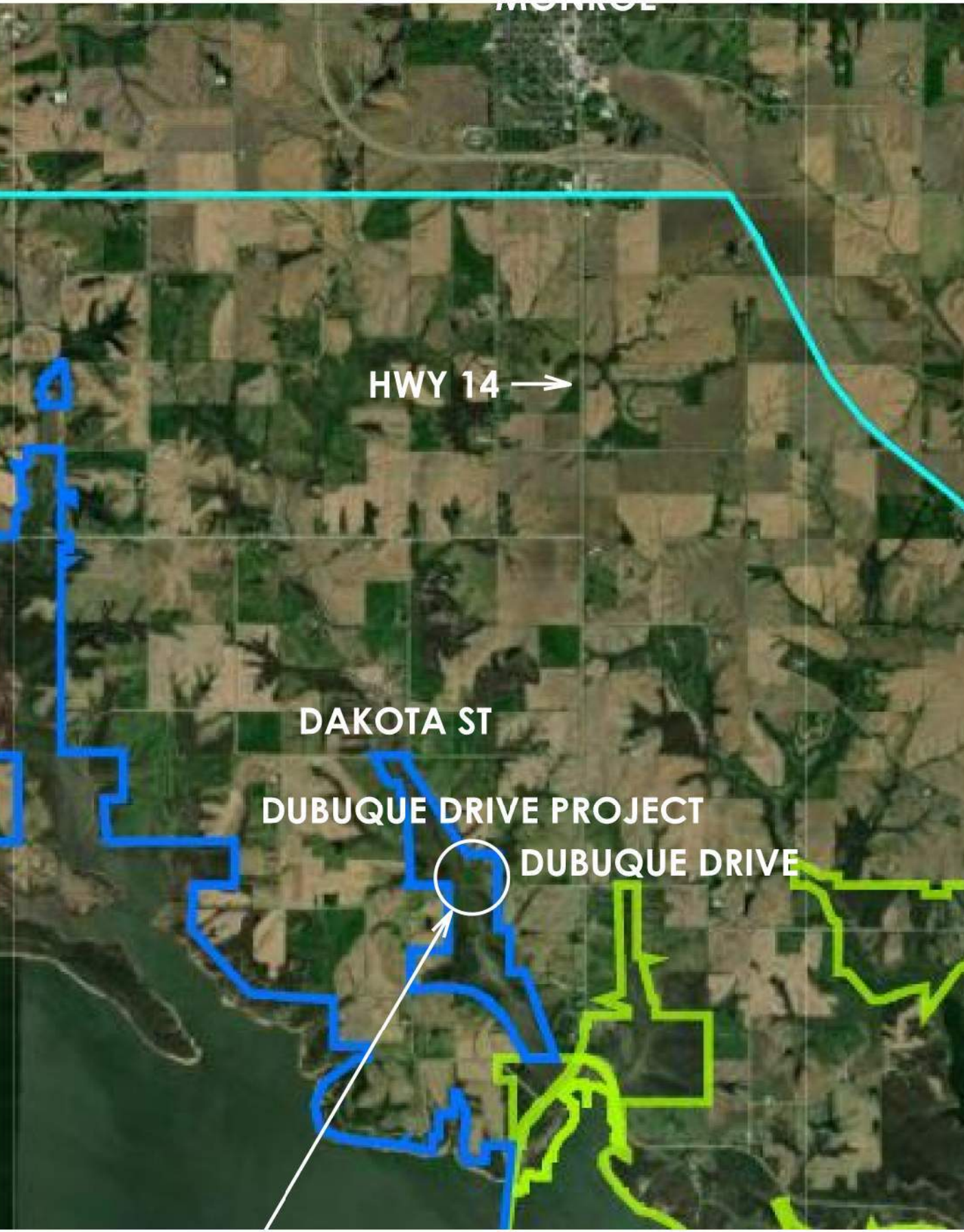
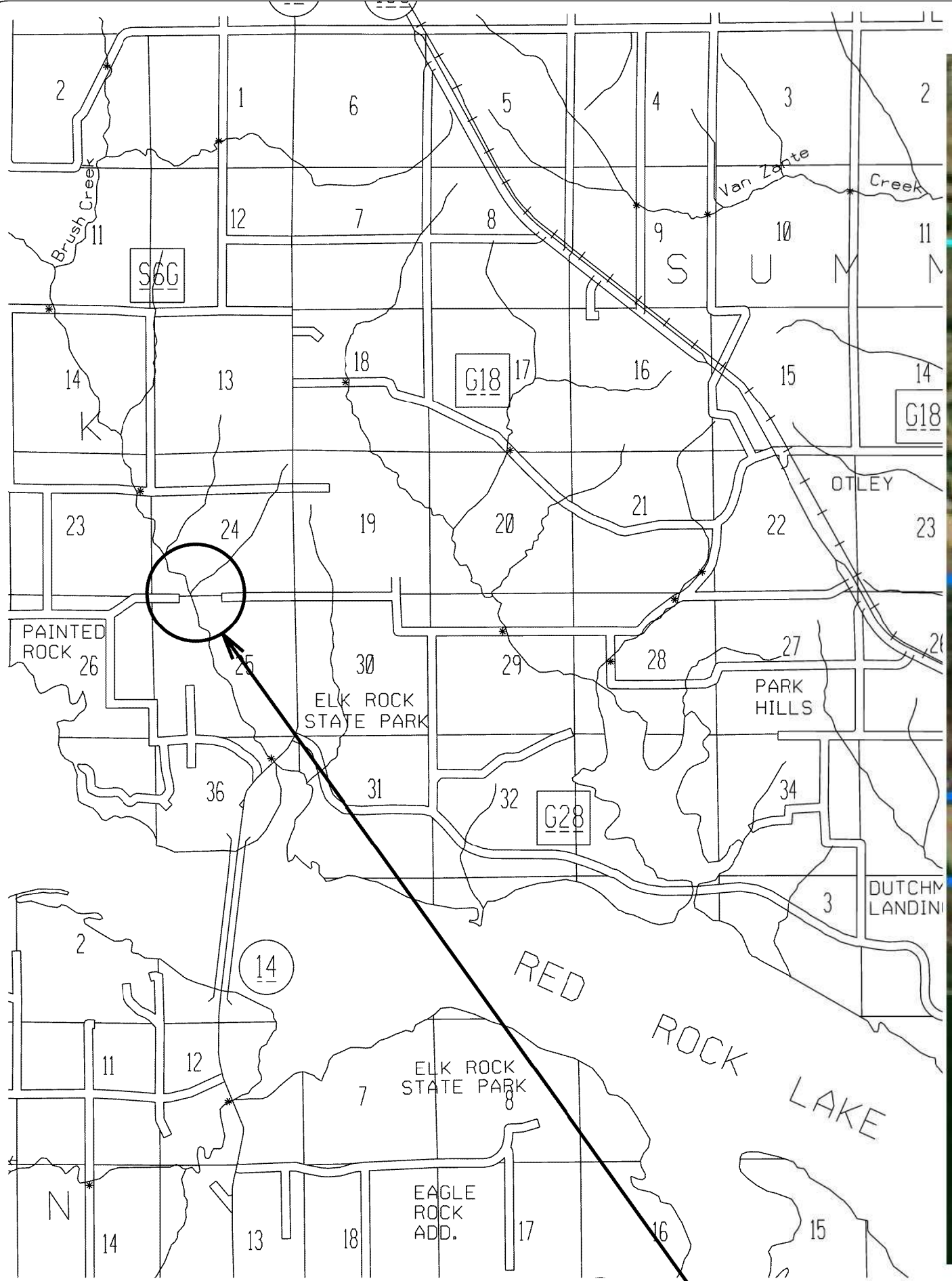
MARION/WARREN/MAHASKA COUNTIES

NO.	BY	REVISION

DRAWN BY: BLF PROJECT NUMBER: 23-05-63-04  
CHKD BY: DATE: AUG 2023

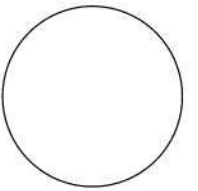
SHEET NO:

**A.05**



PROJECT LOCATION

CONSULTANT:



IOWA DEPARTMENT OF NATURAL RESOURCES

ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034



PROJECT LOCATION MAP

ROAD MAINTENANCE FOR:

