

LETTING DATE
DEC 15 2026

HMA Resurfacing/Heater Scarification
STP-149-1(100)--2C-90

WAPELLO/MAHASKA/KEOKUK COUNTY



PLANS OF PROPOSED IMPROVEMENT ON THE

PRIMARY ROAD SYSTEM WAPELLO/MAHASKA/KEOKUK COUNTY HMA Resurfacing/Heater Scarification

Approx. 1.1 mi N of US 63 to 0.4 mi S of IA 23

SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

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



For Project Location Map
Refer to Sheet No. A.02

REVISIONS

TOTAL

PROJECT IDENTIFICATION NUMBER

24-90-149-010

PROJECT NUMBER

STP-149-1(100)--2C-90

R.O.W. PROJECT NUMBER

INDEX OF SHEETS

No.	DESCRIPTION
A Sheets	Title Sheets
A.1	Title Sheet
A.2	Location Map Sheet
A.3 - 9	Project Concept
A.10 - 11	Project Design Criteria
A.12 - 16	D2 Questions
B Sheets	Typical Cross Sections and Details
B.1 - 5	Typical Cross Sections and Details
D Sheets	Mainline Plan and Profile Sheets
D.1 - 4	IA 149 Plan Sheets
D.5 - 13	IA 149 As-Built Plan and Profile
J Sheets	Traffic Control and Staging Sheets
J.1	Traffic Control Plan
J.1	511 Travel Restriction
J.1	Coordinated Operations
U Sheets	500 Series, Mod.Stds. and Detail Sheets
U.1	500 Series, Modified Standards and Detail Sheets
U.2	500 Series, Modified Standards and Detail Sheets

PROJECT EVENT DATES

DM5 - 09-01-2026
D-7 - 10-06-2026

KEOKUK COUNTY	
DESIGN DATA RURAL	
2025 AADT	3002 V.P.D.
2045 AADT	3150 V.P.D.
2045 DHV	330 V.P.H.
TRUCKS	11 %
Total Design ESALs	993,480

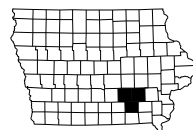
WAPELLO COUNTY	
DESIGN DATA RURAL	
2025 AADT	3002 V.P.D.
2045 AADT	3150 V.P.D.
2045 DHV	330 V.P.H.
TRUCKS	11 %
Total Design ESALs	993,480

INDEX OF SEALS			
SHEET NO.	NAME	TYPE	BID QUANTITY SHEETS
A.1	X	Primary Signature Block	X

PRELIMINARY PLANS

Subject to change by final design.

D2 PLAN - Date: 05/21/2026

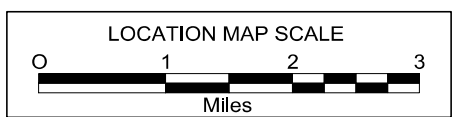
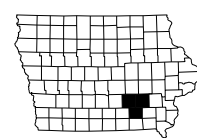
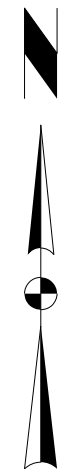
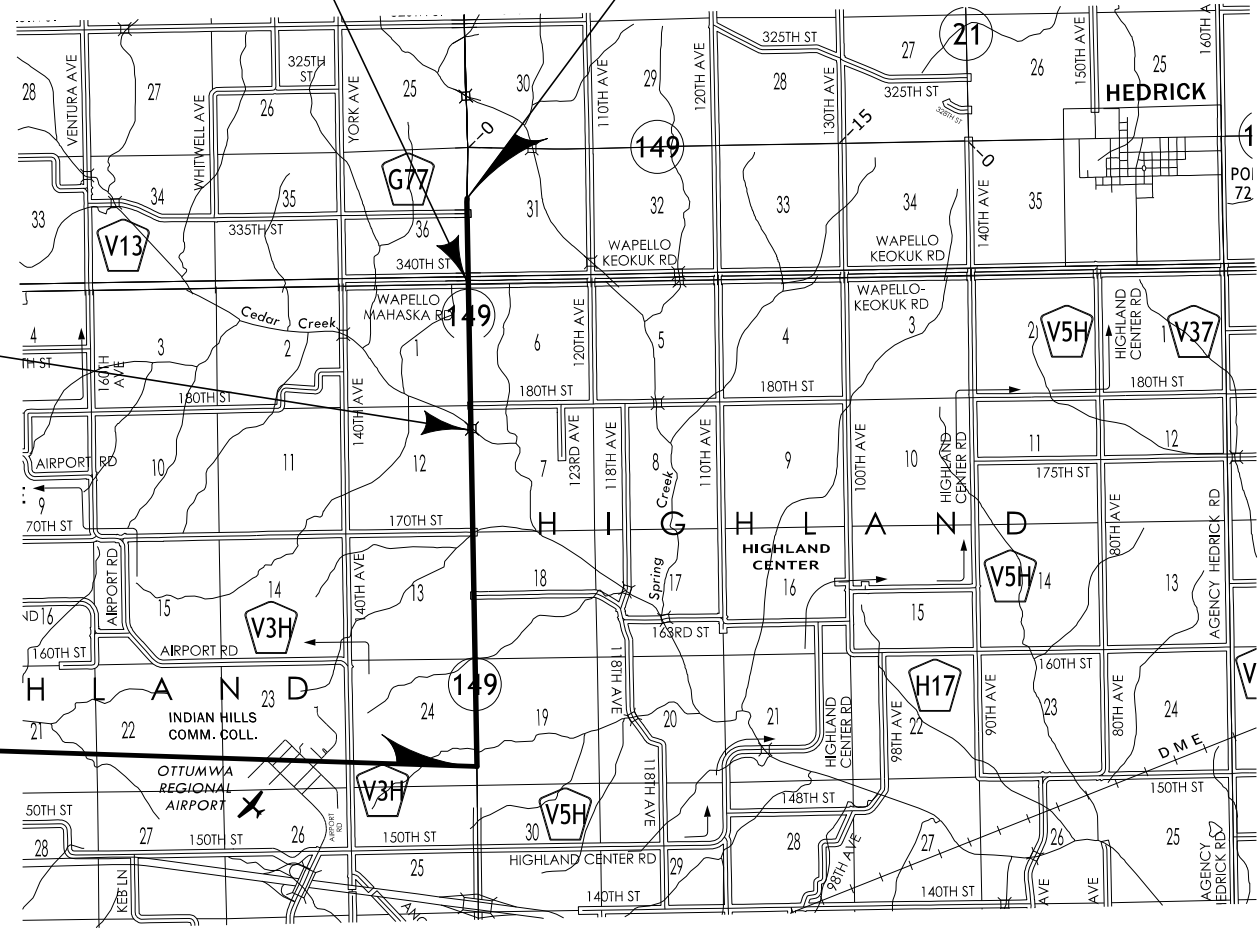


