VAN BUREN Co.
RCB CULVERT REPLACEMENT - SINGLE BOX
STPN-001-1(32)--2J-89

LETTING DATE
October 20, 2020

IOWA DOT

Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM

VAN BUREN COUNTY

RCB CULVERT REPLACEMENT - SINGLE BOX

ON IA 1 AT MILE MARKER 4.8
0.1 mi N of Franklin St in Keosauqua

SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

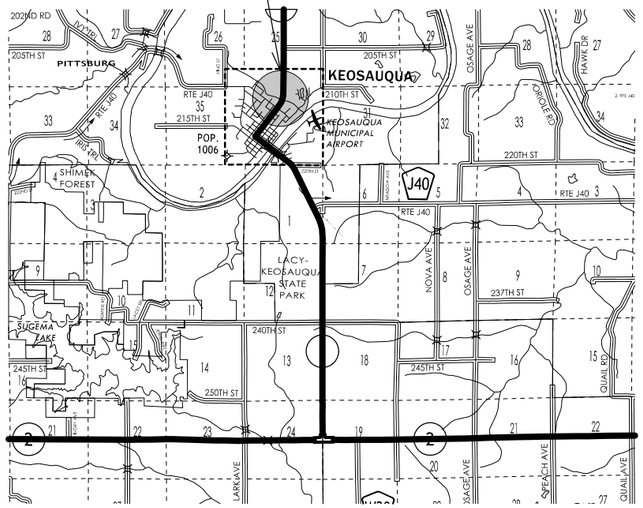
Value Engineering Saves. Refer to Article 1105.14 of the Specifications.

REVISIONS

TOTAL 19
PROJECT IDENTIFICATION NUMBER
18-89-001-010
PROJECT NUMBER
STPN-001-1(32)--2J-89
R.O.W. PROJECT NUMBER
ROW NUMBER

INDEX OF SHEETS

Project Location



LOCATION MAP SCALE
0 1 2 3
Miles

DESIGN DATA RURAL

2014 AADT	2100	V.P.D.
2021 AADT	2250	V.P.D.
2021 DHV	225	V.P.H.
TRUCKS	10	%
Total Design ESALs	--	

INDEX OF SEALS

SHEET NO.	NAME	TYPE
A.1		Primary Signature Block

PRELIMINARY PLANS

Subject to change by final design.

D3 PLAN–Date: June 29, 2018

FILE NO.	ENGLISH	DESIGN TEAM	IOWA DOT\McCLURE ENGINEERING Co.	VAN BUREN COUNTY	PROJECT NUMBER	STPN-001-1(32)--2J-89	SHEET NUMBER	A.1

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IOWA DEPARTMENT OF TRANSPORTATION

TO OFFICE: District 5

ATTENTION: James V. Armstrong

FROM: Anthony J. Klein

OFFICE: District 5 Design

SUBJECT: FY 2020 – Culvert Replacement Project Concept

DATE: October 13th, 2017

PROJECT: Van Buren County
STPN-001-1(32)--2J-89
PIN: 18-89-001-010

PROJECT LOCATION MAP: Page 4 or Click Here

BACKGROUND:

The existing culvert is a 96 inch corrugated metal pipe (CMP) and a 6' x 8' reinforced concrete box (RCB) culvert at approximately station 1707+37.50. The original structure was a 6' x 8' RCB with a length of 148'-5. A 13 degree bend was placed at approximately the mid point of the culvert. The inlet section of the culvert was constructed in 1924. In 1935 the road alignment was shifted and the outlet section was constructed. In the early 1970s it was discovered the inlet section was in need of repair. In 1976 approximately 76' of the upstream section of the culvert was replaced with a 96 inch CMP. A concrete headwall and drop inlet were also constructed in 1976.
The invert of the CMP has deteriorated and in some locations holes in the pipe flow line are present. The RCB section of the culvert appears to be in relatively good shape based on a limited visual inspection.

Need for Project:

If left unchecked the invert of the CMP will continue to deteriorate. Loss of pipe material will lead to structural inadequacy and water flowing under and around the pipe could lead to subgrade loss of the highway. Loss of subgrade could cause damage to the highway pavement structure.

Van Buren County, IA 1, MM 4.8

The existing culvert can be replaced with a 10' x 8' x 110' RCB culvert. The culvert barrel is skewed 49 degrees right ahead and standard parallel wing 45 degree skew aprons are proposed at the inlet and outlet. A bend will not be required due to the placement of the inlet. The proposed inlet is located north of the existing drop inlet and south of the funeral home parking lot. The placement of the inlet will require the creek to be realigned so that it flows to the inlet. The flow line of the inlet was chosen so that the top of parapet does not extend above the ground surface. This resulted in a flow line below the existing box inlet flow line. In order to match the existing flow line a vertical end wall is proposed at the new inlet apron. The top of the wall will match the existing flow line (elevation 601). We want to match the existing creek flow line and not make the creek any steeper to limit erosion. The existing hillside on the north side of the inlet will need to be graded due to the apron and the creek realignment. The funeral home parking lot will not need to be reconstructed due to the creek realignment. The proposed outlet will lie downstream of the existing outlet. The outlet placement is chosen to achieve a 3:1 maximum foreslope grade beyond the clear zone. Class E revetment is proposed at the inlet and outlet to reduce erosional effects. The clear zone used for this concept was 18' based on a design speed of 50 mph and 2,100 vpd. The proposed culvert meets the IDOT guidelines for a 50 year storm event. The adjacent funeral home building first floor elevation is approximately 612.5. The 50 and 100 year headwater elevations at the proposed culvert are 608.56 and 609.43, respectively. Generally insurable structures are protected to the 100 year flood. In this case the funeral home first floor elevation is above the 100 year culvert headwater elevation. It should be noted if the culvert is surcharged and roadway overtopping occurs the funeral home will be affected. Roadway overtopping occurs at elevation 613.5 and the funeral home first floor elevation is 612.5.

RECOMMENDATIONS:

The total estimated cost of the project is $300,000.
Replacement of the existing culvert as described above is recommended. The culvert should be replaced in the near future in order to limit adverse effects to the highway.
Patching of the damaged CMP invert with flowable mortar or other means should be done as a temporary measure. Replacement of the CMP portion only or continued patching was considered as alternatives. However due to the age of the existing RCB (82 to 93 years) and the condition of the CMP we recommend complete replacement. Traffic will be maintained during construction using an onsite detour. It is anticipated that the box can be built one half at a time while maintaining one-way traffic using signals.

The project is located within a Zone A flood hazard area. Base flood elevations have not been established in this zone.

Since the basin is less than 2 square miles in area a DNR Floodplain Development Permit will not be required.

Since the basin is less than 2 square miles in area a DNR channel change permit is not required. The creek is not a protected stream.

Temporary easements will be needed during construction and permanent easements\right of way will be needed for future maintenance.

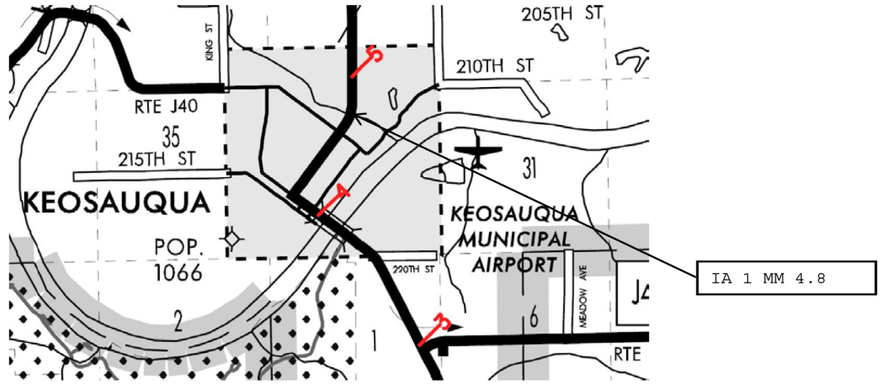
ESTIMATED COST:

Culvert, 10' x 8' x 110' RCB	$	83,300
Wingwalls, 45 deg skew, 0 deg flare	$	47,500
Removal existing culvert	$	6,000
Class E revetment	$	14,000
Engineering Fabric	$	2,500
Roadway Costs	$	92,000
Mobilization (5%)	$	12,600
Contingencies (15%)	$	37,800
Total Cost	$	296,000

FUNDS PROGRAMMED:

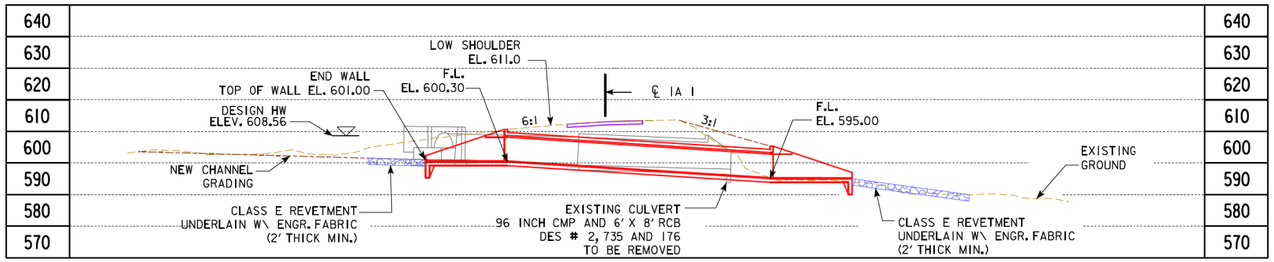
It has been identified by the District 5 office for construction in FY 2020. A schedule of events for plan development will be determined following approval of the Project Concept.