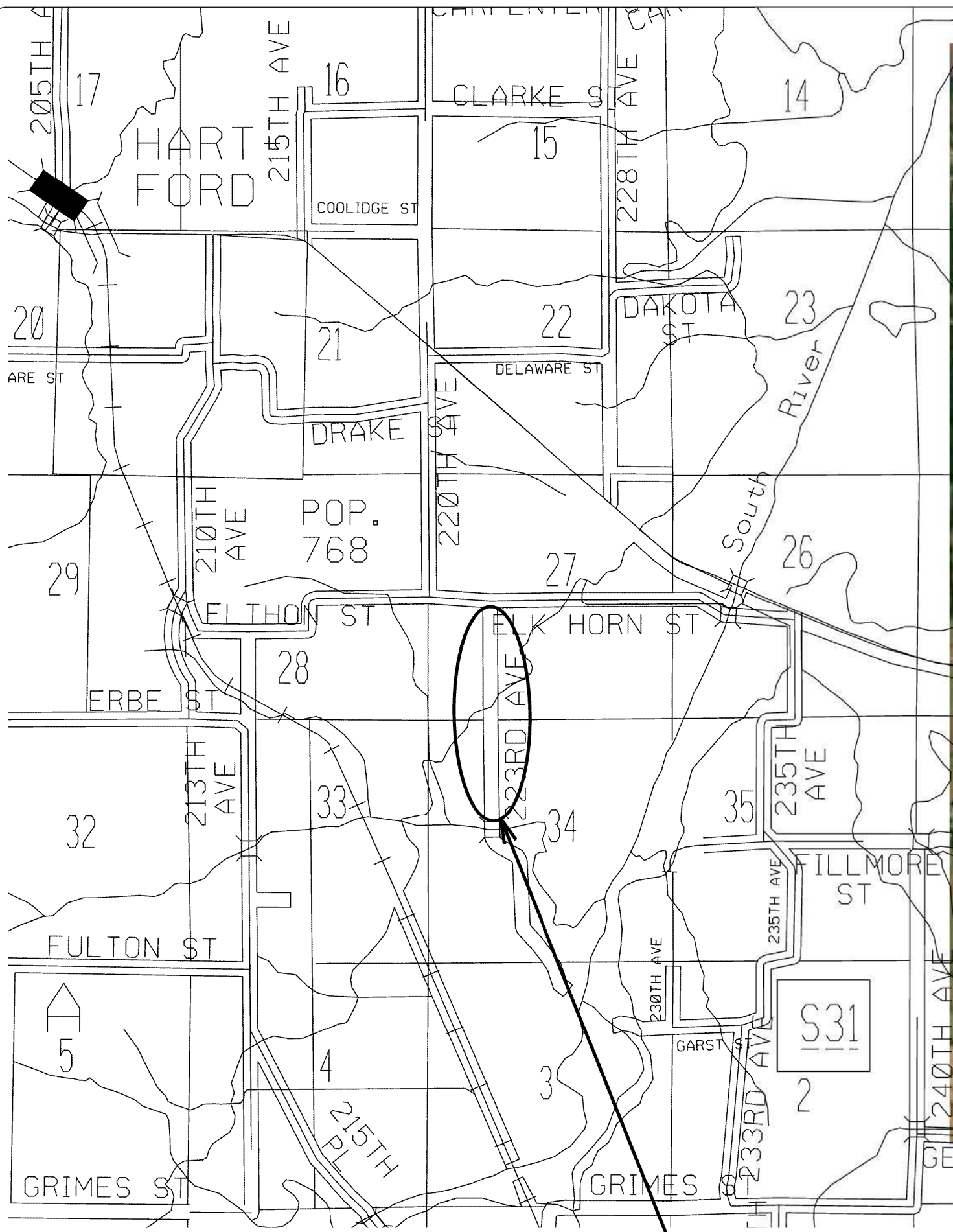
RED ROCK WMU/LAKE KEOMAH

MARION/WARREN/MAHASKA COUNTIES

NO.	DATE	REVISION

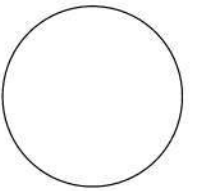
DRAWN BY: BLF PROJECT NUMBER: 23-05-63-04  
 CHKD BY: DATE: AUG 2023

SHEET No: **A.06**



PROJECT LOCATION

CONSULTANT:



IOWA DEPARTMENT OF  
NATURAL RESOURCES

ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034



PROJECT LOCATION MAP

ROAD MAINTENANCE FOR:

RED ROCK WMU/LAKE KEOMAH

MARION/WARREN/MAHASKA COUNTIES

NO. BY REVISION


DRAWN BY: PROJECT NUMBER:

BLF 23-05-63-04

CHKD BY: DATE:

AUG 2023

SHEET No:

**A.07**

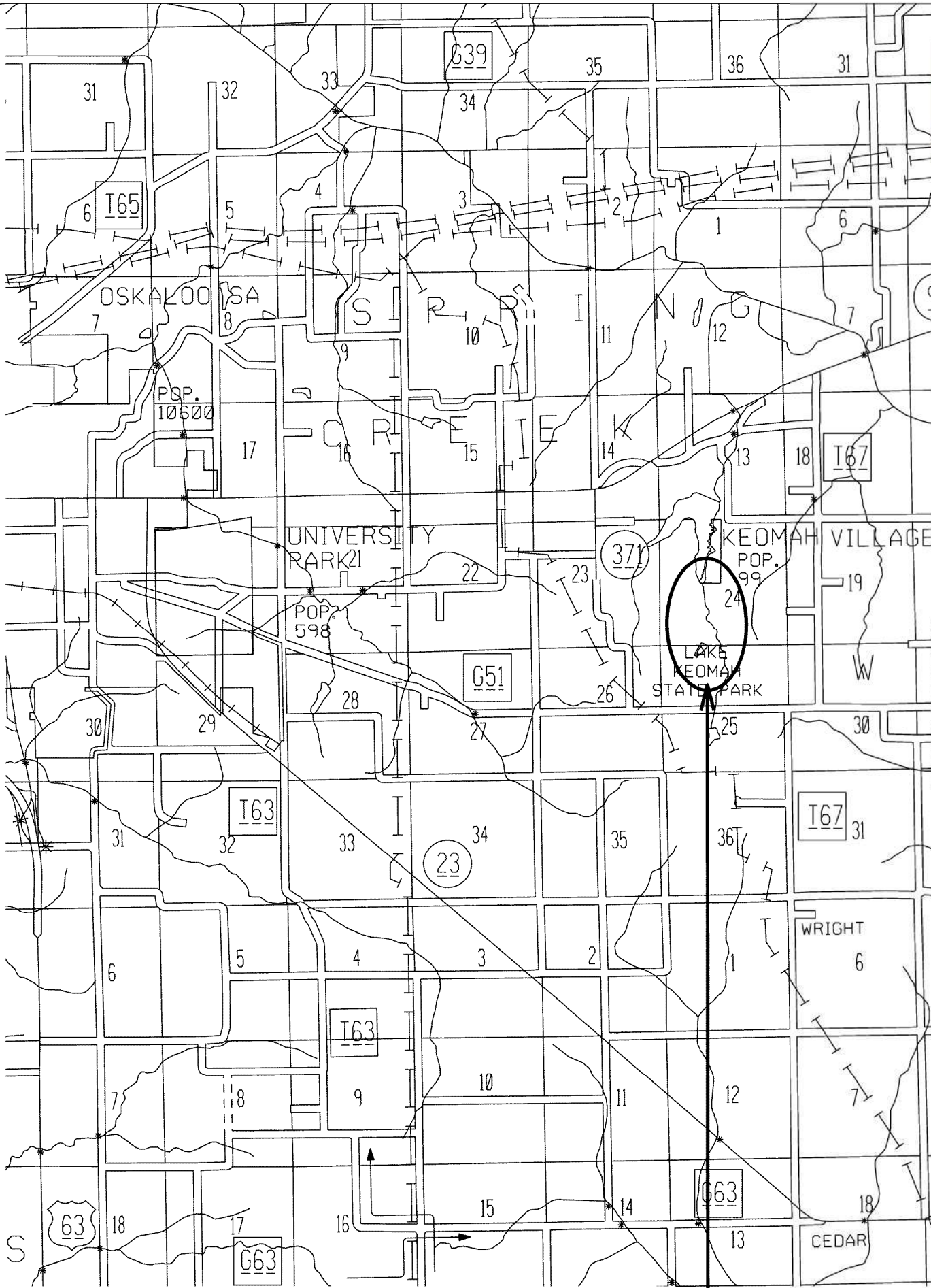


# LAKE KEOMAH STATE PARK

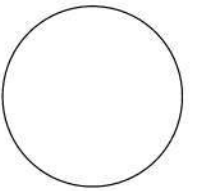
CONSULTANT:

### MAP KEY

- Beach Area
- Boat Ramp
- Campground
- Day-Use Lodge
- Dump Station
- Fishing Pier
- Group Campground
- Park Office
- Park Residence
- Picnic Area
- Restroom - Modern Seasonal
- Restroom - Nonmodern Year-round
- Shelter
- Trail
- Road
- Park Boundary



PROJECT LOCATION



IOWA DEPARTMENT OF  
NATURAL RESOURCES

ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034



PROJECT LOCATION MAP

ROAD MAINTENANCE FOR:  
RED ROCK WMU/LAKE KEOMAH

MARION/WARREN/MAFASKA COUNTIES

NO. BY REVISION

DRAWN BY: PROJECT NUMBER:

BLF 23-05-63-04

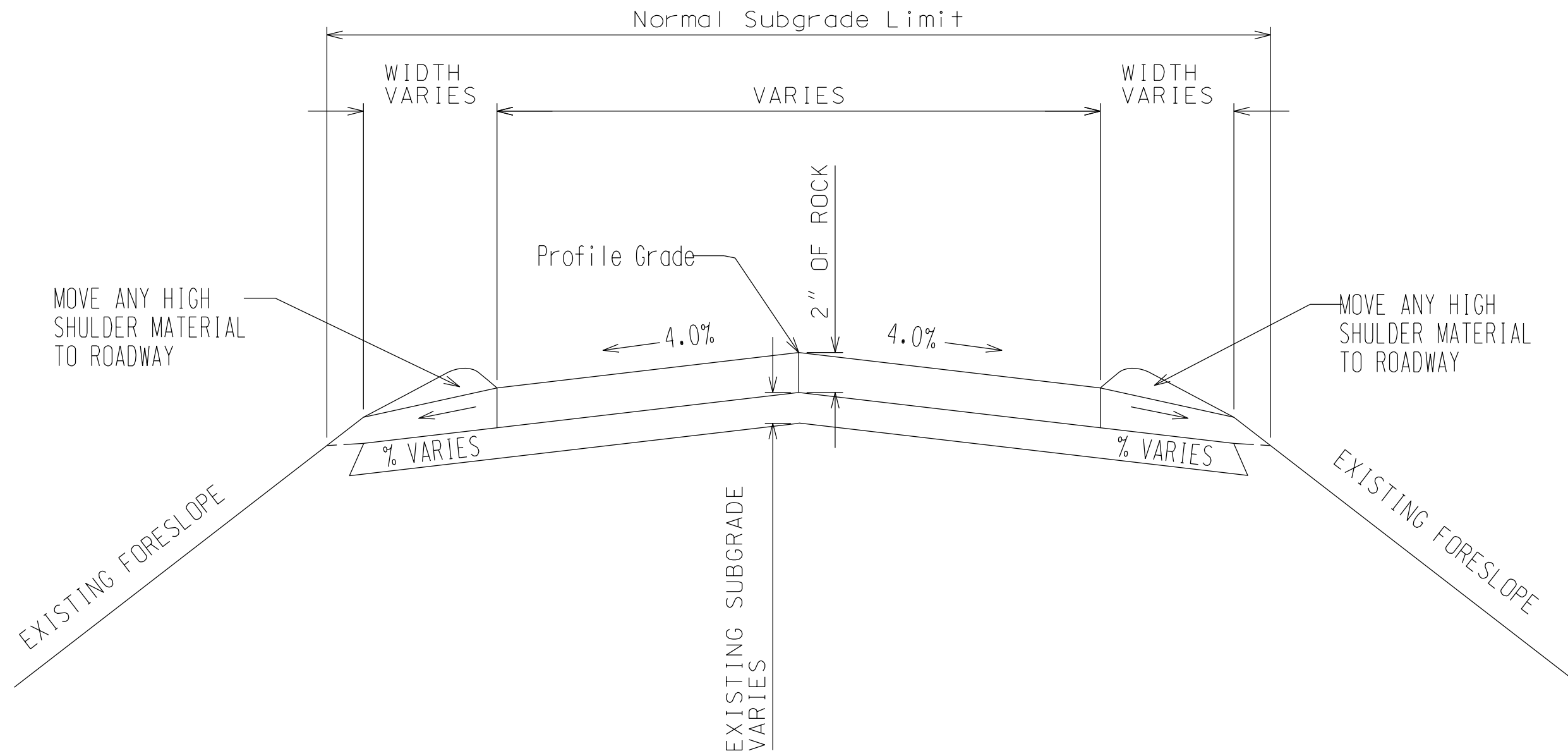
CHKD BY: DATE:

AUG 2023

SHEET No.:

**A.08**





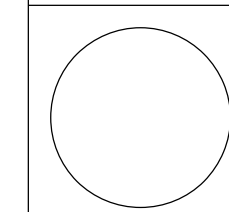
Typical Roadway Section - Center Crown

Note:

Normal sections shown may be appropriately modified for areas specifically designated by the Engineer.