STATION EQUATION
 $1553+24.20 \text{ (BK)} = 853+04.90 \text{ (AH)}$

END PROJECT
 STA. 834+30
 (66) REF. LOC. 11.59

FHWA #050691
 MAINT #9009.9S149

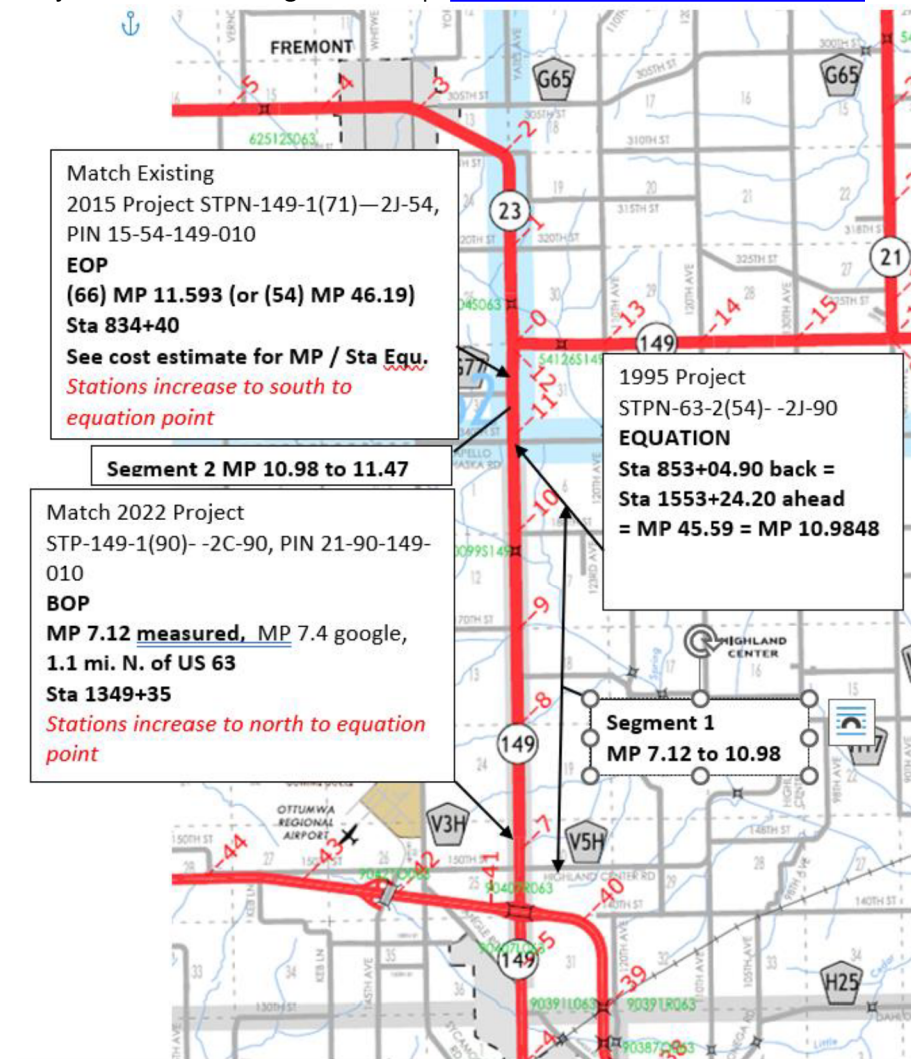
BEGIN PROJECT
 STA. 1349+45
 REF. LOC. 7.12



TO OFFICE: District 5 **DATE:** October 5, 2023
ATTENTION: Bob Younie **COUNTY:** Wapello
FROM: Jim Phillips **PROJ. NO.:** STP-149-1(100)- -2C-90
OFFICE: District 5 Design **PIN:** 24-90-149-010
SUBJECT: FY 2026 3R Concept Statement - Final
FOLDER: [la 149 from North of US 63 to South of Ia 23 3R Final Concept \(100\) 10 5 2023.docx](#)

PROJECT LOCATION:

Iowa 149 from Approx. 1.1 mi. N of US 63 to 0.4 mi S of IA 23
 ProjectWise link to GoogleEarth Map: [S0149-072323-01 Project Package.kmz](#)



PROJECT DATA:

ROUTE: Iowa 149
 LENGTH: 4.47 miles
 PLANNING CLASSIFICATION: 3
 MAINTENANCE SERVICE LEVEL: C
 NHS ROUTE: Yes

TRAFFIC:

IA 149 Wapello COUNTY

DESIGN DESIGNATION DATA SHEET			ESTIMATED	2025	ESTIMATED	ESTIMATED	2045
COUNTY	ROUTE	LOCATION	2025	PERCENT	2045	2045	PERCENT
			ADT	TRUCKS	ADT	DHV	TRUCKS
WAPELLO	149	US 63 to S LINE OF KEOKUK CO	3002	11%	3150	325	11%
TOTAL LENGTH			4.91	3000	11%	3200	330
APPROX. AVERAGE FOR THE TOTAL PROJECT							
PROJECT NUMBER	N/A		ESTIMATE NUMBER		3679		
DATE OF ESTIMATE	December 22, 2022						

ProjectWise link to Traffic Data: [3679a.xlsx](#)

PURPOSE AND NEED:

There is an existing 28 foot wide surface, with 2 ft granular shoulders from Milepost 6.58 to 11.47. A HMA widening unit, along both sides is proposed so that there are 4 ft. wide paved shoulders and 12 foot wide travel lanes minimum. Record drawing: [1995 STPN-63-2\(54\)--2J-90.pdf](#)

Iowa 149 was previously signed as US 63. Iowa 149 was last HMA resurfaced in the year 1995, per Project STPN-63-2(54)- -2J-90, a 3" Binder (Intermediate) course plus 1.5" Surface Course was placed along the mainline roadway at a 28 foot width. Pavement markings are placed for a 12 ft wide lanes. In 2016 there was PCC full depth patching. PW link [2016 Ia 149 Wapello patching MP.pdf](#). The HMA surface of the State Highway is oxidized, cracking and showing signs of distress and needs resurfacing.