LOCATION MAP:

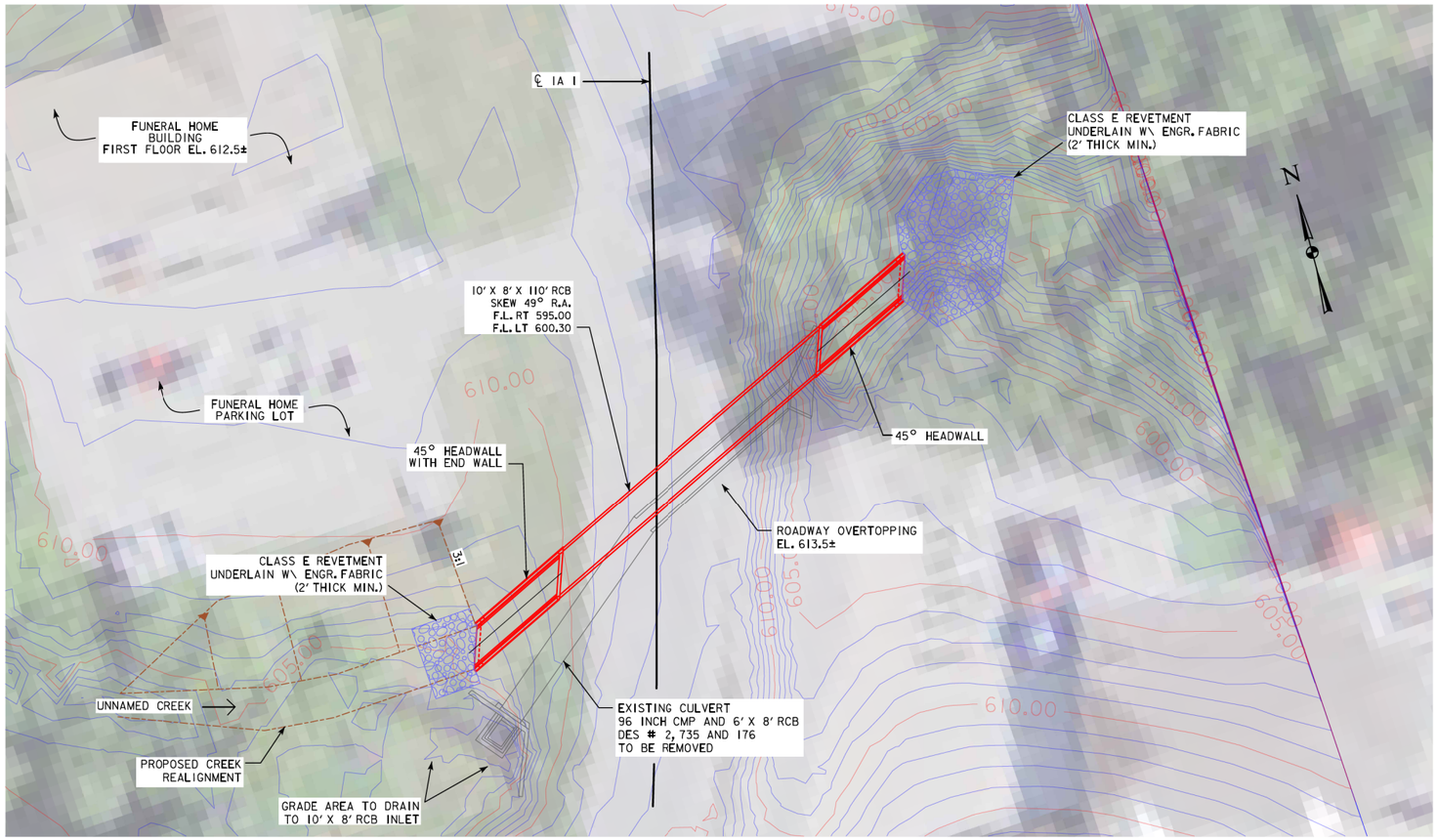


cc:

C. Purcell	M. J. Kennerly	K. D. Nicholson
D. L. Maifield	C. B. Brakke	S. J. Megivern
F. W. Todey	A. A. Welch	N. M. Miller
C. C. Poole	S. Anderson	G. A. Novey
M. A. Swenson	M. J. Sankey	R. A. Younie
D. R. Tebben	B. D. Hofer	K. Brink
D. L. Newell	B. E. Azeltine	D.R. Claman
T. D. Hanson	S. J. Gent	W.A. Sorenson
T. D. Crouch	J.W. Laaser-Webb	M. Van Dyke
D. E. Sprengeler	E. C. Wright	H. Torres-Cacho
J. R. Webb	A.J. Klein	J. R. Phillips
B. M. Clancy	T. Quam	FHWA
M. E. Ross	J. Selmer	P.C. Keen
J. Garton	J. Woodcock	



LONGITUDINAL SECTION ALONG ℄ CULVERT



SITUATION PLAN

LOCATION

IA-1 OVER AN UNNAMED CREEK
T-69N R-10W
SECTION 36
CITY OF KEOSAUQUA
VAN BUREN TOWNSHIP
VAN BUREN COUNTY
LATITUDE °
LONGITUDE °

HYDRAULIC DATA

DRAINAGE AREA = 0.72 SQ. MI.
Q_{50} = 604 CFS
HW ELEV. = 608.56
STREAM SLOPE = 29 FT./MI.

TRAFFIC ESTIMATE

2014 AADT	2,100	V.P.D.
202_ AADT	-	V.P.D.
202_ DHV	-	V.P.H.
TRUCKS	-	%
TOTAL DESIGN ESALs	-	

0 ENGLISH 40
SCALE IN FEET

CONCEPT

DESIGN FOR 49° SKEW R.A.

10' X 8' X 110' REINFORCED CONCRETE BOX CULVERT

SITUATION PLAN

STATION 1707+44 SEPTEMBER 2017

VAN BUREN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 1 OF 1 FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	VAN BUREN COUNTY	PROJECT NUMBER	SHEET NUMBER V.1

9/11/2017 7:07:59 AM dmulhol C:\LIDAR\LIDAR\VAN BUREN COUNTY, IA 1 OVER LOCAL DRAINAGE IN KEOSAUQUA\LIDAR.dgn CONCEPT 11x17_pdf.pltcfg

FILE NO.	ENGLISH	DESIGN TEAM	IOWA DOT\McCLURE ENGINEERING Co.	VAN BUREN COUNTY	PROJECT NUMBER	STPN-001-1(32)--2J-89	SHEET NUMBER A.4