STATION	TO STATION	LOCATION	WIDTH
0+00	47+54	108TH PLACE	12'
100+00	107+21	108TH PLACE	12'
200+00	259+99	146TH AVE	12'
300+00	315+36	DUBUQUE DR	12'
400+00	411+03	DUBUQUE DR	12'
500+00	538+48	223RD AVE	12'
600+00	625+47	LAKE KEOMAH	12'

CONSULTANT:



**IOWA DEPARTMENT OF NATURAL RESOURCES**  
 ENGINEERING SERVICES - WALLACE BUILDING  
 502 E. 9TH ST., DES MOINES, IA 50319-0034

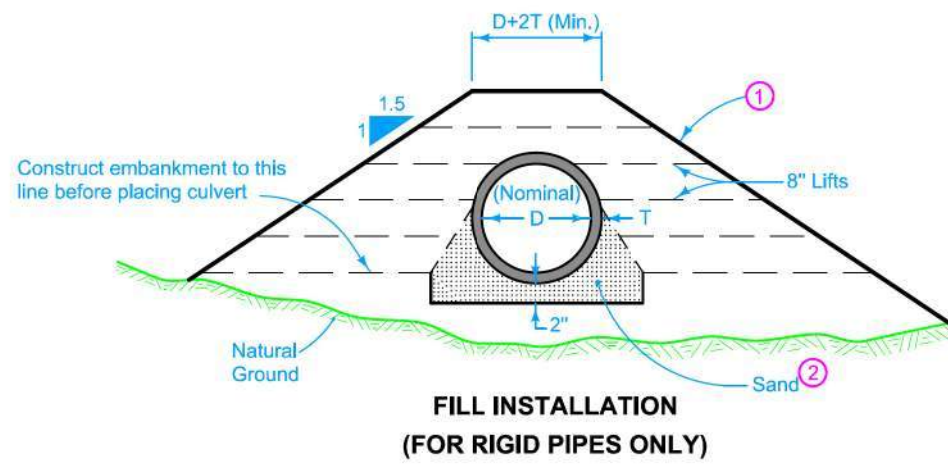
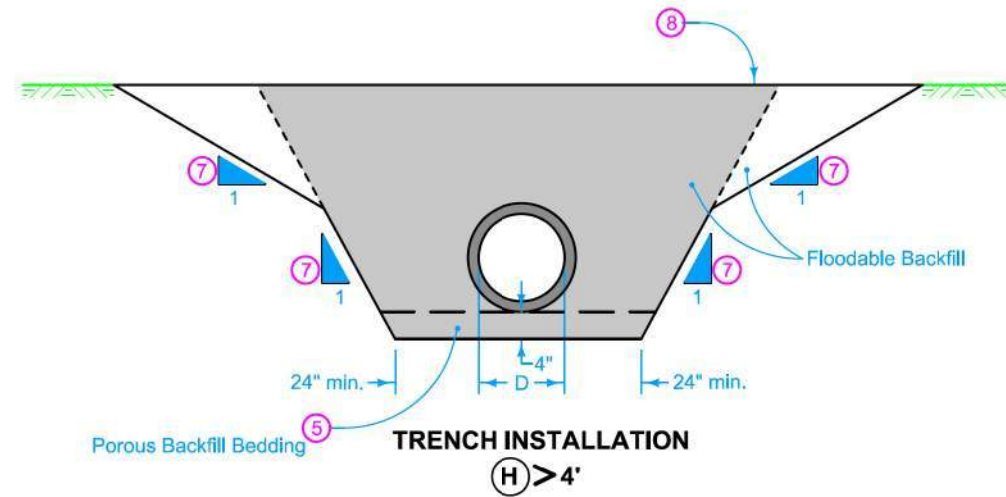
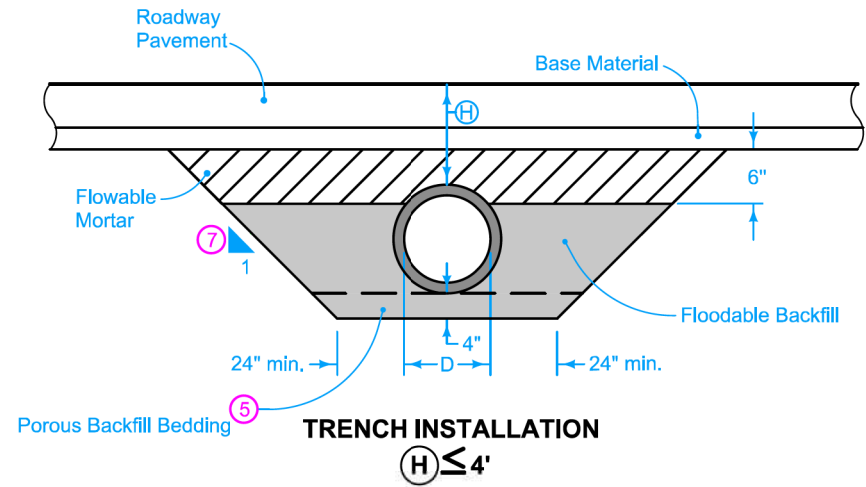


**TYPICAL CROSS SECTIONS AND DETAILS**  
 ROAD MAINTENANCE FOR:  
**RED ROCK WMU/LAKE KEOMAH**  
 MARION/WARREN/MAHASKA COUNTIES

NO.	BY	DATE	REVISION

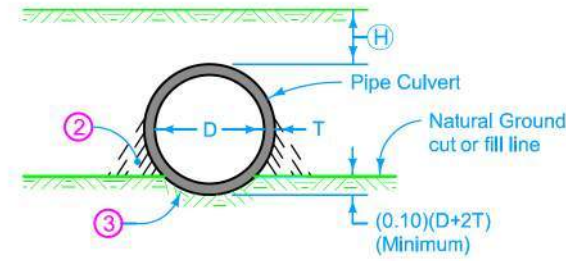
DRAWN BY: BLF PROJECT NUMBER: 23-05-63-04  
 CHK'D BY: DATE: AUG 2023

SHEET No: **B.01**

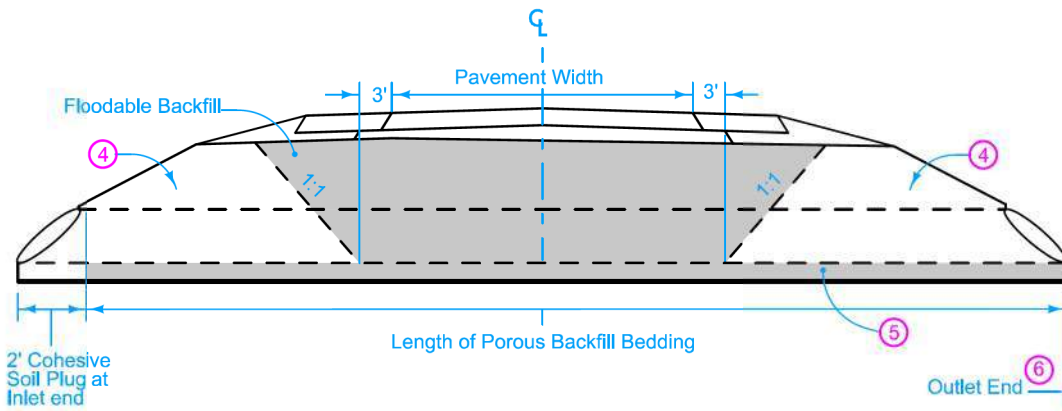
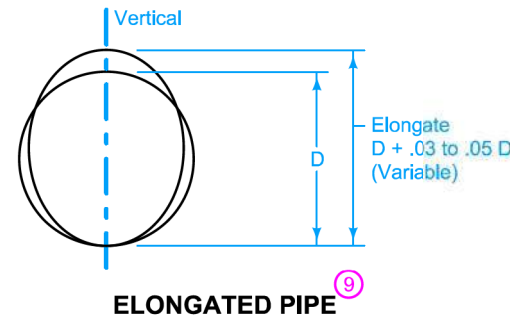


**CLASS 'B' BEDDING & BACKFILL**

Denotes pay limits for flooded backfill



**CLASS 'C' BEDDING & BACKFILL**



Refer to DR-104 for minimum and maximum allowable cover  $(H)$  for the particular kind of pipe culvert.

- 1 The backfill adjacent to and above the pipe culvert may be placed in conjunction with normal embankment construction. Thoroughly tamp the embankment within the limits shown.
- 2 Take extra care to ensure complete and satisfactory tamping of backfill material in the area immediately adjacent to the lower portion of pipe.
- 3 Carefully shape excavation below groundline either using a template conforming to actual dimension and shape of the pipe or using other means. If using other means, check with a template conforming to the actual dimension and shape of the pipe.
- 4 For culverts backfilled by flooding, place a cohesive soil plug at the inlet, outlet, and, when necessary, sides, prior to flooding.
- 5 4-inch Porous Backfill bedding. 2-inch Floodable Backfill bedding may be used under unsealed rigid pipe.
- 6 Extend Porous Backfill through the outlet end soil plug when used for bedding.
- 7 Quantity calculations are based upon a 1:1 slope and minimum trench dimension. Actual slope of trench may vary based upon Contractor's operations.
- 8 Ground Line at time of pipe installation. When existing ground exceeds 5 feet depth over pipe, backfill and compaction by flooding is not required more than 5 feet above the pipe.
- 9 Where a corrugated metal pipe culvert requiring elongation is to be installed (to counteract deformation caused by backfill), complete elongation using a means approved by the Engineer. Elongation may be developed either as part of shop fabrication or field installation. Install with elongated axis vertical.

Possible Contract Items:  
 Flowable Mortar  
 Flooded Backfill  
 Excavation, Class 20

Possible Tabulations:  
 104-3  
 104-4

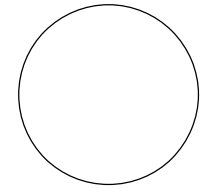
<b>IOWA DOT</b>	REVISION	
	2	04-18-17
<b>STANDARD ROAD PLAN</b>		<b>DR-101</b>
		SHEET 1 of 1

REVISIONS: Changed "Porous Backfill" to "Porous Backfill Bedding" for clarity. Modified trench installation detail for  $H > 4'$  to clarify pay limits.