See existing conditions, pg. 6. PCI is 56-62.

The 2 ft granular shoulders could be HMA paved 2 ft. wide (plus the aforementioned outside 2 ft in the 28 ft. paved surface, would make a 4 ft functional paved shoulder when the 12 ft lanes are painted), to address edge drop-offs, run-off the road, and cross-centerline crashes.

Paving 2 ft. (2 ft road surface + 2 ft paved shoulder) of the 2 ft. existing granular shoulders may also significantly reduce the amount of time maintenance staff is out along the roadway maintaining the granular shoulder, which may reduce the risk of potential crashes.

FEASIBLE ALTERNATIVES:

Per pg. 6 the Pavement Determination of 1.5 – 3.5” of a functional overlay and the dTims (Primary_CIR with 3” HMA) indicates a similarity in the need for a functional HMA overlay. Constructing a paved shoulder is also an alternative.

Adding HMA paved shoulders would provide some safety improvement and roadway width consistency with other segments of Iowa 149 to the south, and Ia 23 to the north that have existing 4 ft. paved shoulders.

The Pavement Determination table was the primary tool that was used for considering alternative treatments.

3 pavement treatment types were cost estimated and considered:

Each alternate includes an additional 2 ft wide x 4 inch base widening along each side of the 28 foot wide existing pavement, for a functional approx. 6 inch wide granular shoulders, 4 foot wide paved shoulder and 12 foot wide travel lanes. Construct both centerline and shoulder rumble strips.

The 2018 PCC pavement at the Cedar Creek bridge, Milepost 9.9, would not be HMA overlaid.

Alternate 1: 3” HMA milling with HMA overlay \$ 3,180,500

Alternate 2: 3” Cold-in-Place recycling (CIR, max 4”) with HMA overlay \$ 2,663,300

Alternate 3: 2” Hot-in-Place recycling (HIR, max. 3”) with HMA overlay \$ 2,017,700

See the table below for the HMA thickness for 2 different Iowa 149 roadway segments.

Includes 2 ft existing + 2 ft prop. = 4 ft paved shoulder

10/4/2023

Iowa 149 Wapello Co, SUMMARY OF COST ESTIMATES			
ALTERNATES	Ia 149 Segment 1 MP 6.588- 10.98, FY '25	Ia 149 Segment 2, MP 10.98 to 11.467, FY 25	Total Segment 1 and 2
	PCI 58	PCI 56	
ALT 1 3” Mill and x” Overlay	\$2,890,200	\$290,300	\$3,180,500
	3” mill and 6” HMA: 3.0” net profile chnge meets the PD need. PD is 6 in. after 3 in milling	3 in milling w/ 4 in HMA: 1.0” net profile meets the PD need. PD is 4.0 in after 3 inch overlay	
ALT 2 3” CIR w/ x” HMA	\$2,426,700	\$236,600	\$2,663,300
	3 in CIR w/ 4.5” HMA meets the PD need. PD is 4.5 in.	3 in CIR w/ 3” HMA is greater than PD need. PD is 1.5 to 2.5 in. [but 2 lift HMA overlay is needed w/ CIR for smoothness]	
Chosen Alt. ALT 3 2” HIR and x” HMA	\$1,810,100	\$207,600	\$2,017,700 ##
	## had patching in 2016 2” HIR w/ 3.5” matches the PD need. PD is 3.5 in.	2” HIR w/ 1.5” HMA Meets PD need. PD is 1.5 in.	

FY '26, Ia 149
Budget 9 22
2023
\$2,100,000.00

Cost includes the existing PCC finish patches that would need to be converted to composite patches (mill off 3” PCC, place 3” HMA) prior to 2” HIR. See 9 28 2023 field tab, pw:\NTPwint1.dot.int.lan:PWMMain\Documents\Projects\9014901024\DistrictDesign\TABTEXT\Exist PCC patches to convert to composite for HIR\Ia 149 Wapello (100) Exist patch and culvert ext repair locations 9 28 2023 (2).xlsx 359 SY, 10 count
HIR recycles existing HMA pavement resources on the grade, and the end product works as a deterrent to reflective cracking into the new HMA overlay surface and provides pavement smoothness even without an HMA overlay. A microsurface or thin HMA overlay can be helpful to seal the finished surface of the HIR. A 2 lift overlay in Segment 3 is only provided for HMA strengthening, per the PD. HIR max. thickness is typically 3” due to paving train needing to straddle the hot HMA millings. This project proposes 2” HIR to remove the existing 2” HMA surface.

Whereas there are different benefits and estimated costs for each of the 3 segments that may be favored for each individual segment, there are also constructability reasons that support a desire to select a balanced, uniform, reliable and reasonably consistent surface treatment throughout the 2 segments for potentially improved construction cost efficiencies. Due to the smoothness of the end product of the HIR process, a microsurface or single lift HMA overlay is all that is needed to seal the HIR surface. However, this Iowa 149 project has an HMA structural need, in Segment 1, that is greater than a single lift HMA overlay.

RECOMMENDATIONS:

Alternate 3: \$2,017,700

MP 7.12 to 10.98 (3.9 miles) 2.0” Hot-In-Place recycling (HIR) with a 2 lift 3.5” HMA overlay (2” Intermediate, 1.5 inch surface course). See page 9 for gap in surfacing at MP 9.9

MP 10.98 to 11.59 (0.61 miles) 2.0” Hot-In-Place recycling (HIR) with a single lift 1.5” HMA overlay (1.5 inch surface course).

This alternate includes an additional 2 ft wide x 4.0 inch base widening along each side for a functional approx. 6 in wide granular shoulder, 4 foot wide paved shoulder and 12 foot wide travel lanes. Construct both centerline and shoulder rumble strips.

The 2” HIR process needs 3” of HMA at the surface of the existing PCC patches. New Patches to be done before the HIR process are to be full depth HMA patches.

Also place subdrains pg. 7 along 1 side and place shoulder and centerline rumble strips.

Pipe repairs pg.9, patching, and granular shoulder updating are to be included. See page 9 for a foreslope slide repair.

\$ 2,017,700 3R funds See below for Cost Estimate

pending potential Wapello Co side road intersection paving, pg. 4,8,10,12
\$ 2,017,700

Funds Programmed:

FY 2026 has \$ 2,100,000 pending of 3R funds

Here are ProjectWise links:

Cost Estimate: [Ia 149 Wapello MillOverlay, or CIR, or HIR 4 ft paved shld FY 25 - 10 4 2023 - MW Qty.xlsx](#)

Development Schedule:

See pg. 13 for details.