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Event Description	Event	Project Number	Duration	Start Date	Actual Start	Finish Date
D00 - Pre-Design Concept	Active	STPN-001-1(32)--2J-89	63.0 days	8/9/2017	9/28/2017	11/3/2017
U00 - Preliminary Utility Review	Active	STPN-001-1(32)--2J-89	22.0 days	11/9/2017	11/14/2017	12/8/2017
T01 - Existing ROW, Property and Sections Lines in CADD	Active	STPN-001-1(33)--2J-89	242.0 days	6/8/2017	12/4/2017	5/11/2018
W00 - Preliminary Wetland Review	Active	STPN-001-1(32)--2J-89	104.0 days	8/29/2017		1/19/2018
D01 - Survey Plan and Photogrammetry (DTM)	Active	STPN-001-1(32)--2J-89	34.0 days	2/20/2018		4/6/2018
D02 - Design Field Exam	Active	STPN-001-1(32)--2J-89	62.0 days	3/15/2018	4/13/2018	7/8/2018
A01 - Approval of DOT Commission - Inclusion in 5-Year Program	Active	STPN-001-1(32)--2J-89	0 days	6/12/2018		6/12/2018
D03 - Plans for Preliminary Bridge	Active	STPN-001-1(32)--2J-89	79.0 days	3/13/2018		7/29/2018
H00 - Cultural Resources Assessment	Active	STPN-001-1(32)--2J-89	104.0 days	2/13/2018	10/13/2017	7/6/2018
TE0 - Threatened/Endangered Species Review	Active	STPN-001-1(32)--2J-89	104.0 days	2/13/2018		7/6/2018
W01 - Wetland Design Review	Active	STPN-001-1(32)--2J-89	176.0 days	11/3/2017		7/6/2018
B01 - Bridges and Structures Layout	Active	STPN-001-1(32)--2J-89	55.0 days	7/16/2018		9/28/2018
U02 - Project Notification to Utilities	Active	STPN-001-1(32)--2J-89	66.0 days	7/6/2018		10/5/2018
S02 - Identification of Soils Related ROW Issues	Active	STPN-001-1(32)--2J-89	110.0 days	6/18/2018		11/16/2018
D05 - Plans to Right Of Way	Active	STPN-001-1(32)--2J-89	11.0 days	11/23/2018		12/7/2018
F03 - Final Regulated Materials Review	Active	STPN-001-1(32)--2J-89	150.0 days	6/18/2018		1/11/2019
R01 - Right Of Way Layout	Active	STPN-001-1(33)--2J-89	9.0 days	2/25/2019		3/8/2019
R00 - Plot Plans and Summary Sheets to District	Active	STPN-001-1(33)--2J-89	0 days	3/8/2019		3/8/2019
P09 - Public Information Meeting (PIM)	Active	STPN-001-1(32)--2J-89	0 days	5/2/2019		5/2/2019
S04 - Soils Submittal to Bridge	Active	STPN-001-1(32)--2J-89	115.0 days	11/28/2018		5/7/2019
T02 - Acquisition Plats and Legal Descriptions	Active	STPN-001-1(33)--2J-89	198.0 days	10/3/2018		7/5/2019
U03 - 1st Plan Submital to Utilities	Active	STPN-001-1(32)--2J-89	66.0 days	4/12/2019		7/12/2019
R02 - Right Of Way Appraisal	Active	STPN-001-1(33)--2J-89	4.0 days	9/30/2019		10/4/2019
R03 - Right Of Way Negotiation	Active	STPN-001-1(33)--2J-89	569.0 days	11/6/2017		1/10/2020
U04 - 2nd Plan Submittal to Utilities	Active	STPN-001-1(32)--2J-89	44.0 days	12/9/2019		2/6/2020
W02 - Wetland Field Work	Active	STPN-001-1(32)--2J-89	10.0 days	1/31/2020		2/14/2020
W03 - 404 Permit Submittal	Active	STPN-001-1(32)--2J-89	0 days	2/14/2020		2/14/2020
S03 - Soils Design Complete	Active	STPN-001-1(32)--2J-89	13.0 days	2/19/2020		3/6/2020
W04 - 404 Permit Clearance	Active	STPN-001-1(32)--2J-89	0 days	4/17/2020		4/17/2020
U06 - Notice to Proceed to Utilities	Active	STPN-001-1(32)--2J-89	44.0 days	4/7/2020		6/5/2020
D04 - Design Plans for Bridge	Active	STPN-001-1(32)--2J-89	53.0 days	4/10/2020		6/23/2020
P08 - Pre-Construction Agreement	Active	STPN-001-1(32)--2J-89	0 days	7/10/2020		7/10/2020
R04 - Right Of Way Acquisition	Active	STPN-001-1(33)--2J-89	1.0 days	7/9/2020		7/10/2020
U07 - Utility Bid Attachment	Active	STPN-001-1(32)--2J-89	22.0 days	7/6/2020		8/4/2020
B03 - Final Bridge Plans	Active	STPN-001-1(32)--2J-89	201.0 days	10/28/2019		8/4/2020
L05 - Letting-Bridge and Culverts	Active	STPN-001-1(32)--2J-89	56.0 days	8/4/2020		10/20/2020
C02 - Construction Period (Field Work)	Active	STPN-001-1(32)--2J-89	268.0 days	10/21/2020		10/29/2021

Plan Review Prior to Field Exam:

The Field Exam Engineer will review the plans to become familiar with the scope of the project and the proposed design. The following checklist is provided for this review:

Are plans complete enough to conduct the field exam and are they legible? Yes

Check the typical section. Are L, R, and BW correct for the assumed pavement thickness? Yes

Review the disposition shown for all drainage areas, whether diversion of water appears possible, and if the outlets for drainage areas are being cut out.

Is the proposed profile grade high enough for adequate snow storage or is it too high requiring too much borrow? Adequate

Do taper lengths, spirals, vertical curves, etc. conform to current design standards? UAC Alignment and Profile

What are the right-of-way impacts? Are "line shifts" necessary to minimize excess right-of-way? Are right-of-way "need"lines shown on the plans? ROW will be required

Is design year traffic for the mainline and side roads shown on the plans? No

Is/are detour route(s) required for construction? If so, have any recommendations been made by Design? Does the map on the title sheet cover the detour area? No Detour allowed

Review the proposals made for the disposition of waste.

Review the proposals made for the disposition of removal items.

Review whether the class of access control has been shown.

Checklist for the Field Examination

Review the preliminary plans for any new items that should be included and/or any old items that should be removed since the preliminary data was obtained.

Review the profile grades and horizontal alignment to determine if it fits the terrain. Also, do proposed horizontal and vertical geometrics provide a good economical design to accomplish the intended need?

Review drainage in regard to the following aspects:

Does the proposed grade line provide adequate positive drainage? Yes, however barn roof slope will be checked in relation to adjacent property to determine if existing guard rail may be removed.
What relationship does drainage have with adjacent property? Drainage changes may impact Day Care Center parking lot on east side.

Are the proposed drainage structures satisfactory, is there a diversion of water, and what is the condition of the structures being extended? Water will be diverted through culvert during construction per concept.

Do structures in drainage channels need provisions for the future lowering of the channel (this is of particular importance in regard to river bottoms and Northern Iowa flatland); attention should be given to established drainage ditches? OLE has determined culvert shall be lowered minimum 1' for fish passage.

Are ditches, as proposed, going to satisfactorily drain the road without excessive erosion problems or diversion of water? Yes

Are there areas which appear to need intercepting ditches or are there any proposed which appear to be unnecessary? Not applicable

Determine if any "letdown" structures are needed in backslopes or side ditches. Not required

Examine channel changes to determine if they are warranted. Slight realignment will be required on west side.

Review the traffic management assessment provided by the Office of Traffic and Safety, or the traffic control/staging concept developed in the project concept or by the Project Management Team. Examine whether or not additional measures are required for traffic management to mitigate traffic congestion and whether or not the project is constructible as staged. While on the field exam, discuss and document the traffic control measures decided on. Measures may include modifying contract periods to accelerate project completion, use of lane rental or incentives/disincentives for timely contract completion, extra law enforcement, special traffic control details, additional motorist warning devices, etc. Access to Hospital will be maintained at all times. Temporary signals and lane closures will be required. Possible incentives and disincentives may be required.

Review whether sideroads/interchanges need to be kept open to maintain access or if closures are necessary. Discuss detour/runarounds in regard to surfacing, potential improvements to the detour route for capacity, or other safety measures. Determine if a county agreement is necessary. Document the additional Traffic Control measures requested in the field exam letter in the paragraph on staging/traffic control. Not applicable

Review if there are areas that may need to involve possible winter carry over of traffic control in the construction zone. Determine who will be responsible for maintaining the traffic control during this time period. Not applicable

Review whether proposed drives and field entrances give satisfactory access and whether there is adequate sight distance on the side roads for entering the primary road. In addition, the team will determine whether there are any proposed drives or entrances which appear unneeded and unwarranted. Access to hospital will be maintained at all times. May need temporary access to funeral home during construction staging.

Review whether the abutments of two span bridges over the mainline encroach on sight distance on horizontal curves. Not applicable

The indication of needed horizontal line shifts will be reviewed by the team and a determination made of the apparent effect of the proposed road on the adjacent right-of-way. Review damage to farmsteads; see if minimum ditches are possible. Can we provide mowable backslopes either in our design or in the ROW agreement? Not applicable. Horizontal and vertical alignment will be U.A.C.