APPROVED BY DESIGN METHODS ENGINEER  
 Brian Smith

**PIPE CULVERT**  
**(BEDDING AND BACKFILL)**

CONSULTANT:



**IOWA DEPARTMENT OF NATURAL RESOURCES**

ENGINEERING SERVICES - WALLACE BUILDING  
 502 E. 9TH ST., DES MOINES, IA 50319-0034



TYPICAL CROSS SECTIONS AND DETAILS

ROAD MAINTENANCE FOR:  
**RED ROCK WMU/LAKE KEOMAH**  
 MARION/WARREN/MAHASKA COUNTIES

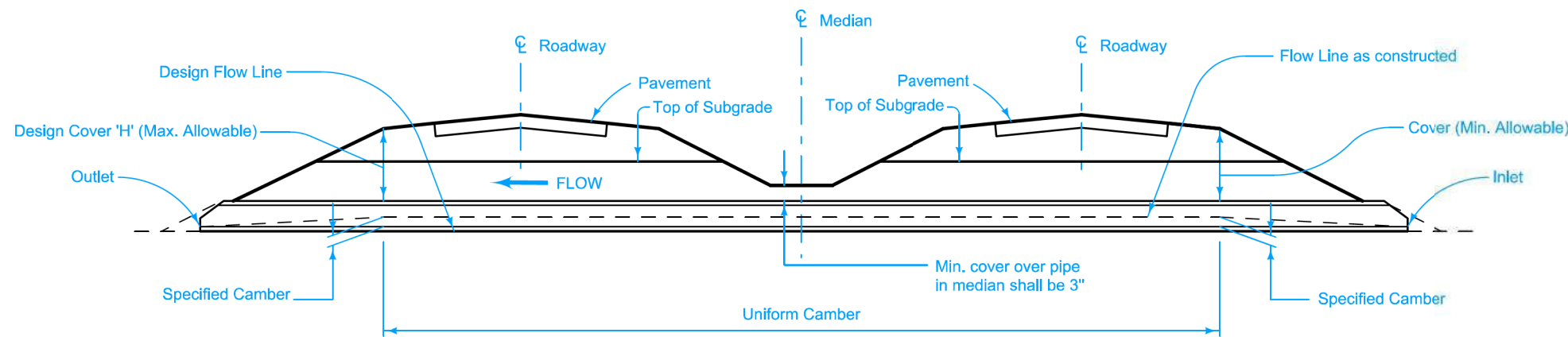
NO. BY DATE REVISION

DRAWN BY: BLF PROJECT NUMBER: 23-05-63-04

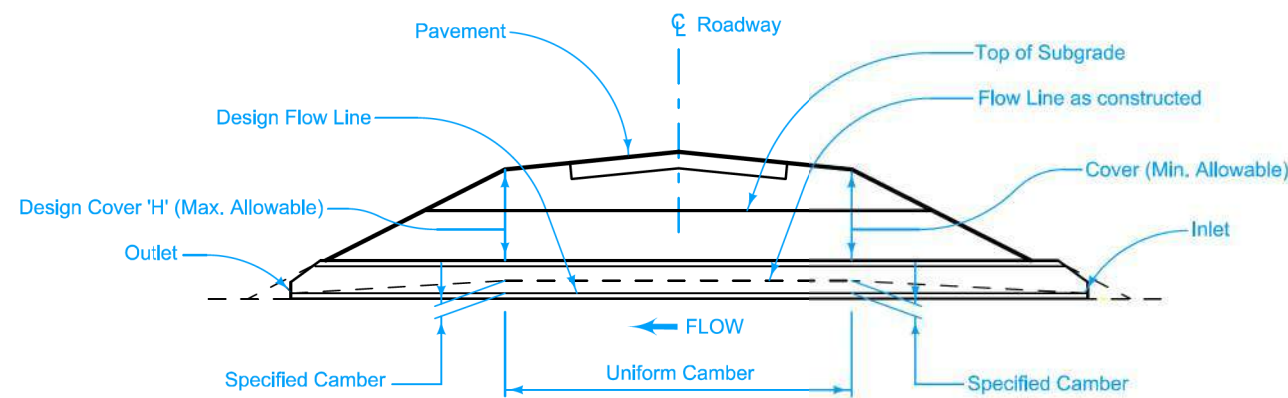
CHK'D BY: DATE: AUG 2023

SHEET NO.:

**B.02**



TYPICAL INSTALLATION DUAL ROADWAY



TYPICAL INSTALLATION SINGLE ROADWAY

Refer to DR-121 for pipe joint connection and wrapping.

Refer to DR-101 for culvert bedding and backfill.

**COVER**

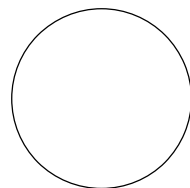
Refer to DR-104 for minimum and maximum allowable cover for the particular kind of culvert.

**CAMBER**

Camber is the dimension line between inlet and outlet elevation. Some settlement of the structure is usually anticipated, resulting in the design flow line between inlet and outlet. Camber is developed uniformly from inlet and outlet to a point beneath the outside shoulder lines of the roadway and is uniform between those points, as indicated. The Normal Camber indicated in the "Allowable Camber Tables" should be used unless specific camber values are indicated elsewhere in the plans.

- ① Camber for concrete pipe is created by placing pipe sections tight at the bottom of the joint with variable opening at top of joint. Camber for corrugated metal pipe to be done as directed by the Engineer.

CONSULTANT:



IOWA DEPARTMENT OF  
NATURAL RESOURCES

ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034



TYPICAL CROSS SECTIONS AND DETAILS

ROAD MAINTENANCE FOR:

RED ROCK WMU/LAKE KEOMAH

MARION/WARREN/MAHASKA COUNTIES

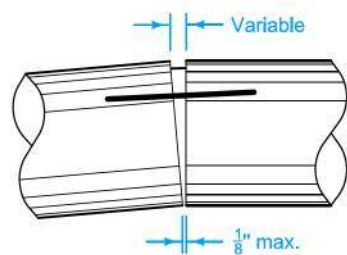
NO.	BY	REVISION

DRAWN BY: PROJECT NUMBER:  
BLF 23-05-63-04

CHK'D BY: DATE:  
AUG 2023

SHEET NO:

**B.03**



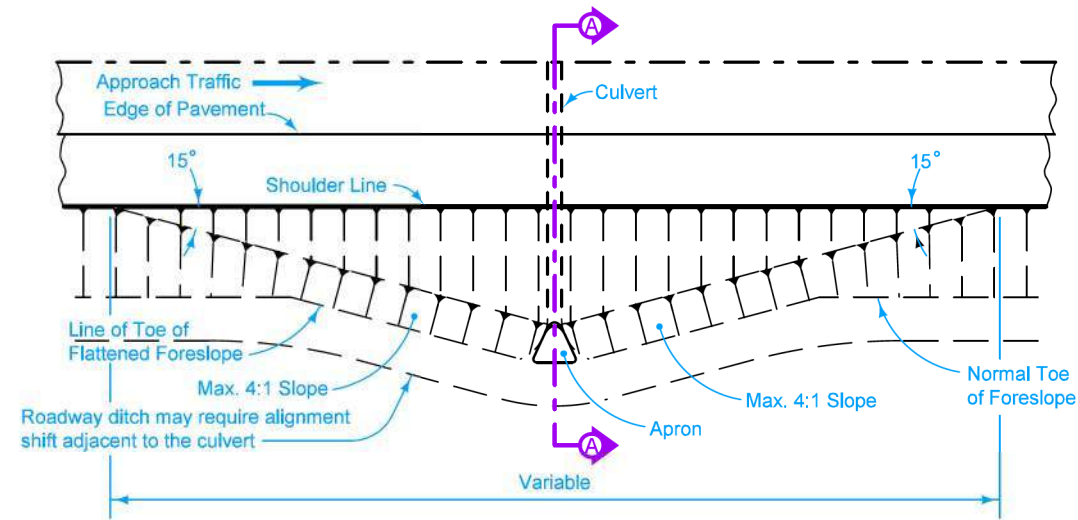
TYPICAL JOINT IN CAMBERED PIPE ①

Design Cover 'H' (feet)	Normal Camber (feet)
5	0.08
10	0.17
15	0.25
20	0.33
25	0.42
30	0.50
35	0.58

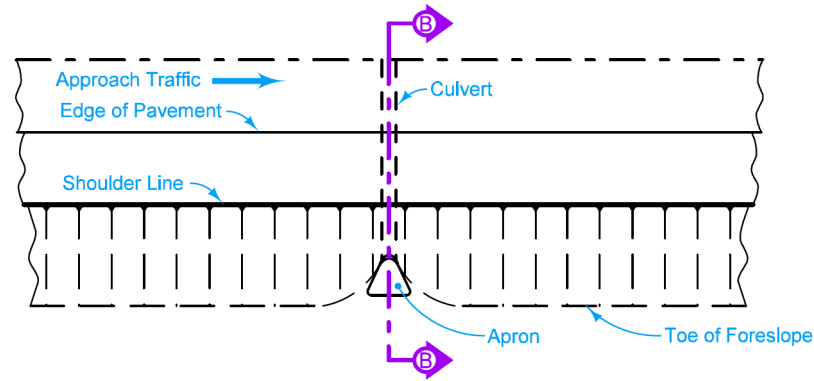
Pipe Size 'D'	Maximum Camber (feet)
24"	1.1
30"	1.2
36"	1.3
42"	1.4
48"	1.5
60"	1.6
84"	1.7

ALLOWABLE CAMBER TABLES

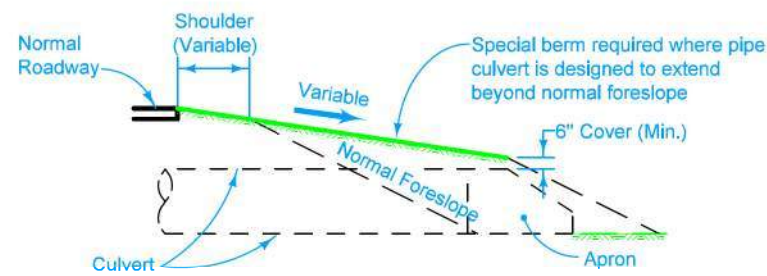
	REVISION
	New 04-21-15
<b>STANDARD ROAD PLAN</b>	<b>DR-102</b>
REVISIONS: New. Replaces RF-30B.	SHEET 1 of 1
 APPROVED BY DESIGN METHODS ENGINEER	
<b>PIPE CULVERT</b> (COVER AND CAMBER)	



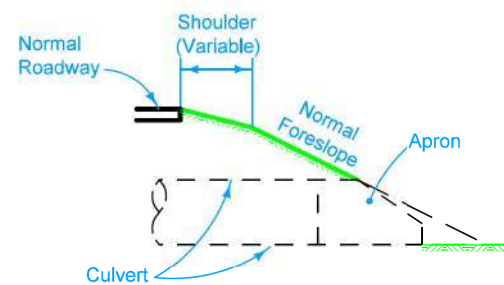
TYPICAL INSTALLATION PLAN  
WHERE SPECIAL BERM IS REQUIRED



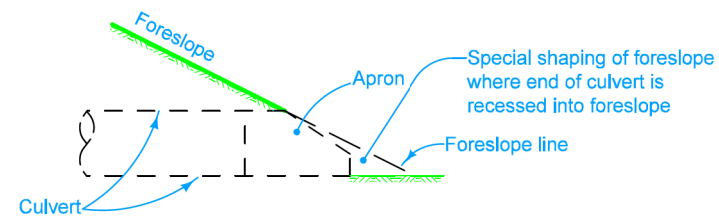
TYPICAL INSTALLATION PLAN  
WHERE CULVERT MATCHES NORMAL FORESLOPE



SECTION A-A



SECTION B-B



DETAIL OF SHAPING EARTH FORESLOPE  
AT CULVERT END

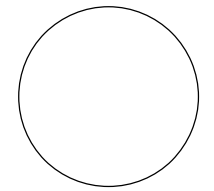
	REVISION	
	New	04-21-15
<b>STANDARD ROAD PLAN</b>		<b>DR-103</b>
		SHEET 1 of 1

REVISIONS: New. Replaces RF-30C.