DO: Oct. 20, 2023

Letting: December 16, 2025

PROJECT IMPACTS: Designed by: District/**Design**/Consultant

Design Impact	Assistance Requested (Y/N)	Remarks
ADA:	N	
Agreements/Notification Letters:	Y	Wapello County paved gravel side road option – pending, pg. 4,8,10,12
Bridges and Structures:	N	See Pg. 9
Consultant:	N	
Contracts:	N	
Design/Methods:	N	
Location and Environment:	Y	See pg. 10
Maintenance: (Shop Location)	Y	Ottumwa, potential location to stockpile Cl. 13 Exc. or guardrail
Project Management:	N	
Railroad:	N	
RCE: (Office Name)	Y	Fairfield
Right of Way:	N	
Soils:	N	
Survey/Photogrammetry:	N	
Systems Planning:	N	
Traffic and Safety:	N	
Utilities:	N	
Other:	N	

Cc:

B. Hofer
W.A. Sorenson
B. Bradley
J. Laaser-Webb
R. Harris
C. Brakke
A. Shell
S.P. Anderson
J. Vortherms
B. Hucker
C. Cagle
S. Majors
J. Garton
S. McElmeel
M. Claeys
R. Porter
J. Klein
H. Torres-cacho
N. Moore

S. J. Gent
E.C. Wright
K.K. Patel
C. Poole
N.L. Cuva
D.E. Sprengler
M. Nop
D. Stokes
M. Dell
D. Ta
D. Blue
C. Purcell
B. Beavers
B. Clancy
J. Woodcock
B. Lauderman
R. Fiedler
C. Steffensmeier
FHWA Program.Delivery-IA@dot.gov

M.J. Kennerly
K.D. Nicholson
K. Brink
G. Karssen
M.A. Swenson
J.S. Nelson
J. Ellis
E. Gansen
H. Beach
J. Bartholomew
J. Hart
M. Solberg
L. Finarty
D. Bielser
B. Beavers
FHWA
J.Ridlen
D.Heeren

CONCEPT ANALYSIS & SUPPORTING DATA:

Date of Field Review: Sept. 22, 2023

Participants: Martin Scharff, Jay Ridlen, Jim Phillipe

PAVEMENT:

Existing Conditions:

The PCI is 53-62, the wheel path rutting is .22 -.31 inches which could contribute to hydroplaning, and the roughness, IRI is approx. 100-112 (upper threshold 253, desired 32-100).

Pavement History:

See the Project Wise link from Project Prioritization Scoping tool download: [S0149-072323-01 Project Package.xlsx](#) and Record drawings: [2003 Resurface NHSX-063-2\(66\).pdf](#) and the pavement history [6 20 2022 Road Review Inventory of Needs Dist 5 only Milepost Book V2022 6 1 2020 data.xlsx](#)

PMIS Data:

See attached Quick Look sheet, pg 14.

Pavement Recommendation:

Segment	MP	MP	DIR	TESTED	80% SR	AVG K (psi/in)	Interpolated Res. Mod. (psi)	Alternate 3	Alternate 2	Alternate 1	SN5 = 136
								20 Year HIR Structural Need	20 Year CIR Structural Need	3" mill and " HMA 20 Year Structural Need	
								in. Overlay Thickness after 2.0" HIR (in.)	in. Overlay Thickness after 4.0" CIR (in.) [use 3.0" CIR since existing 28 ft overlay is 3 in thick]	in. Overlay Thickness after 3.0" Mill (in.)	
1	6.13	6.71	B	4/8/2019	4.08	172	3940	0.5 (say 1.5", net Profile Grade change 1.5")	1.5 (say 3" since CIR needs 2 lift overlay for smoothness, net PG change is 3")	3 (say 4", net PG change 1")	1927 PC7 7.0, 1960 AAC 1.5 AAC 1.5, 1985 AAC 1.5 AAC 1.5 MIL 1.5, 2003 AAC 2.0 BAC 2.0, 2003 AAC W 7.0
1	6.71	10.26	B	10/5/2021	3.93	107	3084	1.5 (say 1.5")	2.5 (say 3" since CIR needs 2 lift overlay for smoothness)	4 (say 4")	1927 PC7 7.0, 1960 AAC 3.0, 1971 AAC 3.0, 1995 AAC 1.5 AAC 1.5
1	10.26	11.06	B	3/27/2017	3.51	179	4129	1.5 (say 1.5")	2.0 (say 3" since CIR needs 2 lift overlay for smoothness)	4 (say 4")	1927 PC7 7.0, 1960 AAC 3.0, 1971 AAC 3.0, 1995 AAC 1.5 AAC 1.5
2	11.06	11.69	B	3/27/2017	2.78	123	3276	3.5 (say 3.5", net PG 3.5")	4.5 (say 4.5", net PG 4.5")	6 (say 6", net PG change 3")	1929 PC7 7.0, 1952 BAC 1.5 TBB 1.5, 1960 AAC 1.5 AAC 1.5, 1971 AAC 1.0, 1981 AAC 1.5 RAC 1.0, 1995 AAC 1.5 AAC 1.5 MIL 2.0

(say = common thickness in a road segment, for better uniformity in the constructability)

[PD highlighted Wapello, Keokuk 149.xlsx](#)

The above Pavement Determination of 1.5 – 3.5" of structural need, after HIR and the dTims report below shows a Primary_CIR (CIR plus 3" HMA) which indicate some differences in the need for HMA overlay thickness – depending upon the method.

dTims Treatment, Status Quo Report link:

<https://iadot.sharepoint.com/:x:/s/XDIV/TAM/PMSC/EeryYJGZm0VKik3HGM1r6S8BeLIH2b43Og9Qf1a69YN22Q?wdLOR=c3D7E42B3-8C8B-42D2-8AB1-AEA6BA97C12A>

FROM	TO	LANE_MIL	DESCRIPT	NYEA	BUDGET_SCENARIO	PCI	CRACK_RATI	IRI	RL	FAULTAV	TREATMENT
5.576242	6.297025	1.54	From JCT IA 149/US 63 North to 0.2 Mi N of Old IA 389		2026 Network - Status Quo	94.93	0	60	0		0 PRI_CIR
9.738122	10.550422	1.62	From 0.8 Mi S of W/K CoL North to the Wapello/Keokuk Cc		2028 Network - Status Quo	94.93	0	60	0		0 PRI_CIR

PAVEMENT cont'd:

Subdrains:

Per 1995 project STPN-63-2(54)- -2J-90 there is 0% existing longitudinal subdrain. The proposed improvement includes placing subdrains such that there will be 100% subdrains along 1 side.