Do entrances provide access to every part of the property? Yes

Can entrances with steep grades be adjusted or moved in order to reduce the grade? Not applicable

The team will review soils from the following aspects:

Determine if there are areas that appear unstable and need special attention for grade or alignment. No

Determine whether there is an estimate of "boulders" required for bid item. If so, this will normally be proposed by the Soils Engineer with District Office concurrence. Possible shallow rock will be present in areas

Determine whether there appears to be changes needed in the "shrink factors." If so, this will normally be proposed by the Soils Engineer with District Office concurrence. Possibly

The team will make proposals for borrow considering the following aspects:

Are there any particularly desirable areas for borrow? Contractor furnished

Can excess right-of-way serve as borrow area? Not applicable

Can the selected borrow improve either snow, aesthetics, or wetland mitigation? Not applicable

If the borrow needs to be drained is there a suitable drainage channel? Who owns the drainage channel? Not applicable

Consider oversize ditches and widened backslopes for borrow. Not applicable

The following aspects of roadside development and erosion control should be considered by the team:

Are there any areas requiring special erosion control work during grading? Yes. The rip rap on east side will be maintained

Are there areas which might be considered scenic or historic which can be preserved or enhanced? No.

Can inlets of ditches be raised to help upstream erosion conditions? Not applicable

Are proposed ditches going to satisfactorily drain the road without erosion problems or diversion of water? Yes

Are there trees or similar environmentally sensitive areas which can be saved? Yes

Are there any areas that appear to be wetlands and could line shifts minimize impacts to these areas? If line shifts cannot minimize the impacts, what type of mitigation is needed? Are there impacts to any ponds or ponds that need to be drained? OLE will investigate

Review the need for shielding obstacles, steep embankments, or other areas of concern. Review flattening foreslopes and extending culverts to eliminate the use of guardrail. Foreslope on east side will be reviewed to determine if guard rail may be removed.

Review the proposals for disposition of removal items such as pavement (will it be used as subbase?), bridges, culverts, guardrail, etc. Contractor to have possession of removal items. Guardrail, signs, etc.

Ascertain the stations of locating tile lines. Not applicable

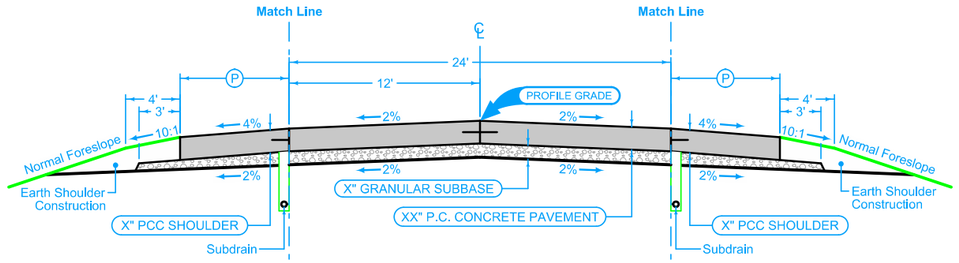
Review the fencing requirements on fully controlled access roads with particular attention given to culvert areas and special ditch areas for livestock control. Not applicable

Review existing lighting at secondary and minor roads and determine who owns these and is responsible if they are disturbed. The location and construction of these should be noted. Not applicable

Full Depth PCC Shoulder

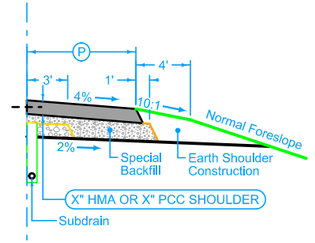
Shoulder Jointing:
Longitudinal joint: L-2 or KT-2
Transverse joints: C at 20' spacing

		2_P_FullPCC_ 10-19-10
STATION TO STATION		(P) Feet
1706+58.16	1707+87.63	



Mainline Jointing:
Transverse joints: CD at 20' spacing
Longitudinal joint: L-2

	2P_ 10-19-10
STATION TO STATION	
1706+58.16	1707+87.63



Full Depth PCC Shoulder

Shoulder Jointing:
Longitudinal joint: L-2 or KT-2
Transverse joints: C at 20' spacing

		2_P_FullPCC_ 10-19-10
STATION TO STATION		(P) Feet
1706+58.16	1707+87.63	

Paved Shoulder at Guardrail

PCC Shoulder Jointing:
Longitudinal joint: BT-1 or BT-5
Transverse joints: C at mainline spacing
HMA Shoulder Jointing:
Longitudinal joint: B

		2_P_Guard_ 10-17-17
STATION TO STATION		(P) Feet
1706+83.88	1708+37.20	8'

See Tab 100-24 or 100-25 for pavement quantities.
See Tab 112-9 for shoulder quantities.

IA 1 TYPICAL SECTION

FILE NO.	ENGLISH	DESIGN TEAM	IOWA DOT\McCLURE ENGINEERING Co.	VAN BUREN	COUNTY	PROJECT NUMBER	STPN-001-1(32)--2J-89	SHEET NUMBER	B.1

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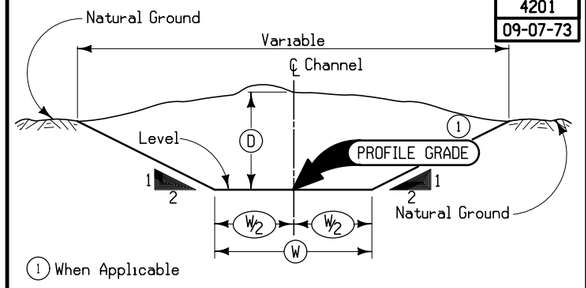
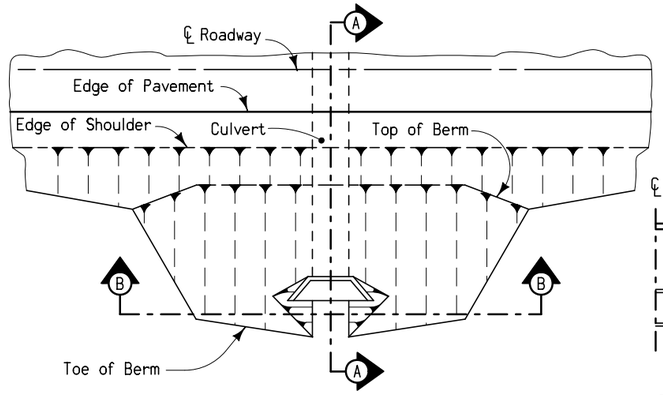
4201
09-07-73



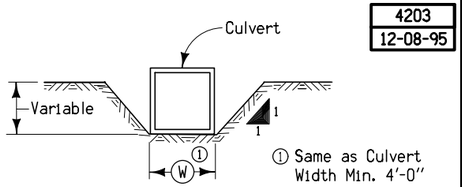
TYPICAL CROSS SECTION TYPE 1 CHANNEL

LOCATION		WIDTH	DEPTH (Average)
STATION	SIDE	(W)	(D)

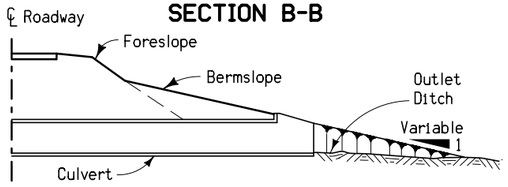
4203
12-08-95



TYPICAL PLAN

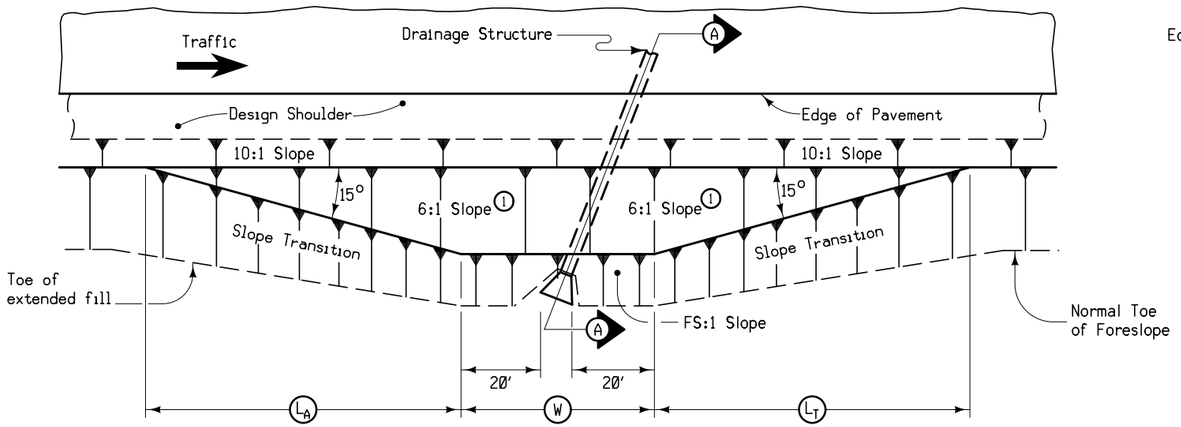


SECTION B-B

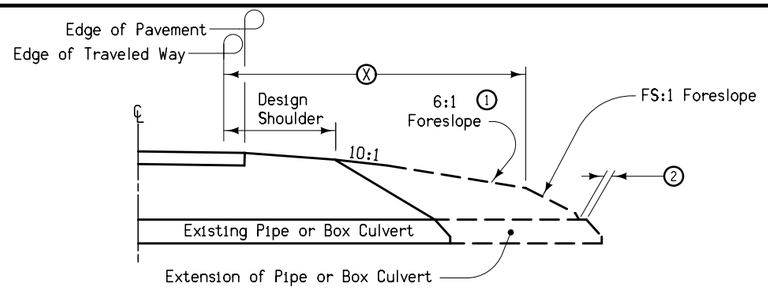


SECTION A-A

TYPICAL DETAILS FOR OUTLET DITCH THROUGH FORESLOPE BERM



PLAN VIEW



SECTION A-A

STRUCTURE LOCATION		(W)	(LA)	(LT)	(X)	(FS)
STATION (3)	SIDE	Feet	Feet	Feet	Feet	
1707+39.82						3

4312
04-18-17

At locations where an extended or newly constructed drainage structure extends beyond the normal foreslope cover, flatten as indicated so as to cover the structre. Minimum earth cover is 6 inches.