APPROVED BY DESIGN METHODS ENGINEER  
*Brian Smith*

**PIPE CULVERT  
(INSTALLATION DETAILS)**

CONSULTANT:



**IOWA DEPARTMENT OF  
NATURAL RESOURCES**

ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034



TYPICAL CROSS SECTIONS AND DETAILS

ROAD MAINTENANCE FOR:

RED ROCK WMU/LAKE KEOMAH

MARION/WARREN/MAHASKA COUNTIES

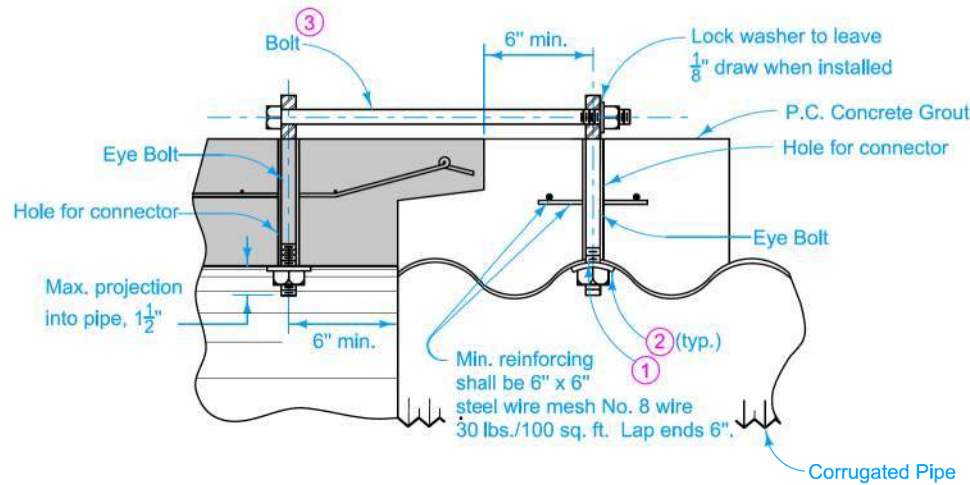
NO.	BY	REVISION
DATE		

DRAWN BY: PROJECT NUMBER:  
BLF 23-05-63-04

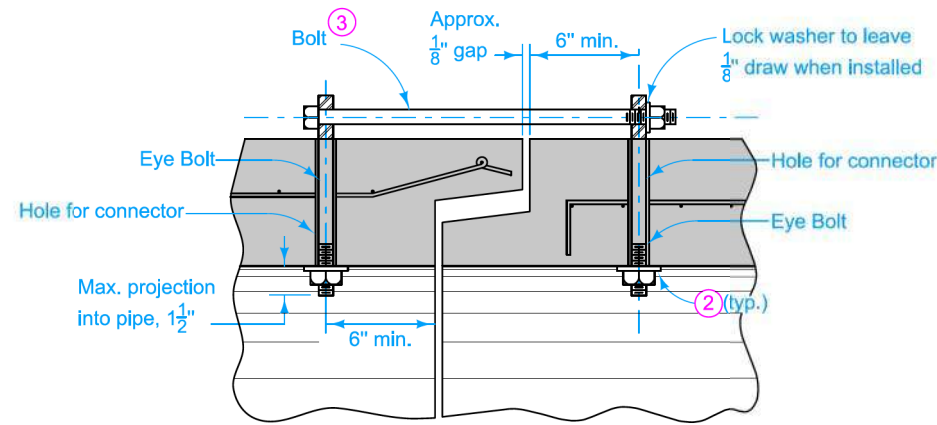
CHK'D BY: DATE:  
AUG 2023

SHEET NO:

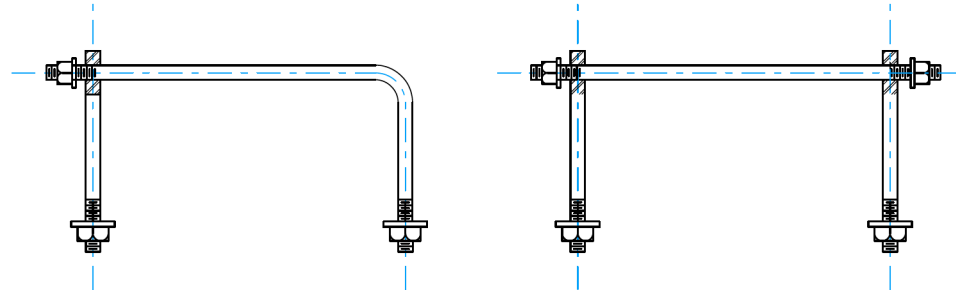
**B.04**



**SECTION OF PIPE CONNECTOR  
(Concrete Pipe to Corrugated Pipe)**



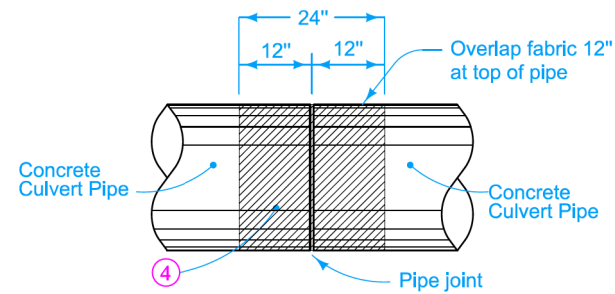
**SECTION OF PIPE CONNECTOR  
(Concrete Pipe to Concrete Pipe)**



**ONE BEND END**

**THREADED AT BOTH ENDS**

**OPTIONAL BOLTS/CONNECTORS**



**PIPE JOINT WRAPPING**

PIPE SIZE (in)	CONNECTOR AND BOLT SIZE (in.)	HOLE FOR CONNECTOR (in.)
12 to 27	$\frac{5}{8}$	$\frac{7}{8}$
30 to 60	$\frac{3}{4}$	1.0
66 to 132	1.0	$1\frac{1}{4}$

Wrap all joints on concrete roadway pipe culverts.

Use Type 3 Connections on all culvert pipes, unless specified otherwise. Refer to Materials I.M. 445.01 for Connector requirements.

Minimum 2 threads showing at all threaded ends.

Connections not required on pipe sections installed by trenchless methods.

For belled concrete pipe joints, connectors may be installed on the inside of the pipe.

**TYPE 1**

One connector at the top of the pipe section.

**TYPE 2 (Sealed Joint)**

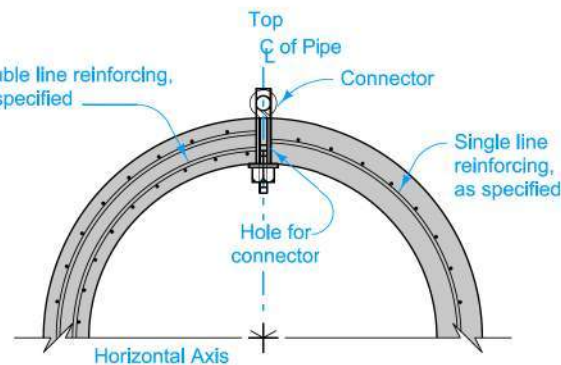
Two connectors near the top of the pipe section. For details of reinforcement, refer to AASHTO M 170 for the class of pipe required. Refer to Materials I.M. 491.09 for seal requirements.

**TYPE 3 (Non - Sealed Joint)**

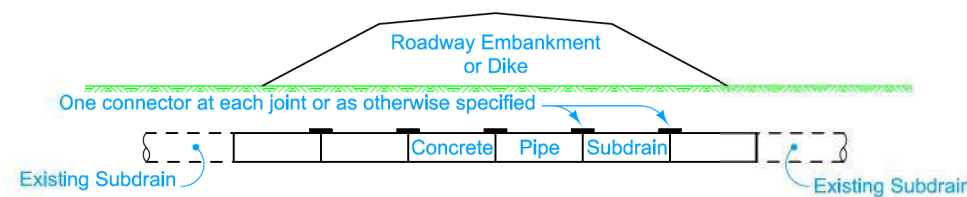
Two connectors near the top of the pipe section. For details of reinforcement, refer to AASHTO M 170 for the class of pipe required.

- ① If holes are field drilled, place a ribbon of butyl sealant around bolts before placing 3 in. x 3 in. x 1/4 in. plate on bolts through corrugated metal pipe and tightening nuts.
- ② 1 3/4 inch round x 9/64 inch thick washer or 3 in. x 3 in. x 1/4 in. square plate (shaped to pipe radius).
- ③ Connectors with One Bend End and Bell End spacers allowed per Materials I.M. 451. Refer to Optional Bolts detail.
- ④ Engineering fabric for embankment erosion control.

Possible Tabulations:  
104-3  
104-5B



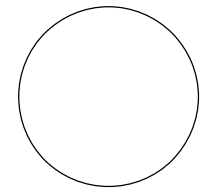
**TYPICAL SECTION  
(Non-Sealed Joint)**



**TYPICAL INSTALLATION**

**TYPE 1 CONNECTION**

CONSULTANT:



**IOWA DEPARTMENT OF  
NATURAL RESOURCES**

ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034



TYPICAL CROSS SECTIONS AND DETAILS

ROAD MAINTENANCE FOR:  
**RED ROCK WMU/LAKE KEOMAH**  
MARION/WARREN/MAHASKA COUNTIES

<b>IOWA DOT</b>	REVISION
	4 04-18-23
<b>STANDARD ROAD PLAN</b>	<b>DR-121</b>
	SHEET 1 of 2

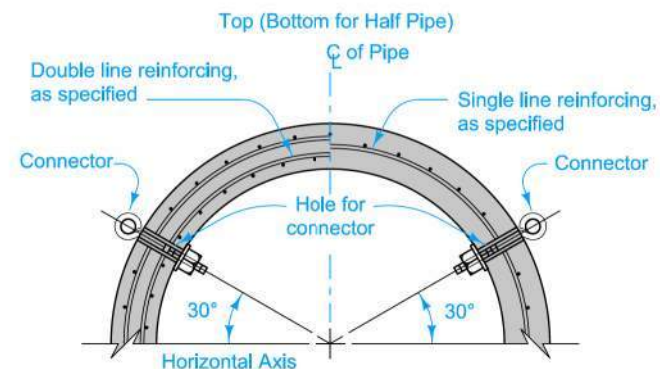
REVISIONS: Corrected title.