Patching/Curb Repairs:

Patch tab is pending data collection. The HIR process needs a minimum of 2" (desire 3") of HMA at the surface of the existing PCC patches – to make them composite patches. **A tabulation of existing patches was obtained 9 28 2023, 10 patches, 359 SY** Link : [la 149 Wapello \(100\) Exist patch and culvert ext repair locations 9 28 2023 \(2\).xlsx](#) . Rec. drawing: [2016 la 149 Wapello patching MP.pdf](#) New Patches to be constructed before the HIR process are to be full depth HMA patches.

ADA/Sidewalk/Trails:

None

Benefit-Cost Safety tool: [3R Spreadsheet Tool 1.xlsx](#)

and Safety Integration: **Complete Streets:** ProjectWise link, no Needs test: [RE Complete Streets 3R FY '25 Iowa 149 Wapello Co PIN 24-90-149-010 STP-149-1\(100\)--2C-90.msg](#) If there is no space for additional paved shoulder width, the project is exempt from the Complete Streets Policy as follows. *If ROW acquisition would be necessary for the sole purpose of providing bicycle accommodations, the provision of facilities shall not be required as per Section 2.2.d. of the Complete Streets Policy.*

SAFETY:

3R Design Criteria:

Acceptable Values for 3R Roadway Features						Project Values
DESIGN ELEMENT	FREEWAY	NON-FREEWAY				
Regulatory Speed (mph)	65/55	55	45	35	25	55
Minimum Vertical Curve (mph)	65/55	35	25	15	5	n/a
Maximum Horizontal Curve (degrees)	3	6	8	14	28	n/a
Maximum Gradient	3%	6%	7%	10%	13%	n/a
Lane Width (feet)	12	12	11	11	11	12
Parking Lane Width (feet)	--	--	8	8	8	n/a
Shoulder Width (feet)	10/6	6	4	4	2	4, pg. 2
Foreslopes	3:1	3:1	3:1	--	--	n/a
Transverse Slopes	6:1	6:1	6:1	--	--	n/a
Horizontal Clearance (feet)						
Bridge Width	Approach Lanes + Shoulder Width		Approach Lanes + Offset			See Note 1
Vertical Clearance - Over NHS (feet)	16.5	16.5	16.5	16.5	16.5	n/a
Vertical Clearance - Over Local (feet)	14.5	14.5	14.5	14.5	14.5	n/a

Note 1: See the list of Structures on pg. 9

SAFETY cont'd:

Crash Analysis:

For crash data, see the Project Wise link from the Project Prioritization Scoping tool download: [S0149-072323-01 Project Package.xlsx](#) and from ICAT [la 149 Crash Characteristics 2018 - 2022.pdf](#)

Corridor Crash History:

Over the course of 5 years, 2018-2022, 33 crashes are reported including major causes of 7 animal, 8 Run off the road, 3 distracted driver, 3 FTYROW, 2 driving too fast for conditions, 1 Operating vehicle in reckless manner, 1 followed too close, 2 passing, 2 made improper turn.

The severities are 0 Fatal, 2 Major injury, 1 Minor injury, 6 Possible / Unknown, and 24 Property Damage only.

A crash rate of 123 per HMVMT which is greater than the Rural Statewide average is 93 per HMVMT. Here is a ProjectWise link to the crash rate: [la 149 Wapello CrashRates.xls](#)

Intersection Crash History: Not applicable. **Intersection Analysis, Side Roads:**

No Analysis done for this project.

The proposed paved shoulders are to be continued through existing gravel side roads. If fillets or further paving is needed at a side road, this can be done after the widening is complete.

Wapello County is to be contacted to determine their interest in participating in a Preconstruction Agreement for the paving of gravel public side road intersections, per Std detail 7149. See pg. 4,10,11

The proposed paved shoulders are to be gapped at existing paved side roads.

Railroads:

n/a

Additional Safety & Operation Considerations:

n/a

STRUCTURES and DRAINAGE:

Bridges:

FHWA No.	Maint. No.	Size/Type	Year Built	BDO/Rehab Year	Bridge Rail Height	End Post Type	Vertical Clearance	Future Projects
50691	9009.9S149	214 x 44 ft	2018	n/a	2'10"		n/a	Note 1

Comments from bridges and Structures: [STP-149-1\(100\)--2C-90 BSB Review Comments.xlsx](#)

Maint. No.	FHWA No.	Size/Type	Skew Angle	County	Over	On NHS	Year Built	Rail Retrofit Year	BDO/Rehab Year	Bridge Rail Height	Vertical Clearance	Future Project	GR Trans.	GR End Terminal
9009.9S149	050691	214'-0 x 44'-0 Continuous Concrete Slab Bridge	37° Skew (L.A.)	Wapello	1A 149 over Cedar Creek	No	2018	---	---	34"	---	---	Current	Current

Maint. No.	GR Paved Shoulders	Rail Endpost Taper	Rail Endpost Height	Abutment Type	Approaches	Notes	Recommendations
9009.9S149	Paved	No	34"	Integral Concrete	Both approaches are paved with PC concrete.	Guardrail components meet the current standards. Minor accumulation of debris in gutters.	No recommendations.

Note 1: Continuous concrete slab beam bridge MP 9.9, Iowa 149 over Cedar Creek, Bridge Report: [Bridge 9009 pt 9 S149 report.pdf](#) Guard Rail Const. yr: 2018. The end terminals are the current standard. **Recommend to UAC the guard rails.** Guard rail height = 34" (minimum 32")
 The proposed HMA overlay raises the road profile 3.5". Plan to provide a HMA runout to **gap the bridge** approaches south bridge and bridge approaches (gap new PCC pavement and bridge from Sta 1489+00 to 1499+50, MP 9.759 to 9.961) and UAC the guard rail. Bridge Plans: [2018 MP 9 bridge replacement Cedar Creek BRFN-149-1\(68\)--39-90.pdf](#)

Note 2: UAC Twin 60 inch dia culvert MP 8: UAC 28 ft. wide x 30 ft long PCC pavement Iowa 149 over drainage way. No Existing guardrail. Culvert plans: [2014 MP 8 Const Twin RCP and Pavement RCB removal STPN-149-1\(70\).PDF](#) The proposed HMA overlay raises the road profile 3.5". Plan to 30 ft gap the HIR process. Provide a HMA overlay of the PCC.