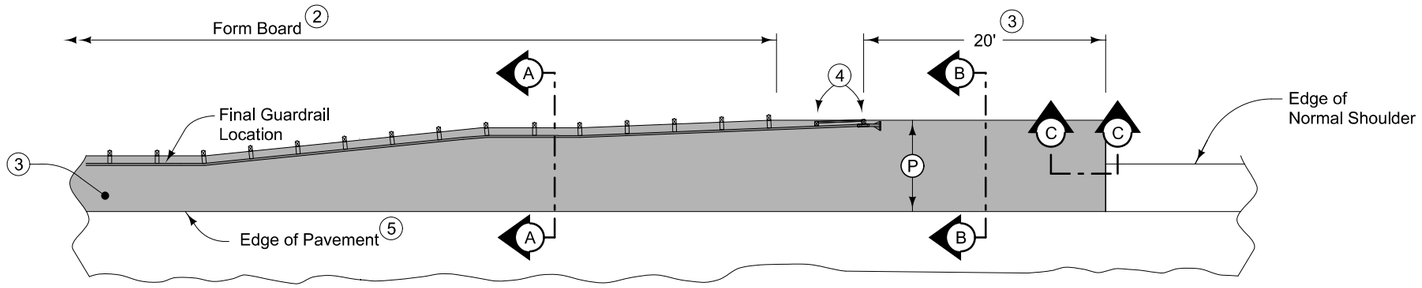
(1) Slope may be flatter than 6:1.

(2) 6 inch minimum for pipe installations or to top of headwall on RCB.

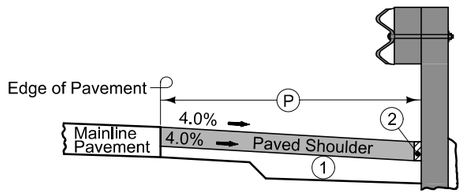
(3) At ℄ of road.

(W) = Pipe or RCB opening width plus 20 feet each side.

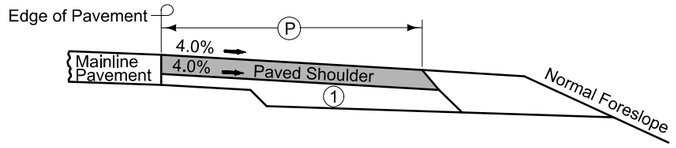
BARNROOF FORESLOPE AT SKEWED DRAINAGE STRUCTURE



PLAN VIEW

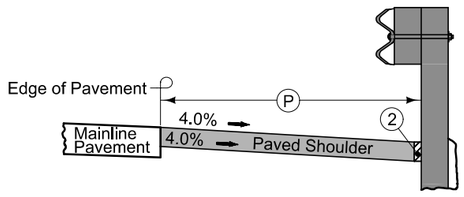


Section A-A

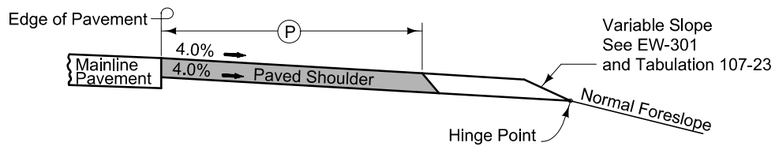


Section B-B

NEW CONSTRUCTION



Section A-A



Section B-B

EXISTING SHOULDER

9" HMA Paved Shoulder at guardrail. 8" PCC may be substituted with the following jointing layout:

Match mainline pavement joint spacing. When mainline pavement is 8" or greater in thickness, place additional transverse 'C' joints in shoulder at mid-panel of the mainline pavement. Place longitudinal 'C' joint at P/2 from edge of mainline pavement when P is greater than 10' wide. Terminate longitudinal joint at transverse joint less than 10' in length.

Compaction of HMA is required to face of guardrail post. Hand compaction will be allowed under guardrail. Removal and reinstallation of guardrail will be allowed with no additional payment.

Refer to Tabulation 112-9 for shoulder quantities.

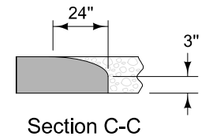
(1) For subgrade treatment, refer to other details in the plan.

(2) PCC option only: When guardrail posts are installed prior to construction of PCC paved shoulder, fasten form board to the face of guardrail posts for the length shown. Refer to note 4 for final 2 posts.

(3) Continue paved shoulder to existing paved shoulder or 20 feet beyond the center of the first post.

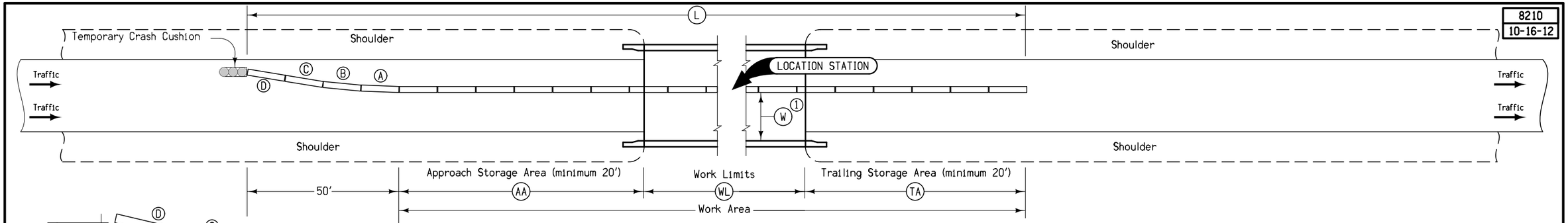
(4) Shoulder may be notched for final 2 posts or post sleeves may be installed through pavement. Do not drive posts through pavement.

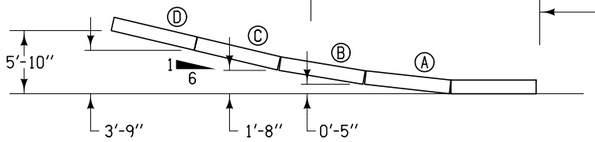
(5) 'KT-1 joint for PCC shoulder.
'B' joint for HMA shoulder.



Section C-C
Roll down at granular shoulder or earth.

PAVED SHOULDER AT GUARDRAIL





BARRIER OFFSETS FOR FLARE SECTIONS

Station	Side	AA	WL	TA	L	Anchored	W (1)	Remarks
		Feet	Feet	Feet	Feet	X	Ft-Inches	
1707+39.82		20		20				

(1) Where (W) is less than 14'-6", install restricted width signing as per Standard Road Plan TC-81.

TEMPORARY CONCRETE BARRIER LAYOUT for One-Way Traffic

FILE NO.	ENGLISH	DESIGN TEAM	IOWA DOT\McCLURE ENGINEERING Co.	VAN BUREN	COUNTY	PROJECT NUMBER	STPN-001-1(32)--2J-89	SHEET NUMBER	B.4

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SURVEY SYMBOLS

- BM Bench Mark
- FENO FENO Monument
- BL Topo Breakline
- GR Ground Shot
- WC Wild Card (Misc. Field Shot)
- E1 – EL1D Electric Line Co. 1 - Quality D
- FO3 – FO3D Fiber Optic Co. 3 - Quality D
- TV – TV1D TV Cable Co. 1 - Quality D
- San. – SA1D Sanitary Sewer Co. 1- Quality D
- FO2 – FO2D Fiber Optic Co. 2 - Quality D
- G – GL1D Gas Line Co. 1 - Quality D
- PPA Power Pole Co. 1
- PR Electic Riser Pole
- TSB Telephone Switch Box
- SH Paved Shoulder
- C Centerline BL of Road (ML or SR)
- ENP Edge Paved Entrance & Park Lot
- GDL Guard Rail Steel
- CU Back of Curb
- GU Gutter In Front of Curb
- CON Concrete or A/C Slab
- SWK Sidewalk
- D Centerline Draw or Stream (Down)
- RIP Rip-Rap
- SNP Unpaved Shoulder
- FO – FO1D Fiber Optic Co. 1 - Quality D
- BNK Stream Bank
- IN Storm Sewer Intake
- UE Utility Elevation
- PIP Pipe Culvert
- MH Utility Access (Manhole)
- SOP Size of Pipe or Culvert
- EW Edge of Water
- FCL Chain Link and Security Fence
- ENT Centerline BL of Entrance

SURVEYED UTILITY OWNER SYMBOLS

Sub-Surface Utility Mapping Quality Level is in accordance with CI/ASCE 38-02 Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data.