APPROVED BY DESIGN METHODS ENGINEER

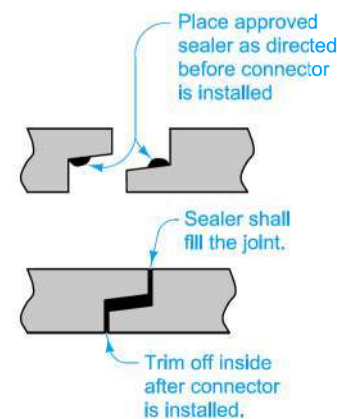
**CONNECTED PIPE JOINTS**

NO.	BY	REVISION
DATE		
DRAWN BY:	PROJECT NUMBER:	
BLF	23-05-63-04	
CHK'D BY:	DATE:	
	AUG 2023	

SHEET NO:  
**B.05**

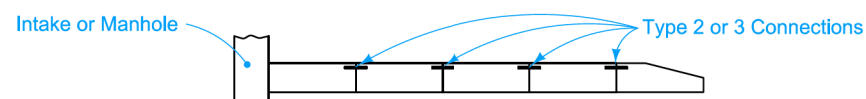


**TYPICAL SECTION  
TYPE 2 CONNECTION  
TYPE 3 CONNECTION**

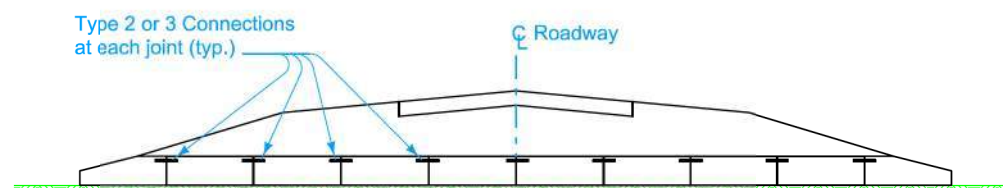


**SEALED JOINT  
TYPE 2 CONNECTION**

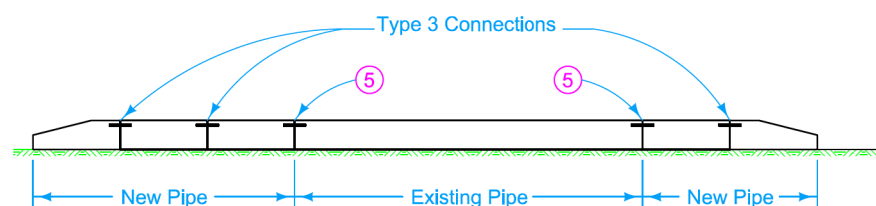
⑤ On culvert extensions, connect all new joints including the joint between the old and new culvert pipe. Holes may need to be drilled into existing pipes.



**TYPICAL INSTALLATION  
STORM SEWER OUTLET - TYPE 2 OR TYPE 3 CONNECTION**



**TYPICAL INSTALLATION  
NEW CONSTRUCTION - TYPE 2 or 3 CONNECTION**



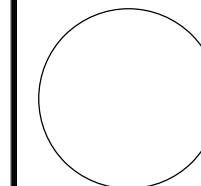
**TYPICAL INSTALLATION  
PIPE EXTENSION - TYPE 3 CONNECTION**

**TYPE 2 AND TYPE 3 CONNECTIONS**

 <b>STANDARD ROAD PLAN</b>	REVISION 4   04-18-23 <b>DR-121</b> SHEET 2 of 2	
	REVISIONS: Corrected title.	

APPROVED BY DESIGN METHODS ENGINEER 	
DRAWN BY: BLF	PROJECT NUMBER: 23-05-63-04
CHK'D BY: DATE: AUG 2023	SHEET No: <b>B.06</b>

CONSULTANT:



**IOWA DEPARTMENT OF  
NATURAL RESOURCES**

ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034

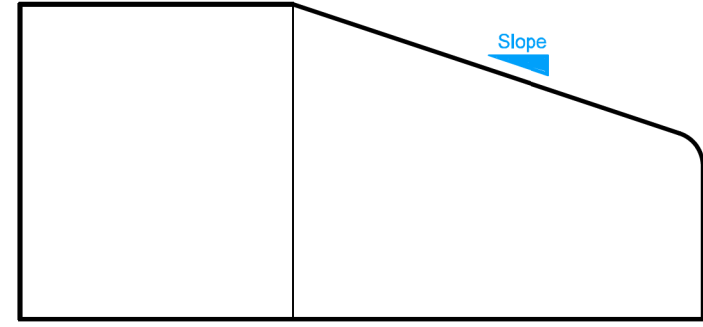
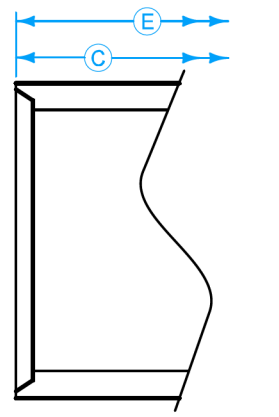
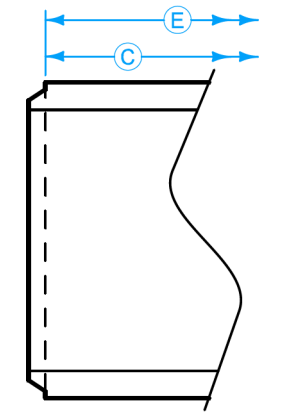
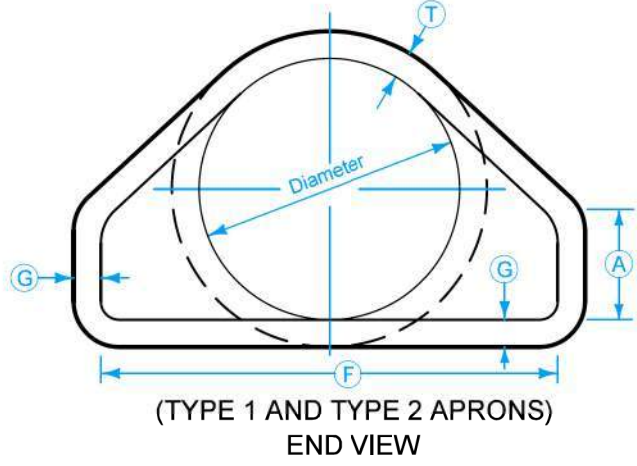
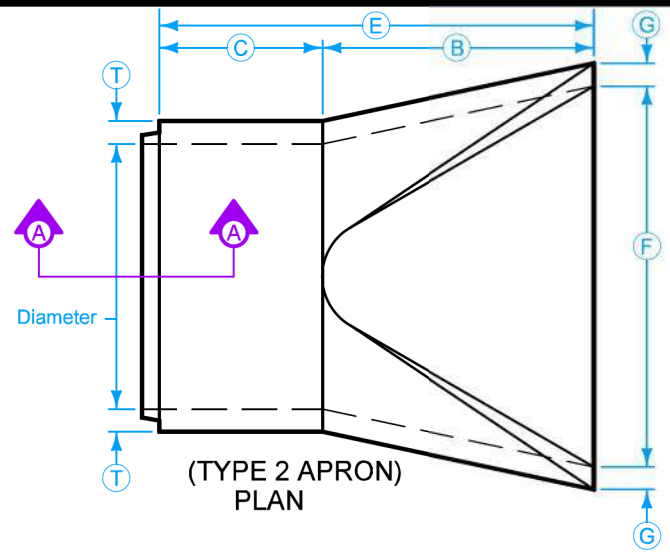
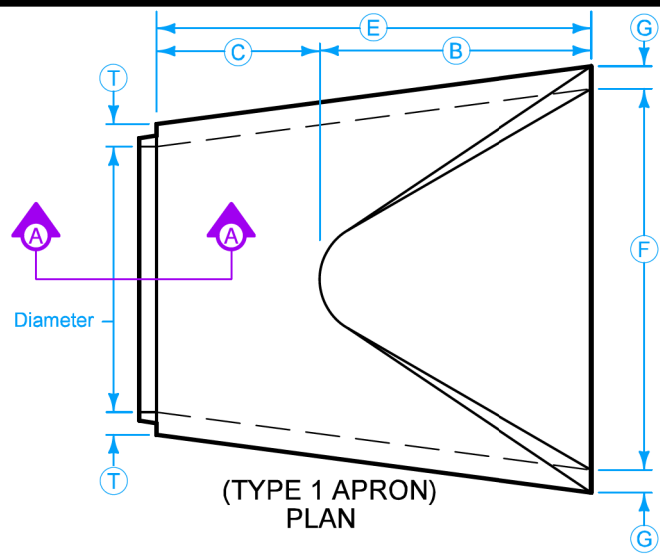


TYPICAL CROSS SECTIONS AND DETAILS

ROAD MAINTENANCE FOR:

**RED ROCK WMU/LAKE KEOMAH**

MARION/WARREN/MAHASKA COUNTIES



Dimension 'E' shown is the minimum and is considered the design length. Adjust for any difference between the actual length of concrete apron installed and the length indicated hereon within the length of concrete culvert pipe furnished.

Install connected pipe joints as shown on DR-121.

When specified in the contract documents, install pipe apron guards as shown on DR-213. Pipe apron guards are incidental to "Concrete Aprons".

① Tongue end used on inlet end section. Groove end used on outlet end section.