Culverts/Pipes:

Pending field data gathering.

The existing RCB culverts were previously extended with RCP culverts.

Over the years, several of the RCP extensions have separated and / or failed.

District Maintenance has substituted the RCP with plastic extensions and they are performing well.

Maintenance identified, 9/28/2023, which existing box culverts (3), extended with round pipe are still in need of repair and which extensions are to be removed and reinstalled, with a concrete collar, as a part of this project. MP 10.784, 10.874, 11.008.

Since Ia 149 is a non-NHS route, plan to UAC the existing entrance / transverse slopes. They do not need to be flattened per Design Manual 3F-3, Road Standard EW-501, and Tab 102-14.

ProjectWise link to sample culvert updates on NHS routes: [updated 4 7 22 54-0928-043 tabs.xlsm](#)

Guardrail:

See the above structure notes for the guard rail and paved shoulder.

Foreslope slide repair: none Drainage District: n/a

PROJECT IMPACTS:

Impacts Map:

See the Project Prioritization / Scoping tool for all Office of Location and Environment Hotspots, Outstanding Iowa Waters, railroad crossings, bridge numbers, major utilities, etc.

Link: [Ia 149 Impacts 7 23 2023.docx](#)

Environmental:

See the above Project Prioritization / Scoping tool Ia 149 Impacts summary link for wetlands, parks, historic/cultural resources, etc.

Clearing and Grubbing information is pending field data collection.

Pipe repairs are pending field data collection. See pg. 9

TSMO/Traffic Control:

Traffic to be maintained at all construction times with Traffic Control devices.

ROW:

None

Agreements/Notification Letters:

Wapello County is to be contacted, pg. 4,8,12 to determine if the County would like to participate in a Preconstruction Agreement for the paving of gravel public side road intersections per Std detail 7149.

Project Coordination:

No other projects are in the vicinity.

Previous Projects List:

See the 3R Construction History tab within the Project Wise link from the Project Prioritization Scoping tool download: [S0149-072323-01 Project Package.xlsx](#) and [6 20 2022 Road Review Inventory of Needs Dist 5 only Milepost Book V2022 6 1 2020 data.xlsx](#) and the record drawings [2003 Resurface NHSX-063-2\(66\).pdf](#) and [2018 MP 9 bridge replacement Cedar Creek BRFN-149-1\(68\)--39-90.pdf](#)

Future Projects List:

None

FEASIBLE ALTERNATIVES & RECOMMENDATION:

Feasible Alternatives:

Per pg. 6 the Pavement Determination of 1.5 – 3.5“ of a functional overlay and the dTims (Primary_CIR with 3” HMA) indicates a similarity in the need for a functional HMA overlay. Constructing a paved shoulder is also an alternative. Gap the bridge and pavm’t at MP 9.9, see pg. 9 Adding HMA paved shoulders would provide some safety improvement and roadway width consistency with other segments of Iowa 149 to the south, and Ia 23 to the north that have existing 4 ft. paved shoulders.

The Pavement Determination table was the primary tool that was used for considering alternative treatments.

3 pavement treatment types were cost estimated and considered:

Each alternate includes an additional 2 ft wide x 4 inch base widening along each side of the 28 foot wide existing pavement, for a functional approx. 6 inch wide granular shoulders, 4 foot wide paved shoulder and 12 foot wide travel lanes. Construct both centerline and shoulder rumble strips.

The 2018 PCC pavement at the Cedar Creek bridge, Milepost 9.9, would not be HMA overlaid.

Alternate 1: 3” HMA milling with HMA overlay \$ 3,180,500

Alternate 2: 3” Cold-in-Place recycling (CIR, max 4”) with HMA overlay \$ 2,663,300

Alternate 3: 2” Hot-in-Place recycling (HIR, max. 3”) with HMA overlay \$ 2,017,700

See the table below for the HMA thickness for 2 different Iowa 149 roadway segments.

Includes 2 ft existing + 2 ft prop. = 4 ft paved shoulder

10/4/2023

Iowa 149 Wapello Co, SUMMARY OF COST ESTIMATES			
ALTERNATES	Ia 149 Segment 1 MP 6.588- 10.98, FY '25	Ia 149 Segment 2, MP 10.98 to 11.467, FY 25	Total Segment 1 and 2
	PCI 58	PCI 56	
ALT 1 3” Mill and x” Overlay	\$2,890,200	\$290,300	\$3,180,500
ALT 2 3” CIR w/ x” HMA	\$2,426,700	\$236,600	\$2,663,300
Chosen Alt. ALT 3 2” HIR and x” HMA	\$1,810,100	\$207,600	\$2,017,700 ##
## had patching in 2016	2” HIR w/ 3.5” matches the PD need. PD is 3.5 in.	2” HIR w/ 1.5” HMA Meets PD need. PD is 1.5 in.	

FY '26, Ia 149 Budget 9 22 2023

\$2,100,000.00

Cost includes the existing PCC finish patches that would need to be converted to composite patches (mill off 3” PCC, place 3” HMA) prior to 2” HIR. See 9 28 2023 field tab, pw:\NTPwint1.dot.int.lan:PWMMain\Documents\Projects\9014901024\DistrictDesign\TABTEXT\Exist PCC patches to convert to composite for HIR\Ia 149 Wapello (100) Exist patch and culvert ext repair locations 9 28 2023 (2).xlsx 359 SY, 10 count
HIR recycles existing HMA pavement resources on the grade, and the end product works as a deterrent to reflective cracking into the new HMA overlay surface and provides pavement smoothness even without an HMA overlay. A microsurface or thin HMA overlay can be helpful to seal the finished surface of the HIR. A 2 lift overlay in Segment 3 is only provided for HMA strengthening, per the PD. HIR max. thickness is typically 3” due to paving train needing to straddle the hot HMA millings. This project proposes 2” HIR to remove the existing 2” HMA surface.

Whereas there are different benefits and estimated costs for each of the 3 segments that may be favored for each individual segment, there are also constructability reasons that support a desire to select a balanced, uniform, reliable and reasonably consistent surface treatment throughout all 3 segments for potentially improved construction cost efficiencies. Due to the smoothness of the end product of the HIR process, a microsurface or single lift HMA overlay is all that is needed to seal the HIR surface. However, this Iowa 149 project has an HMA structural need, in Segment 1, that is greater than a single lift HMA overlay.