Remark Abbreviations
QLA Quality Level A Highest guideline quality level
QLD Quality Level D Lowest guideline quality level

- E1 – Alliant Energy - Quality D
- FO3 – Van Buren Telephone Co. - Quality D
- TV – Starwest Inc. - Quality D
- San. – City of Keasauqua- Quality D
- FO2 – ICN - Quality D
- G – Alliant Energy - Quality D
- Alliant Energy
- Alliant Energy
- TSB ICN
- FO – Windstream - Quality D

PLAN VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK	Design Color No.	
Green	(2)	Existing Topographic Features and Labels
Blue	(1)	Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Magenta	(5)	Existing Utilities
SHADING	**Design Color No.**	
Yellow	(4)	Highlight for Critical Notes or Features
Red	(3)	Delineates Restricted Areas
Lavender	(9)	Temporary Pavement Shading
Gray, Light	(48)	Proposed Pavement Shading
Gray, Med	(80)	Proposed Granular Shading
Gray, Dark	(112)	Proposed Grade and Pave Shading "In conjunction with a paving project"
Brown, Light	(236)	Grading Shading
Tan	(8)	Proposed Sidewalk Shading
Blue, Light	(230)	Proposed Sidewalk Landing Shading
Pink	(11)	Proposed Sidewalk Ramp Shading

PROFILE VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK	Design Color No.	
Green	(2)	Existing Ground Line Profile
Blue	(1)	Proposed Profile and Annotation
Magenta	(5)	Existing Utilities
Blue, Light	(230)	Proposed Ditch Grades, Left
Black	(0)	Proposed Ditch Grades, Median
Rust	(14)	Proposed Ditch Grades, Right

- Reference Point / Station — Survey Line
- Section Corner
- Ground Line Intercept
- Saw Cut
- Guardrail
- Trench Drain
- HighTension Cable Guardrail
- Sheet Pile
- Pavement Removal
- Clearing & Grubbing Area

RIGHT-OF-WAY LEGEND

- Proposed Right-of-Way
- Existing Right of Way
- Existing and Proposed Right-of-Way
- Easement and Existing Right-of-Way
- Easement (Temporary)
- Easement
- C/A Access Control
- Property Line

PLAN AND PROFILE

(COVERS SHEET SERIES D, E, F, & K)

FILE NO.	ENGLISH	DESIGN TEAM **IOWA DOT\McCLURE ENGINEERING Co.**	**VAN BUREN** COUNTY	PROJECT NUMBER **STPN-001-1(32)--2J-89**	SHEET NUMBER **D.1**

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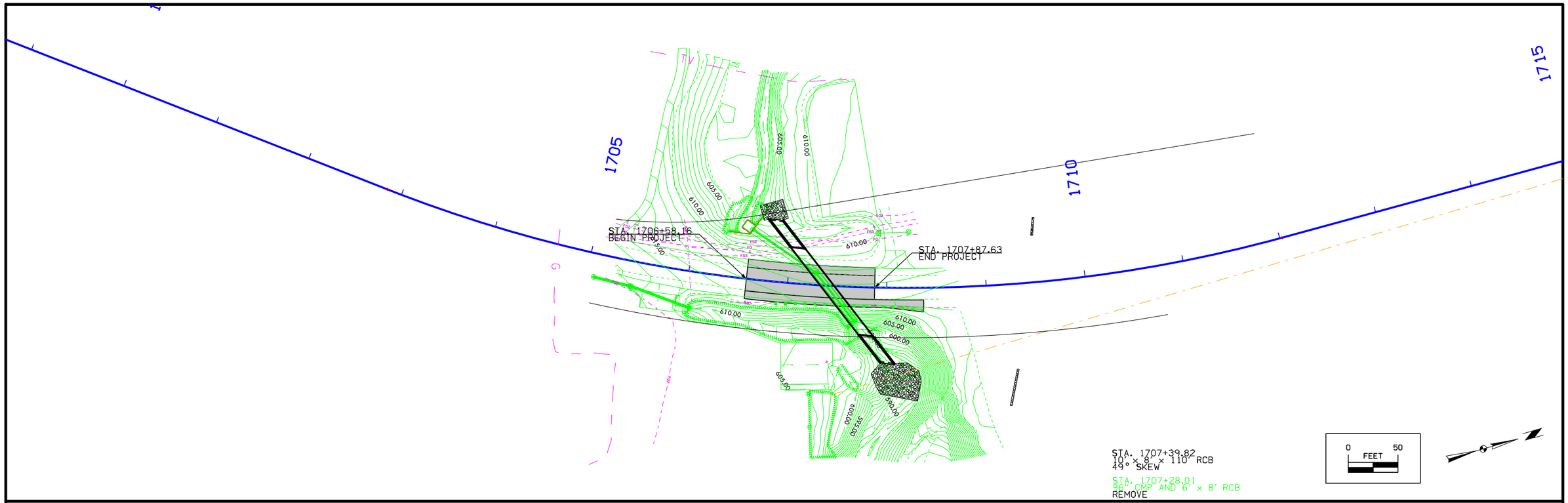

FILE NO.	ENGLISH	DESIGN TEAM IOWA DOT\McCLURE ENGINEERING Co.	VAN BUREN COUNTY	PROJECT NUMBER STPN-001-1(32)--2J-89	SHEET NUMBER D.2	REVISED

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Survey Information

County: Van Buren
SAP 930
PIN: 18-89-001-010
Project Number: STPN-001-1(32)--2J-89
Location: 0.1 mi N of Franklin St in Keosauqua
Type of Work: RCB Culvert Replacement - Single Box
Project Directory: 8900101018

General Information

Measurement units for this survey are US survey feet. This survey is for proposed Culvert reconstruction on IA 1 in Keosauqua, Van Buren County. Project datum and control information is provided by Design Survey Office. This project is a Full DTM Survey. This survey request was for the IA 1 corridor only.

Vertical Control

Vertical datum for this survey is NAVD88 (Computed using Geoid12A). Benchmarks were placed throughout the project using post processed static observations relative to IaRTN Base Network. A minimum of 6hrs of data was simultaneously collected on each of these primary control points.

Van Buren County Control Pt. 141 was checked for vertical tolerance. The vertical difference is about 0.2 ft.
Van Buren County Control Pt. 161 was checked for vertical tolerance. The vertical difference is about 0.2 ft.

Horizontal Control
The project coordinate system for this survey is IaRCS Zone 13 (U.S. Survey Feet). This survey control is relative to IaRTN reference stations. IaRTN Reference Station coordinates are relative to the National Reference Station network datum: NAD83 (2011) for Epoch 2010.00.

Van Buren County Control Pt. 141 was checked for horizontal tolerance. The horizontal difference is about 0.1 ft.
Van Buren County Control Pt. 161 was checked for horizontal tolerance. The horizontal difference is about 0.1 ft.

