

IOWA DEPARTMENT OF TRANSPORTATION

TO OFFICE: District 5

DATE: February 5th, 2020

ATTENTION: James Armstrong

PROJECT: Wayne County
NHSN-065-1(34)--2R-93

FROM: Anthony J. Klein

PIN: 20-93-065-010

OFFICE: District 5 Design

SUBJECT: FY 2022 – RCB Culvert - Repair Project Concept; 0.3 mi N of Jct. SR J54

PROJECT LOCATION MAP: Page 3 or [Click Here](#)

BACKGROUND: Wayne County, US 65 - MM 4.82 - Br. Maint. No. 9304.8S065

Severe erosion has occurred at the left outlet, west side, of the twin 10'x 12' reinforced concrete box (RCB) culvert located at station 364+00 along U.S. Highway 65 in Wayne county. Previous attempts to address the erosion in the past include placement of concrete panels, concrete blocks and rock revetment at the outlet. These measures have had limited success and are not fully reducing the erosional effects to acceptable levels. The outlet has also become partially undermined with a void present near the northwest corner of the wingwall. The creek also appears to be degrading. The degradation is estimated to be 5 feet; this has taken place over an 80 year period of time. The outlet headwall and apron contain significant cracking and are showing signs of structural distress. The culvert is used as a cattle pass. Sloughing of the foreslope near the wing walls is also present due to loss of earth material at the toe due to erosion.

If left unchecked the erosion will continue and cause further undermining of the outlet. Loss of support at the outlet will exacerbate the structural distress of the culvert. Also, the foreslope sloughing will worsen which could eventually affect the highway pavement. The use of the culvert as a cattle pass is also dramatically reduced due to the ongoing erosion.





As-Built Plans:

RECOMMENDATIONS:

The proposed solution is the replacement of the existing headwall\apron with a cast in place twin 10' x 12' RCB headwall\apron and the installation of an erosion control system.

The erosion control system consists of concrete blocks which are connected via steel cables. The blocks will be set on a subbase of granular backfill. The outer perimeter of the blocks will be anchored into ground and a concrete cap will be placed adjacent to each anchor. The blocks will reduce erosional effects and will also provide a surface that the cattle can walk on.

The sloughed foreslopes will be repaired with earth fill and shaped to match the existing foreslope grade.

It is anticipated that temporary easements will be needed during construction and permanent easements\right of way will be needed for future maintenance.

ESTIMATED COST:

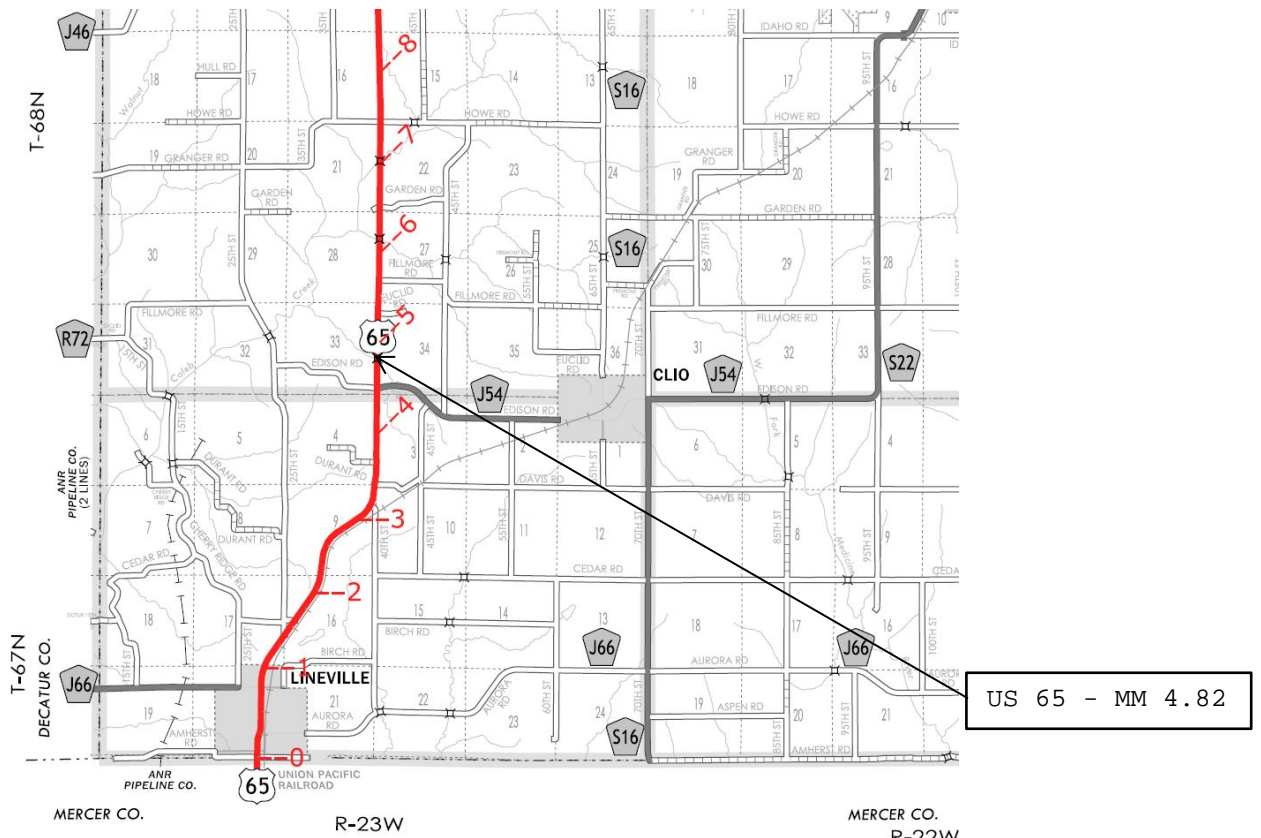
Excavation	\$ 1,400
Removal, Existing twin 10' x 12' RCB	\$ 8,400
Headwall\Apron	
Apron, Twin 10' x 12' RCB	\$ 52,200
Granular Backfill	\$ 8,800
Erosion Control System	\$ 105,200
Concrete Caps	\$ 12,000
Traffic Control	\$ 3,000
Mobilization (10%)	\$ 19,100
Contingencies (20%)	<u>\$ 42,000</u>
 Total Cost	 \$ 252,100

NOTE: Right of way and/or easement costs are not included in the above cost estimate.

FUNDS PROGRAMMED:

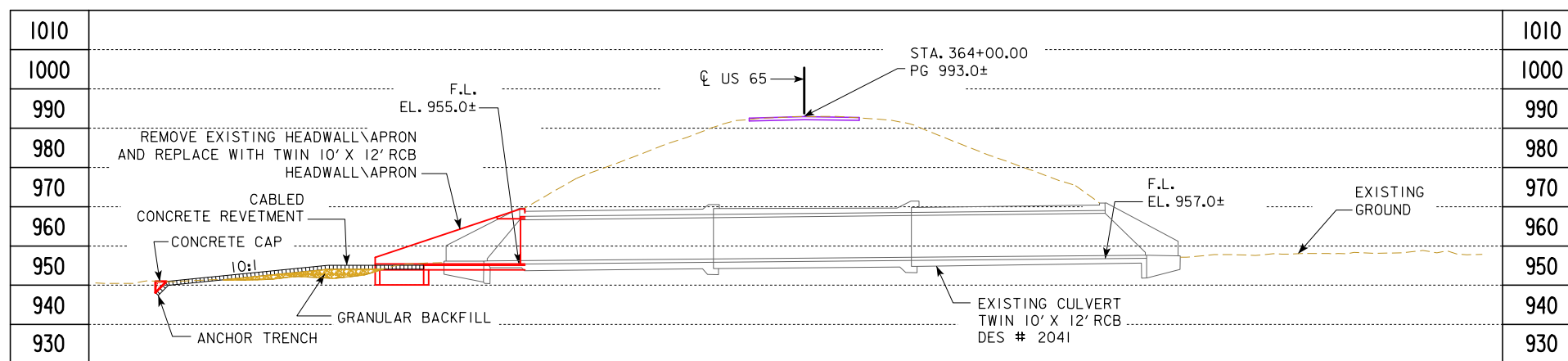
It has been identified by the District 5 office for construction in FY 2022. A schedule of events for plan development will be determined following approval of the Project Concept.