RECOMMENDATIONS:

Alternate 3: \$2,017,700

MP 7.12 to 10.98 (3.9 miles) 2.0” Hot-In-Place recycling (HIR) with a 2 lift 3.5” HMA overlay (2” Intermediate, 1.5 inch surface course). See page 9 for gap in surfacing at MP 9.9

MP 10.98 to 11.59 (0.61 miles) 2.0” Hot-In-Place recycling (HIR) with a single lift 1.5” HMA overlay (1.5 inch surface course).

This alternate includes an additional 2 ft wide x 4.0 inch base widening along each side for a functional approx. 6 in wide granular shoulder, 4 foot wide paved shoulder and 12 foot wide travel lanes.

Construct both centerline and shoulder rumble strips.

The 2” HIR process needs 3” of HMA at the surface of the existing PCC patches. New Patches to be done before the HIR process are to be full depth HMA patches.

Also place subdrains pg. 7 along 1 side and place shoulder and centerline rumble strips.

Pipe repairs pg.9, patching, and granular shoulder updating are to be included. See page 9 for a foreslope slide repair.

\$ 2,017,700 3R funds See below for Cost Estimate

pending potential Wapello Co side road intersection paving, pg. 4,8,10

\$ 2,017,700

Funds Programmed:

FY 2026 has \$ 2,100,000 of 3R funds

Here are ProjectWise links:

Cost Estimate: [Ia 149 Wapello MillOverlay, or CIR, or HIR 4 ft paved shld FY 25 - 10 4 2023 - MW Qty.xlsx](#)

Development Schedule:

See pg. 13 for details.

DO: Oct. 20, 2023

Letting: December 16, 2025

Roadway	IA 149		
PIN Number	24-90-149-010	Submittal Date	04/01/26
Project Number	STP-149-1(100)--2C-90		Approval Date
District	District 5	Assistant District Engineer	Steven McElmeel
County	WAPELLO	or	
Route	IA 149	Office Director	
Location	Approx. 1.1 mi N of US 63 to 0.4 mi S of IA 23		
Work Type	1526 - HMA Resurfacing/Heater Scarification		
Segment Manager	Kyle Schrock		
Designer	William McNamara		

[Design Manual Section 1C-1](#)
[Last Updated: 04-29-19](#) **Rural Two-Lane Highways (Rural Arterials)**

Design Element	Preferred	Acceptable	Project Values
Design speed (mph)	60	50	55 posted
Maximum superelevation rate (Refer to Section 2A-2)	6%	8%	N/A (Note 4)
Design lane width (ft)	12	12	12
Full depth paved width (ft)	12	12	12
Right turn lane (ft)	12	10	N/A
Climbing Lane (ft)	12	12	N/A
Left turn lane (ft)	12	10	N/A
Pavement cross-slope (on tangent sections)	Through lanes	1.5% minimum, 2% maximum	2 (Note 1)
	Auxiliary and turn lanes	3% maximum	N/A
	Crown break at centerline	4% maximum	4 (Note 1)
Shoulder cross-slope (on tangent sections)	4%	Shoulder cross-slope cannot be less than the adjacent lane, 6% max for paved or granular shoulders, 8% max for earth shoulders	2 (Note 1)
Curb type (Refer to Section 3C-2)	Design speed = 50 or 55 mph	6-inch sloped	N/A
	Design speed ≥ 60 mph	4-inch sloped	N/A
Foreslope (For fill areas greater than 40 ft, contact the Soils Design Section for assistance)	Adjacent to shoulder	10:1 for 4' then 6:1	1.5:1 (Note 2)
	Beyond standard ditch depth and design clear zone	3.5:1	N/A
	Curbed roadways	2%	N/A
Backslope (For cut areas greater than 25 feet, contact the Soils Design Section for assistance with backslope benches.)	3:1	2.5:1	1.5:1 (Note 2)
Transverse Slopes	w/ drainage structures	8:1	(Note 3)
	w/o drainage structures	10:1	(Note 3)
Ditches (Refer to Section 3G-1)	Outside ditch (depth x width) (ft)	5 x 10	2 x 2 (Note 2)
Bridge width—new*	Bridge length ≤ 200 ft	design lane widths + effective shoulder widths	N/A
	Bridge length > 200 ft	design lane widths + effective shoulder widths	N/A
Bridge width—existing*		design lane widths + no less than 2 ft left and right	44 (Note 5)
Vertical clearance (ft) (above lanes, shoulders and 25 feet left and right of the center of railroad tracks)	Over primary	16.5	N/A
	Over non-primary	16.5 at interchange locations, 15 at all other locations	N/A
	Over railroad	23.3	N/A
	Sign trusses and pedestrian bridges	17.5	N/A
Structural Capacity	Contact Office of Bridges and Structures	Contact Office of Bridges and Structures	
Level of Service	B	B	C

*FHWA notification via email is required if acceptable criteria is not met on the NHS system (No formal design exception is required)

- NOTES:**
- Note 1: 1995 Plan-set STPN-63-2(54)--2J-90 shows a slope of minimum 2%, maximum 3% through to the edge of paved shoulder (2') on modified detail 2602 with a fillet section for granular material from 7134.
 - Note 2: 1960 Plan-set FN-259(2) indicates that there may be Slope of 3:1 and ditch bottom of 10'; the 1952 P-510BCD appears to be more applicable with 1.5:1 FS and BS with 2' wide ditches, depth of 2'.
 - Note 3: Unknown. Evidence of foreslope flattening could not be found in record drawings.
 - Note 4: There are no circular curves within the project limits.
 - Note 5: 2018 Plan-set BRFN-149-1(68)--39-30 Bridge Replacement over Cedar Creek, Design 218.