Point	Name	Northing	Easting	Elevation	Feature Definition
Q121	6534158.35	23503060.65	738.89	BM CGS BENCHMARK DISK STAMPED Q 121 8" ABOVE GROUND LOCATED 111.5' W OF CL CO RD W20 44.3' N OF CL TRACK ROAD 36.4' W OF THE SE CON COR POST OF WIRE FENCE 1' SE OF FIBERGLASS WITNESS POST AND 0.7' S OF WIRE FENCE	
161	6581106.17	23488750.57	673.73	BM COUNTY MONUMENT #161 2-1/2" DIA CAP IN A 5" DIA PVC PIPE WITH AN ALUMINUM ACCESS COVER NEAR VAN BUREN CO HIGHWAY DEPT OFFICE BUILDING	
301	6577129.80	23488154.38	632.06	FENO1 MONUMENT STAMPED #1 50' SE OF CL HWY 1 30' NE OF CL FRANKLIN ST AND 12.5' NW OF NW COR OF VAN BURAN CO HOSPITAL SIGN	
302	6579141.42	23488562.42	639.48	FENO2 MONUMENT STAMPED #2 33' E OF CL HWY 1 AND 21' N OF CL DRIVE AT MAILBOX NO.1576	
141	6570339.43	23490638.29	719.56	BM COUNTY MONUMENT #141 2-1/2" DIA CAP IN A 5" DIA PVC PIPE WITH AN ALUMINUM ACCESS COVER 30' S OF J40 50' E OF HWY 1	

Alignment Information

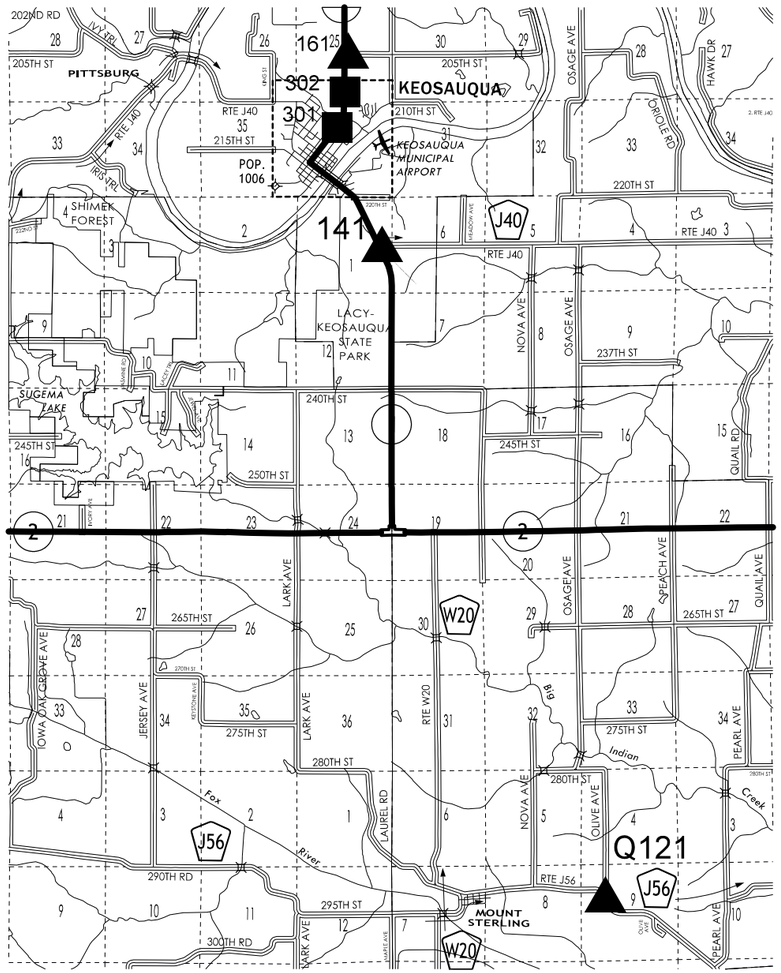
The horizontal alignment for this survey was provided by the IDOT District 5 Land Survey Office, Fairfield, Iowa.

CONTROL POINT VICINITY MAP

This map is a guide to the vicinity of the primary project control points

Primary control is for use with RTK base stations and for RTN validation.

Future surveys will use primary project control to establish temporary control as needed for construction or other surveying applications.



HORIZ. DATUM: NAD83(2011) EPOCH 2013.00

VERT. DATUM: NAVD88

Ia. Regional Coordinate System Zone 13

Coordinate listing from next sheet will be used with IaRTN for monument recovery. No other reference ties are given.

FILE NO.	ENGLISH	DESIGN TEAM	IOWA DOT\McCLURE ENGINEERING Co.	VAN BUREN COUNTY	PROJECT NUMBER	STPN-001-1(32)--2J-89	SHEET NUMBER	G.2

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HORIZONTAL AND VERTICAL PROJECT CONTROL COORDINATE LISTING

HORIZ. DATUM: NAD83(2011) EPOCH 2013.00

VERT. DATUM: NAVD88

Ia. Regional Coordinate System Zone 13

Point	Name	Northing	Easting	Elevation	Feature	Definition
Q121	6534158.35	23503060.65	738.89	BM CGS BENCHMARK DISK STAMPED Q 121 8" ABOVE GROUND LOCATED 111.5' W OF CL CO RD W20 44.3' N OF CL TRACK ROAD 36.4' W OF THE SE CON COR POST OF WIRE FENCE 1' SE OF FIBERGLASS WITNESS POST AND 0.7' S OF WIRE FENCE		
161	6581106.17	23488750.57	673.73	BM COUNTY MONUMENT #161 2-1/2" DIA CAP IN A 5" DIA PVC PIPE WITH AN ALUMINUM ACCESS COVER NEAR VAN BUREN CO HIGHWAY DEPT OFFICE BUILDING		
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141	6570339.43	23490638.29	719.56	BM COUNTY MONUMENT #141 2-1/2" DIA CAP IN A 5" DIA PVC PIPE WITH AN ALUMINUM ACCESS COVER 30' S OF J40 50' E OF HWY 1		

108-23A
08-01-08

TRAFFIC CONTROL PLAN

Single lane traffic shall be maintained on northbound and southbound IA Hwy 1 at all times.

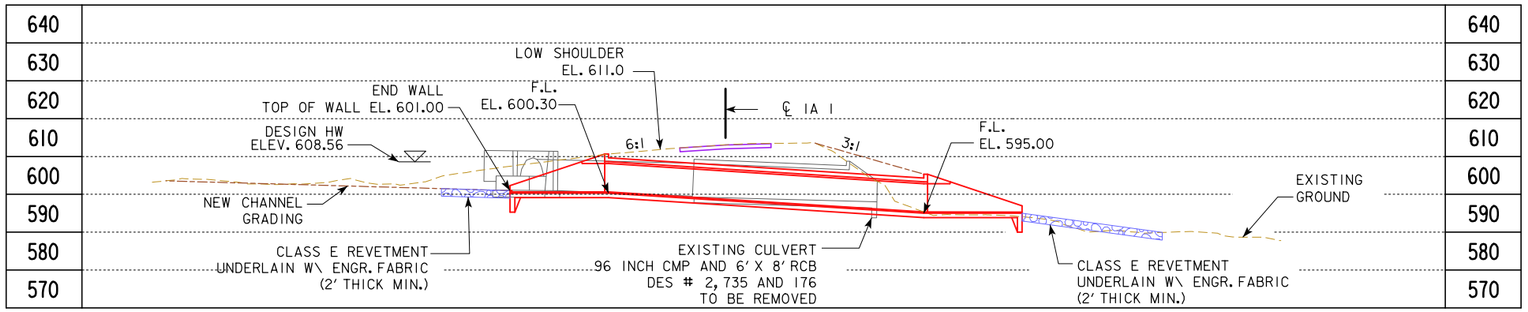
It will be necessary to reduce traffic down to one lane via the use of flaggers and temporary traffic signals during the removal of pavement, culvert removal, and construction of each half of box culvert.

Access to funeral home and daycare/hospital shall be maintained at all times.