TYPE 1 APRONS								
DIAM.	SLOPE	A	B	MINIMUM		F	G	T
				C	E			
12"	2.4:1	4"	2'-0"	4'- $\frac{7}{8}$ "	6'- $\frac{7}{8}$ "	2'-0"	2"	2"
15"	2.4:1	6"	2'-3"	3'-10"	6'-1"	2'-6"	2 $\frac{1}{4}$ "	2 $\frac{1}{4}$ "
18"	2.3:1	9"	2'-3"	3'-10"	6'-1"	3'-0"	2 $\frac{1}{2}$ "	2 $\frac{1}{2}$ "
21"	2.4:1	9"	3'-0"	3'-1 $\frac{1}{2}$ "	6'-1 $\frac{1}{2}$ "	3'-5"	3"	3"
24"	2.5:1	9 $\frac{1}{2}$ "	3'-7 $\frac{1}{2}$ "	2'-6"	6'-1 $\frac{1}{2}$ "	4'-0"	3"	3"
27"	2.5:1	10 $\frac{1}{2}$ "	4'-1"	2'-0"	6'-1 $\frac{1}{2}$ "	4'-4"	3 $\frac{1}{2}$ "	3 $\frac{1}{2}$ "
30"	2.5:1	12"	4'-6"	1'-7 $\frac{3}{4}$ "	6'-1 $\frac{3}{4}$ "	5'-0"	3 $\frac{1}{2}$ "	3 $\frac{1}{2}$ "
36"	2.5:1	15"	5'-3"	2'-9"	8'-0"	6'-0"	4"	4"
42"	2.5:1	21"	5'-3"	2'-9"	8'-0"	6'-6"	4 $\frac{1}{2}$ "	4 $\frac{1}{2}$ "
48"	2.5:1	24"	6'-0"	2'-0"	8'-0"	7'-0"	5"	5"
54"	1.8:1	27"	5'-0"	3'-0"	8'-0"	7'-6"	5 $\frac{1}{2}$ "	5 $\frac{1}{2}$ "
60"	1.6:1	29 $\frac{1}{2}$ "	5'-0"	3'-0"	8'-0"	8'-0"	5 $\frac{1}{2}$ "	6"
66"	1.7:1	30"	6'-0"	2'-3"	8'-3"	8'-0"	5 $\frac{1}{2}$ "	6"
72"	1.6:1	30"	6'-6"	1'-9"	8'-3"	9'-0"	6"	7"
78"	1.8:1	36"	7'-6"	1'-9"	9'-3"	9'-6"	6 $\frac{1}{2}$ "	7 $\frac{1}{2}$ "
84"	1.3:1	29 $\frac{1}{2}$ "	6'-9"	2'-6 $\frac{1}{2}$ "	9'-3 $\frac{1}{2}$ "	10'-0"	6 $\frac{1}{2}$ "	8"

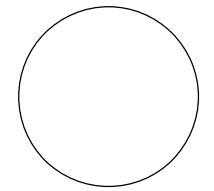
TYPE 2 APRONS								
DIAM.	SLOPE	A	B	MINIMUM		F	G	T
				C	E			
12"	2.4:1	4"	2'-0"	4'- $\frac{7}{8}$ "	6'- $\frac{7}{8}$ "	2'-0"	2"	2"
15"	2.4:1	6"	2'-3"	3'-10"	6'-1"	2'-6"	2 $\frac{1}{4}$ "	2 $\frac{1}{4}$ "
18"	2.3:1	9"	2'-3"	3'-10"	6'-1"	3'-0"	2 $\frac{1}{2}$ "	2 $\frac{1}{2}$ "
21"	2.4:1	9"	3'-0"	3'-1 $\frac{1}{2}$ "	6'-1 $\frac{1}{2}$ "	3'-5"	3"	3"
24"	2.5:1	9 $\frac{1}{2}$ "	3'-7 $\frac{1}{2}$ "	2'-6"	6'-1 $\frac{1}{2}$ "	4'-0"	3"	3"
27"	2.5:1	10 $\frac{1}{2}$ "	4'-1"	2'-0"	6'-1 $\frac{1}{2}$ "	4'-4"	3 $\frac{1}{2}$ "	3 $\frac{1}{2}$ "
30"	2.5:1	12"	4'-6"	1'-7 $\frac{3}{4}$ "	6'-1 $\frac{3}{4}$ "	5'-0"	3 $\frac{1}{2}$ "	3 $\frac{1}{2}$ "
36"	2.5:1	15"	5'-3"	2'-9"	8'-0"	6'-0"	4"	4"
42"	2.5:1	21"	5'-3"	2'-9"	8'-0"	6'-6"	4 $\frac{1}{2}$ "	4 $\frac{1}{2}$ "
48"	2.5:1	24"	6'-0"	2'-0"	8'-0"	7'-0"	5"	5"
54"	1.9:1	24 $\frac{1}{2}$ "	5'-5"	2'-7"	8'-0"	7'-6"	5 $\frac{1}{2}$ "	5 $\frac{1}{2}$ "
60"	1.4:1	24 $\frac{1}{2}$ "	5'-0"	3'-0"	8'-0"	8'-0"	5 $\frac{1}{2}$ "	6"
66"	1.7:1	30"	6'-0"	2'-3"	8'-3"	8'-0"	5 $\frac{1}{2}$ "	6"
72"	1.4:1	24"	6'-6"	1'-9"	8'-3"	9'-0"	6"	7"
78"	1.8:1	36"	7'-6"	1'-9"	9'-3"	9'-6"	6 $\frac{1}{2}$ "	7 $\frac{1}{2}$ "
84"	1.5:1	23 $\frac{1}{2}$ "	7'-6 $\frac{1}{2}$ "	1'-9"	9'-3 $\frac{1}{2}$ "	10'-0"	6 $\frac{1}{2}$ "	8"

Contract Item:  
Apron, Concrete

Tabulations:  
104-3  
104-5C

	REVISION	
	2	4-21-20
STANDARD ROAD PLAN		DR-201
		SHEET 1 of 1
REVISIONS: Added Designer Info button.		
 APPROVED BY DESIGN METHODS ENGINEER		
CONCRETE APRONS		

CONSULTANT:



IOWA DEPARTMENT OF  
NATURAL RESOURCES

ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034



TYPICAL CROSS SECTIONS AND DETAILS

ROAD MAINTENANCE FOR:

RED ROCK WMU/LAKE KEOMAH

MARION/WARREN/MAHASKA COUNTIES

NO.	BY	DATE	REVISION

DRAWN BY: PROJECT NUMBER:  
BLF 23-05-63-04

CHK'D BY: DATE:  
AUG 2023

SHEET No:

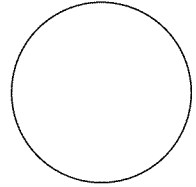
**B.07**

ESTIMATED PROJECT QUANTITIES			
ITEM NO.	ITEM	UNIT	TOTAL
1	2125 - RESHAPING/CLEANING DITCHES	STA	5
2	2127 - RECONSTRUCTION OF ROADBED - BLADING/SHAPING	STA	205
3	2210 - MACADAM STONE BASE	TON	857
4	2312 - GRANULAR SURFACING ON ROAD, CLASS A CRUSHED STONE 1-1/4	TON	535
5	2312 - GRANULAR SURFACING ON ROAD, CRUSHED STONE 3-INCH MINUS	TON	3038
6	2416 - APRON, CONC, 18"	EACH	2
7	2416 - CULV, CONC RDWY PIPE, 18"	LF	24
8	2507 - ENGINEERING FABRIC	SY	20
9	2507 - EROSION STONE	TON	16
10	2518 - SAFETY CLOSURE	EACH	7
11	2528 - TRAFFIC CONTROL	LS	1
12	2533 - MOBILIZATION	LS	1
13	2552 - REPLACEMENT OF UNSUITABLE BACKFILL MAT'L (CLASS II PIPE BEDDING)	CY	5
14	2601 - SEED+FERTILIZE (RURAL)	ACRE	0.5

ESTIMATE REFERENCE INFORMATION	
ITEM NO.	DESCRIPTION
1	A. Clean ditches at indicated stationing to ensure positive flow to the nearest culvert. B. Remove all spoil from project site.
2	A. Repair all potholes and washboards by scarifying surrounding area to depth of pothole and recompacting. B. Re-establish roadway crown - 4% positive drainage each way from centerline; 4% across the width in banked sections. C. Remove any high shoulder areas, before spreading new rock. Remove spoil for project location. An available spoil location is shown on sheet A.02. D. See sheet B.01 for typical roadway cross section.
3-5	A. Place appropriate rock at indicated stationing B. Roll after placement and finish blading. C. DOT approved source.
6-7	A. Wrap and pin all connections. B. DNR Field Engineer will mark location. C. DOT approved source.
8-9	A. Use at inlet/outlet of new culvert. B. DOT approved source.
10	A. Follow Iowa DOT Standard Specification for set-up details.
13	A. Use for pipe bedding - Use Class II material B. Fill to top of culvert. C. DOT approved source.
14	A. Rural mix. B. Seed all disturbed areas. C. DOT approved source.

GENERAL NOTES	
<p>Verify actual locations and elevations with DNR Engineer.</p> <p>All work shall conform to and be performed in accordance with all applicable codes and ordinances.</p> <p>The contractor shall visit the site and inspect the project area and thoroughly familiarize themselves with the actual job conditions prior to bidding and the start of work. Failure to visit the project site shall not relieve the contractor from performing the work in accordance to the plans, specification, special provisions and contract.</p> <p>The contractor shall verify, at the site, all dimensions and conditions shown on the plans and shall notify the DNR Engineer of any discrepancies, omissions, and/or conflicts prior to proceeding with the work.</p> <p>It shall be the contractor's responsibility to provide waste areas or disposal sites for excess material (excavated material or broken concrete) which is not desirable to be incorporated into the work involved on this project. No payment for overhaul will be allowed for material hauled to these sites. No material shall be placed within the right-of-way, unless specifically stated in the plans or approved by the DNR Engineer.</p> <p>The contractor shall not disturb desirable grass areas and desirable trees outside the construction limits. The contractor will not be permitted to park or service vehicles and equipment or use these areas for storage of materials. Storage, parking and service areas will be subject to the approval of the DNR Engineer.</p> <p>Where utilities and fixtures are shown as Existing on the plans or encountered within the construction area, it shall be the responsibility of the contractor to notify the DNR Engineer of those utilities prior to the beginning of any construction. The contractor shall be afforded access to these facilities for necessary modification of services. Underground facilities, structures and utilities have been plotted from available surveys and records and therefore their locations must be considered approximate only. It is possible there may be others, the existence of which is presently not known or shown. It is the contractor's responsibility to determine their existence and exact location and to avoid damage thereto. No claims for additional compensation will be allowed to the contractor for any interference or delay caused by such work.</p> <p>The contractor shall shape graded area to maintain surface drainage. All elevations are to finish grade.</p> <p>The contractor is expected to have materials, equipment, and labor available on a daily basis to install and maintain erosion control features on the project. This may involve seeding, silt fence, rock ditch checks, silt basins or silt dikes.</p>	

CONSULTANT:



IOWA DEPARTMENT OF  
NATURAL RESOURCES

ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034



QUANTITIES AND GENERAL INFORMATION

ROAD MAINTENANCE FOR:

RED ROCK WMU/LAKE KEOMAH

MARION/WARREN/MAHASKA COUNTIES

NO.	BY	REVISION
DRAWN BY:	PROJECT NUMBER:	
BLF	23-05-63-04	
CHKD BY:	DATE:	
	AUG 2023	
SHEET No:		

C.01



HARTFORD

223RD AVE

DUBUQUE DR

146TH AVE

PLEASANTVILLE

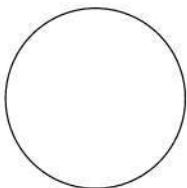
108TH PLACE

KNOXVILLE

# RED ROCK WMA ROAD MAINTENANCE PROJECT OVERVIEW



CONSULTANT:



IOWA DEPARTMENT OF  
NATURAL RESOURCES

ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034



SITE PLAN

ROAD MAINTENANCE FOR:

RED ROCK WMU/LAKE KEOMAH

MARION/WARREN/MAHASKA COUNTIES

NO. BY DATE REVISION

DRAWN BY: PROJECT NUMBER:

BLF 23-05-63-04

CHK'D BY: DATE:

AUG 2023

SHEET No.:

D.01



# 146TH AVE PROJECT



CONSULTANT:



**IOWA DEPARTMENT OF  
NATURAL RESOURCES**

ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034



**SITE PLAN**

ROAD MAINTENANCE FOR:

**RED ROCK WMU/LAKE KEOMAH**

MARION/WARREN/MAHASKA COUNTIES

NO.	DATE	REVISION

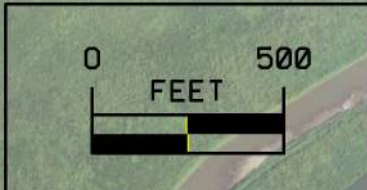
DRAWN BY: PROJECT NUMBER:  
BLF 23-05-63-04

CHK'D BY: DATE:  
AUG 2023

SHEET NO.:

**D.02**

# 108TH PLACE PROJECT



BLADING/SHAPING	
0+00	47+54
47.54 STA	
100+00	107+21
7.21 STA	
ROCK, 3-INCH MINUS	
0+00	47+54
998 TON	
100+00	107+21
152 TON	
SAFETY CLOSURE	
0+00	
1 EACH	
100+00	
1 EACH	

CONSULTANT:



**IOWA DEPARTMENT OF NATURAL RESOURCES**

ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034



**SITE PLAN**

ROAD MAINTENANCE FOR:

**RED ROCK WMU/LAKE KEOMAH**

MARION/WARREN/MAHASKA COUNTIES

NO. BY DATE REVISION


DRAWN BY: PROJECT NUMBER:  
BLF 23-05-63-04

CHK'D BY: DATE:  
AUG 2023

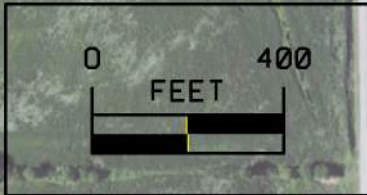
SHEET No:

**D.03**



# 146TH AVE PROJECT

BLADING/SHAPING	
200+00	259+99
59.99 STA	
ROCK, 3-INCH MINUS	
200+00	225+00
525 TON	
Macadam	
225+00	259+99
857 TON	
SAFETY CLOSURE	
200+00	
1 EACH	



CONSULTANT:



**IOWA DEPARTMENT OF  
NATURAL RESOURCES**

ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034



**SITE PLAN**

ROAD MAINTENANCE FOR:

**RED ROCK WMU/LAKE KEOMAH**

MARION/WARREN/MAHASKA COUNTIES

NO.	DATE	REVISION

DRAWN BY: PROJECT NUMBER:

BLF 23-05-63-04

CHK'D BY: DATE:

AUG 2023

SHEET No:

**D.04**

# DUBUQUE DR PROJECT

300+00

305+00

310+00

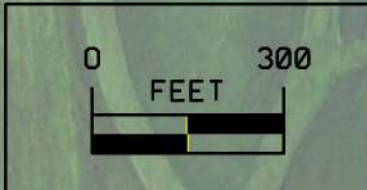
315+36

411+03

405+00

400+00

BLADING/SHAPING	
300+00	315+36
15.36 STA	
400+00	411+03
11.03 STA	
ROCK, 3-INCH MINUS	
300+00	315+36
323 TON	
400+00	411+03
232 TON	
SAFETY CLOSURE	
300+00	
1 EACH	
400+00	
1 EACH	



CONSULTANT:



**IOWA DEPARTMENT OF  
NATURAL RESOURCES**

ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034



**SITE PLAN**

ROAD MAINTENANCE FOR:

**RED ROCK WMU/LAKE KEOMAH**

MARION/WARREN/MAHASKA COUNTIES

NO. BY DATE REVISION

DRAWN BY: PROJECT NUMBER:  
BLF 23-05-63-04

CHK'D BY: DATE:  
AUG 2023

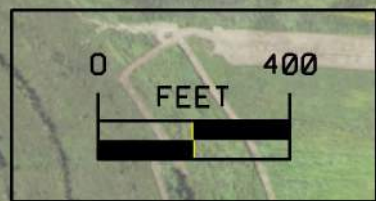
SHEET NO.:

**D.05**

500+00  
 505+00  
 510+00  
 515+00  
 520+00  
 525+00  
 530+00  
 535+00  
 538+48

BLADING/SHAPING	
500+00	538+48
38.48 STA	
ROCK, 3-INCH MINUS	
500+00	538+48
808 TON	
APRON, CONC, 18"	
532+00, 12L & 12R	
2 EACH	
CULV, CONC RDWY PIPE,	
18"	
532+00, 12L-12R	
24 LF	
ENGINEERING FABRIC	
532+00, L&R	
EROSION STONE	
532+00, 18L & 18R	
16 TON	
SAFETY CLOSURE	
500+00	
1 EACH	
CLASS II PIPE BEDDING	
532+00, 12L-12R	
5 CY	

# 223RD AVE PROJECT



CONSULTANT:



**IOWA DEPARTMENT OF  
NATURAL RESOURCES**

ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034



**SITE PLAN**

ROAD MAINTENANCE FOR:

**RED ROCK WMU/LAKE KEOMAH**

MARION/WARREN/MAHASKA COUNTIES

NO. BY DATE REVISION

DRAWN BY: PROJECT NUMBER:

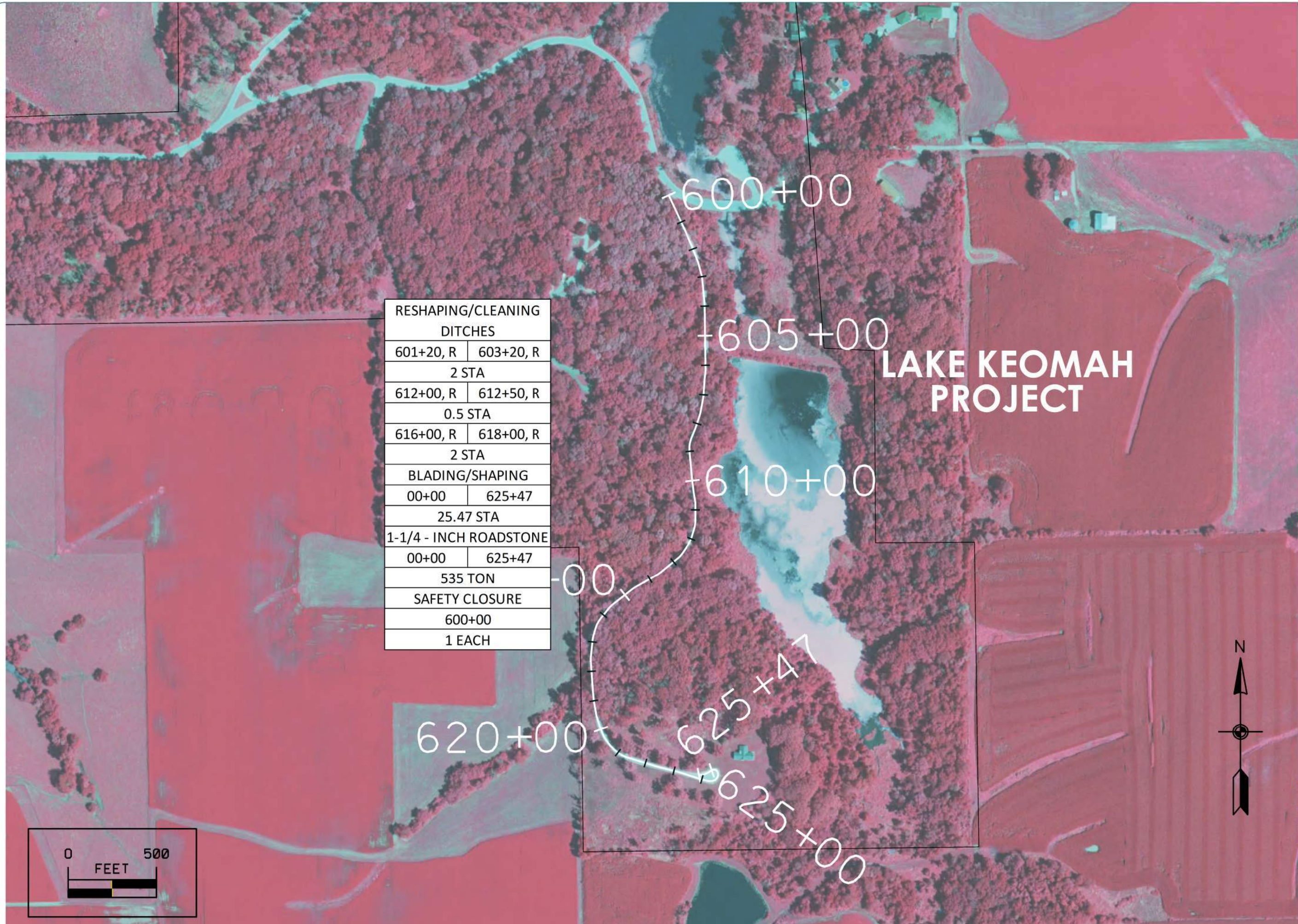
BLF 23-05-63-04

CHK'D BY: DATE:

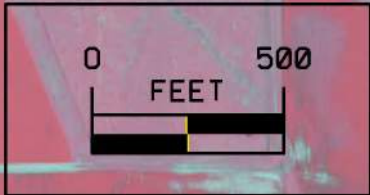
AUG 2023

SHEET NO.:

**D.06**



RESHAPING/CLEANING DITCHES	
601+20, R	603+20, R
2 STA	
612+00, R	612+50, R
0.5 STA	
616+00, R	618+00, R
2 STA	
BLADING/SHAPING	
00+00	625+47
25.47 STA	
1-1/4 - INCH ROADSTONE	
00+00	625+47
535 TON	
SAFETY CLOSURE	
600+00	
1 EACH	



# LAKE KEOMAH PROJECT

CONSULTANT:



**IOWA DEPARTMENT OF NATURAL RESOURCES**

ENGINEERING SERVICES - WALLACE BUILDING  
502 E. 9TH ST., DES MOINES, IA 50319-0034



**SITE PLAN**

ROAD MAINTENANCE FOR:

**RED ROCK WMU/LAKE KEOMAH**

MARION/WARREN/MAHASKA COUNTIES

NO.	DATE	REVISION

DRAWN BY:	PROJECT NUMBER:
BLF	23-05-63-04
CHK'D BY:	DATE:
	AUG 2023

SHEET NO: **D.07**