LOCATION MAP:

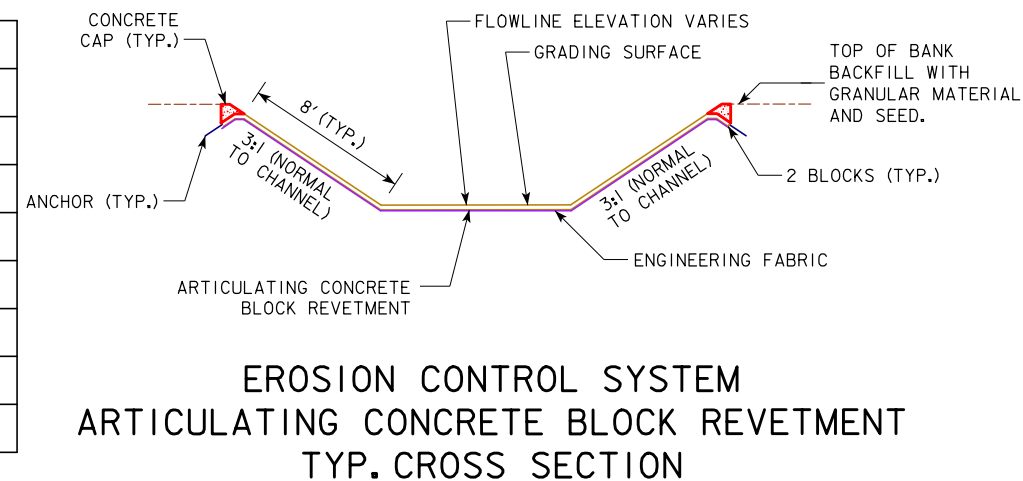


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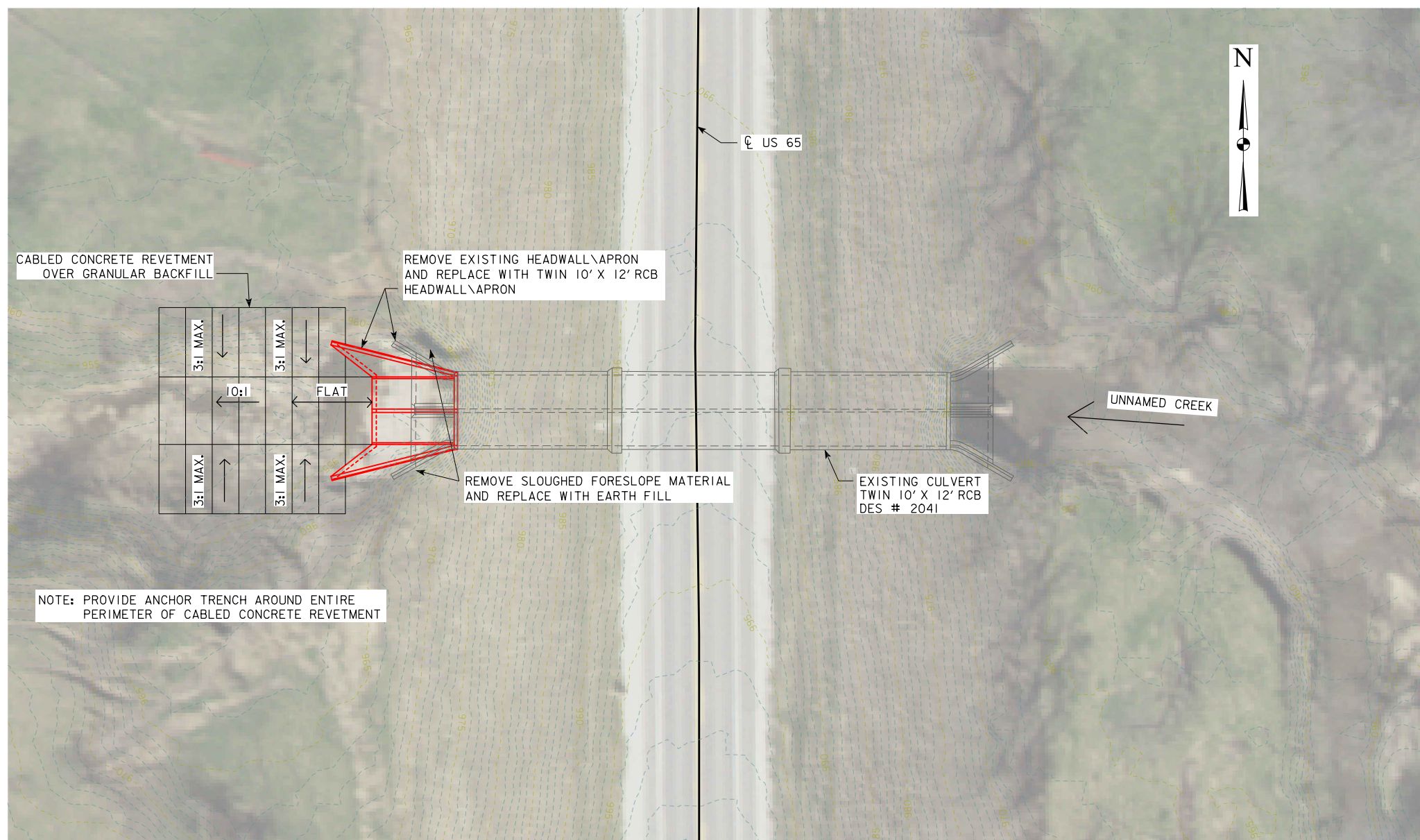
C. Purcell	M. J. Kennerly	K. D. Nicholson
S. J. Megivern	J. S. Nelson	B. Walls
M. Nop	M. A. Swenson	R. A. Younie
D. R. Tebben	K. Brink	D. L. Newell
J. W. Laaser-Webb	W. A. Sorenson	D. E. Sprengeler
E. C. Wright	M. E. Ross	A. A. Welch
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K. Olson	S. Neubauer	M. Van Dyke
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FHWA		



LONGITUDINAL SECTION ALONG CL CULVERT



EROSION CONTROL SYSTEM
ARTICULATING CONCRETE BLOCK REVETMENT
TYP. CROSS SECTION



NOTE: PROVIDE ANCHOR TRENCH AROUND ENTIRE PERIMETER OF CABLED CONCRETE REVETMENT

SITUATION PLAN

LOCATION

US 65 OVER AN UNNAMED CREEK
T-68N R-23W
SECTIONS 33 AND 34
JEFFERSON TOWNSHIP
WAYNE COUNTY
BRIDGE MAINT. NO. 9304.8S065
FHWA NO. 51880
LATITUDE 40.644165°
LONGITUDE -93.499007°

HYDRAULIC DATA

DRAINAGE AREA = 1.56 SQ. MI.
 $Q_{50} = 1,085$ CFS
HW ELEV. = 963.97
STREAM SLOPE = 45.3 FT./MI.

UTILITIES LEGEND:

NO KNOWN UTILITIES



DESIGN FOR REPAIRS TO 0° SKEW

TWIN 10' X 12' X 146' REINFORCED CONCRETE BOX CULVERT

SITUATION PLAN

STATION 364+00.00 AUGUST 2019

WAYNE COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 1 OF 1 FILE NO. ? DESIGN NO. ?