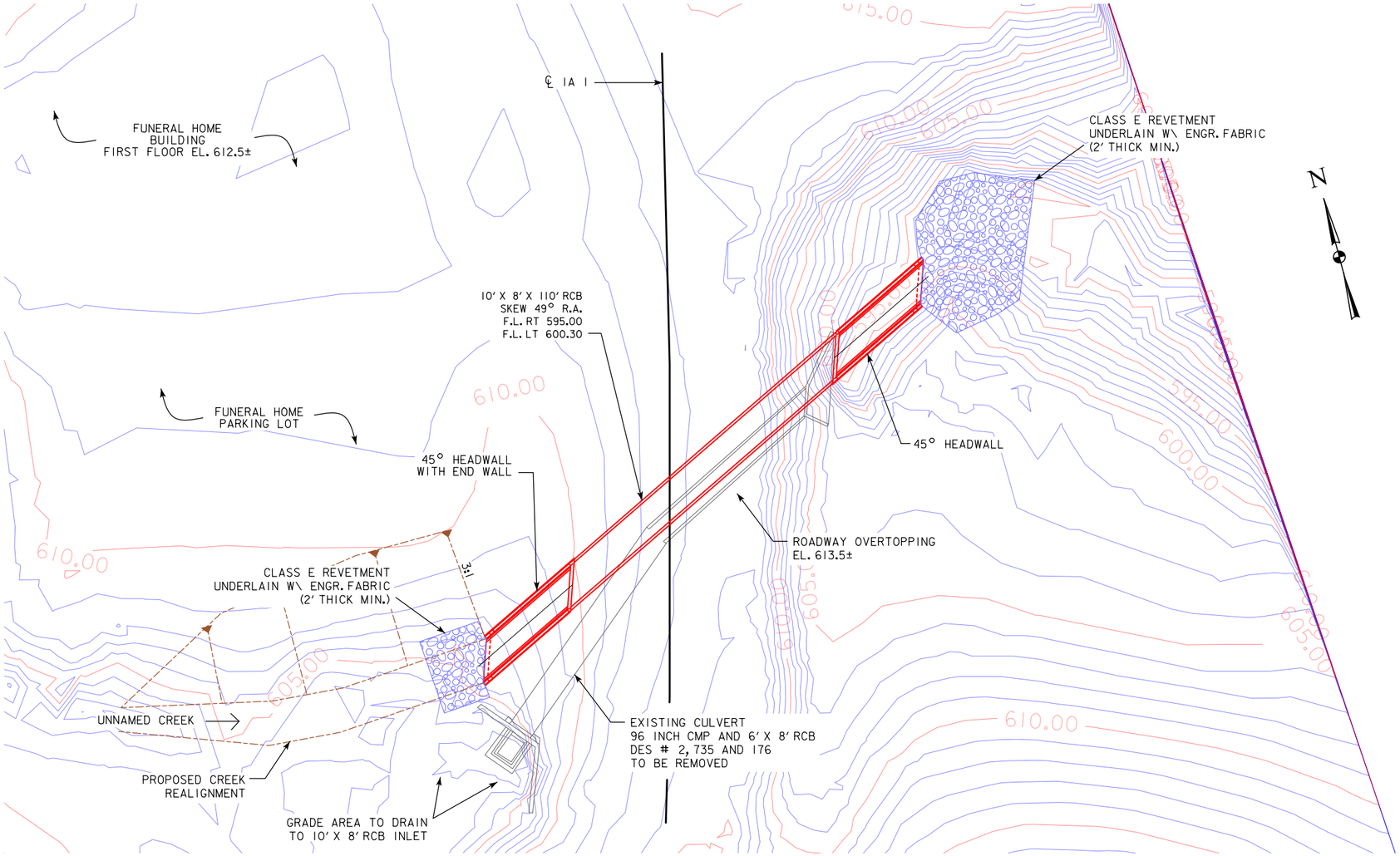
108-25
10-21-14

511 TRAVEL RESTRICTIONS

Route	Direction	County	Location Description	Feature Crossed	Object Type	Maint. Bridge No., Structure ID, or FHWA No.	Type of Restriction	Existing Measurement	Construction Measurement	Construction Measurement as Signed	Projected As Built Measurement	Remarks



LONGITUDINAL SECTION ALONG ℄ CULVERT



SITUATION PLAN

LOCATION

IA-I OVER AN UNNAMED CREEK
T-69N R-10W
SECTION 36
CITY OF KEOSAUQUA
VAN BUREN TOWNSHIP
VAN BUREN COUNTY
LATITUDE 40°44'15.54"N
LONGITUDE 91°57'30.50"W

HYDRAULIC DATA

DRAINAGE AREA = 0.72 SQ. MI.
Q_{50} = 604 CFS
HW ELEV. = 608.56
STREAM SLOPE = 29 FT./MI.

TRAFFIC ESTIMATE

2014 AADT	2,100	V.P.D.
2021 AADT	2250	V.P.D.
2021 DHV	225	V.P.H.
TRUCKS	10	%
TOTAL DESIGN ESALs	-	

0 ENGLISH 40
SCALE IN FEET

CONCEPT

DESIGN FOR 49° SKEW R.A.

10' X 8' X 110' REINFORCED CONCRETE BOX CULVERT

SITUATION PLAN

STATION 1707+44 SEPTEMBER 2017

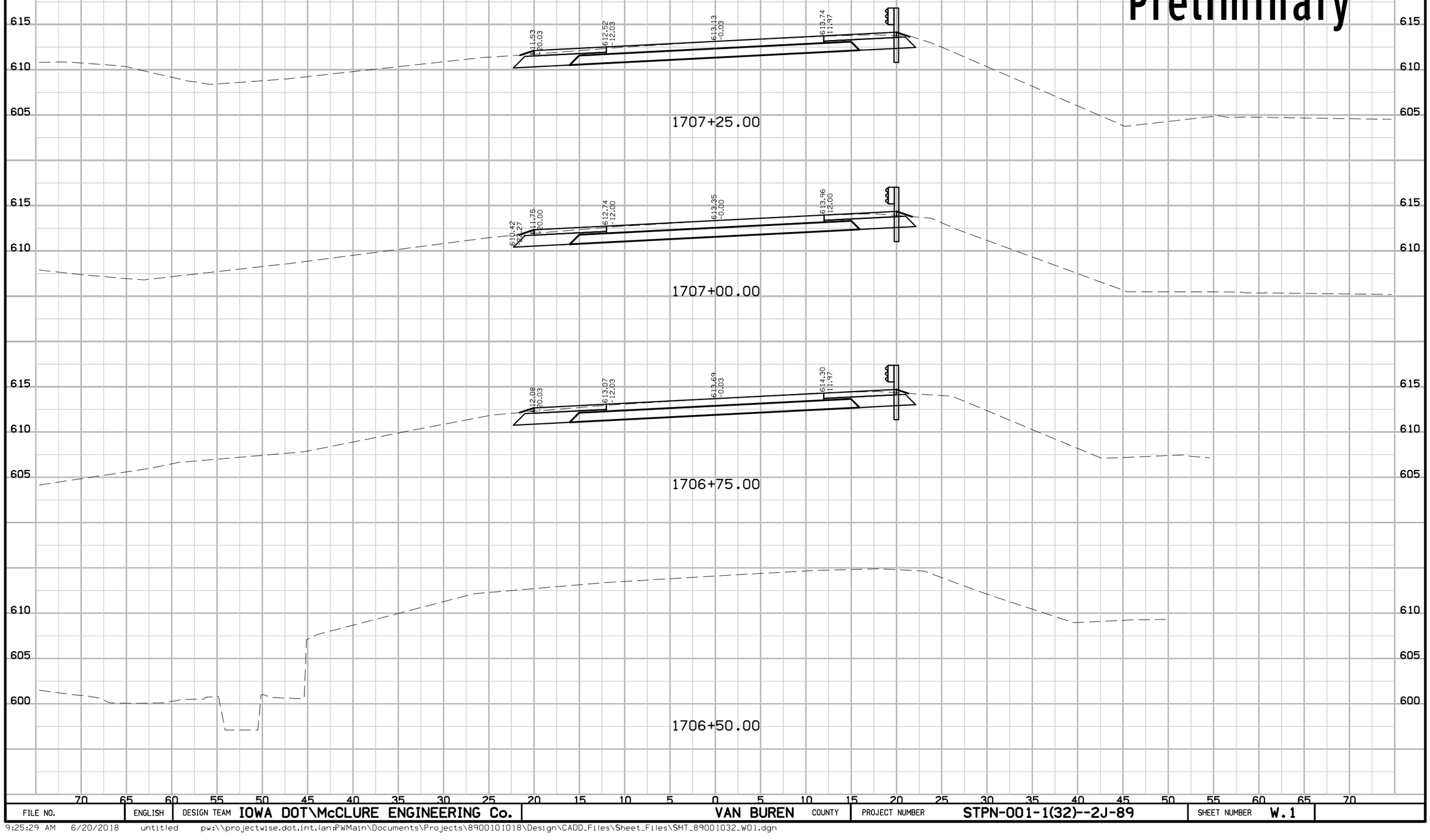
VAN BUREN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. ____ OF ____ FILE NO. _____ DESIGN NO. _____

DESIGN TEAM	McCLURE ENGINEERING Co.	VAN BUREN	COUNTY	PROJECT NUMBER	STPN-001-1(32)--2J-89	SHEET NUMBER	V.1

Highway 3
Preliminary



FILE NO.	ENGLISH	DESIGN TEAM	IOWA DOT\McCLURE ENGINEERING Co.	VAN BUREN	COUNTY	PROJECT NUMBER	STPN-001-1(32)--2J-89	SHEET NUMBER	W.1

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Highway 3
Preliminary

70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70

610 605 600 595 590 615

1708+00.00

611.57
-20.03

612.56
-12.08

613.17
-0.03

613.78
11.97

600.07
62.31

1707+75.00

611.51
-20.03

612.50
-12.03

613.12
-0.03

613.73
11.96

1707+50.00

FILE NO.	ENGLISH	DESIGN TEAM	IOWA DOT\McCLURE ENGINEERING Co.	VAN BUREN	COUNTY	PROJECT NUMBER	STPN-001-1(32)--2J-89	SHEET NUMBER	W.2

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