D2 Question for District 5:
Date: Tuesday, 19 May 2026
Times: 10 AM - 12:15 PM Ottumwa Maintenance Garage and 12:15 PM - 1:00 PM at Project Limits
Description: D02 Field Exam
Location: Ottumwa Maintenance Garage and Project Limits

Attendees:

William McNamara (Ames Road Design)
Elijah Ingram (Ames Road Design / ODAC)
Kari Jackson (Ames Road Design)
Steven McElmeel (District 5, Assistant District Engineer)
Jared Klein (District 5, Staff Engineer)
Jared Roberts (District 5, Staff Engineer)
Jay Ridlen (District 5, Maintenance Supervisor - Ottumwa)

County : Wapello
Project Code : 24-90-149-010
Phase Number : STP-149-1(100)--2C-90
Location : Approx 1.1 mi N of US 63 to 0.4 mi S of IA 23
Work Code : 1526-HMA Resurfacing/Heater Scarification
Project Directory : 9014901024
Project Manager : Steven McElmeel

1. PROJECT LIMITS

- a. Beginning of Project, MP 7.12 measured, STA. 1349+35. This location was the end of a prior 3R project and has a clear interface from Google Earth (HMA-HMA interface).
Beginning of the project is confirmed to be as located for the D02 field exam.
- b. End of Project, MP 11.593, STA. 834+40 (Project Concept) or STA. 821+55 (Google Earth). In prior discussions the intent was to end the project at the HMA-HMA interface (also seen in as a change in shoulder width).
The end of the project was moved to the end of the intersection of IA 23 and IA 149 to avoid an orphaned section of pavement. Instead of a small project later, we will address the need now with a mill and fill of 2". Refer to Pavement Design for specifications from Danny and address the issue noted by maintenance.
This new pavement section starts where the existing shoulder changes from 2' to 4' and shall continue north until the beginning of a previous 3R project which has a clear interface. The mill and fill shall continue through the returns to the east until the interface with the existing microsufacing surface from a 2015 project.
Follow-up: Project Location to include IA 23 and IA 149 Intersection.

2. PAVEMENT DESIGN

- a. Road Design will be working with Danny Zeimen in Materials to determine the appropriate Pavement Specifications.

- b. ADDITIONAL SECTION to EOP: Refer to End of Project addition where a mill and fill of 2" is going to be provided to eliminate an orphaned section of pavement at the intersection of IA 23 and IA 149. Maintenance noted that there is a lot of rutting occurring at the intersection and if there was anything we could do to stiffen the pavement up for better performance.
- c. Follow-up Item: HIR gap and runout. Does the rejuvenating agent, freshness of course and oil, prevent the surface course from binding and making the surface course effectively act as an unbonded course?

3. HOT-IN-PLACE RECYCLING (HIR)

a. SUGGESTED STAGING FOR HIR

Please confirm the Suggested Staging for Hot In-Place Recycling adjacent to Base Widening shall follow the decisions discussed for IA 1 Washington (NHSX-001-4(062)—3H-92 (PW: 9200101023): There appears to be benefits to installing the HMA Base Widening prior to the HIR operation (1) the HIR construction vehicles and Pilot Cars should be able to use the Base Widening for added support and (2) the cold joint of the HMA Shoulder (Base Widening) being adjacent to the existing pavement that's being Hot In-Place Recycled will indirectly become more of a heated-sealed joint and there will be less reflective cracking (the District was not concerned about the HIR operation potentially cutting into the HMA Base Widening). Road Design shall add a Suggested Staging Note to J Sheet Tab 108-26A (Staging Notes) about installing the Base Widening prior to the HIR operation and mention the benefits, but it would remain the Contractor's option.

Mobilization may be an issue, with the several different steps to construct the roadway in the described manner. However, with this project we are going to keep the two operations separate with the base widening coming first to address the jointing.

b. BID ITEMS

Road Design will need to confirm with Danny Zeimen and John Hart in Materials on the appropriate way to bid HIR. Previously, a conflict existed between the 2309 and Special Provisions (2599) bid items.
Jared noted that all of these bid items may be resolved and listed as regular bid items now.

4. TYPICAL SECTIONS

a. Review of typical Sections

The D2 plans have the typicals flipped with what the station is supposed to be between B.1 and B.3. The first part of the project shall be 2" HIR with 1.5" HMA Surface Course, followed with the section of 2" HIR, with 2" HMA Intermediate Course, and 1.5" HMA Surface Course. Added to the end of the project was the IA 23 and IA 149 intersection that shall consist of a 2" mill and fill.

- b. Should the typical section (2" HIR, 2" HMA Intermediate Course, 1.5" HMA Surface Course) continue through the HIR culvert gap? Page 9 of the Project Concept has a HIR gap for 30' and providing an HMA overlay of the PCC surface. Google earth and the 2014 pipe culvert as-built indicate that the section is full depth HMA (1.5" HMA Surface Course, 12" HMA Intermediate Course).

If the section that was planned to be gapped is HMA instead of PCC go ahead and with the typical section through. The as-builts indicate that the section is full depth HMA as described above.

5. EXISTING PAVED SHOULDER

- a. The original pavement was PCC Widened for 12' lanes. Later 2' HMA shoulders were added on in 1995. Existing shoulder section may consist of some edge rut material below two lifts of 1.5" Type 'A' Asphalt Cement Concrete. Refer to 1995 STPN-63-2(54)--2J-90 for record drawing of existing HMA Shoulder.
Utilize the granular fillet that Road Design proposed instead of the 0.5' granular shoulder listed in the project concept.
The existing conditions are not workable to provide additional standard granular shoulder beyond the existing 4' composite shoulders.

6. PROPOSED PAVED SHOULDER

- a. Should the base widening include the existing 2' paved shoulder? Page 3 of the Project Concept identifies a 2' base widening unit. The existing roadway was PCC widened to form full 12' lanes and was later widened to have 2' shoulders. Prior discussion has indicated that having multiple thin widening units may not perform well over time and our preferred method is to remove the existing shoulder widening and do a new paved shoulder of proposed width. I believe this topic was discussed previously for this project and William didn't record it post Teams call.
Road Design will proceed with a clean new installation of the 4' paved shoulder by removing the 2' existing paved shoulder. See BASE WIDENING THICKNESS and SPECIAL BACKFILL sections for further details.

7. BASE WIDENING THICKNESS

- a. Page 4 of the Project Concept identifies a base widening thickness of 4". A minimum of 4" Based Widening is typically needed to withstand construction traffic operations.
Maintain the 4" minimum base widening thickness to withstand construction traffic operations.

8. SPECIAL BACKFILL

- a. Should Special Backfill be included with the HMA Base Widening or are we considering the shoulder to be well compacted and is not part of the traffic lane?
We will be considering the shoulder to be well compacted, not part of the traffic lane, so special backfill will not be required with this project.

9. SAFETY CONSIDERATIONS

- a. Are there any additional safety considerations that aren't already outlined on Page 5 and 6 of the Project Concept?
There were no additional safety considerations at this time.

10. SUPERELEVATED CURVES

- a. There do not appear to be any superelevated curves within the project limits.
There were no superelevated curves noted as needing correction.

11. SHOULDER RUMBLES

- a. Please confirm the use of rumble strips. Pages 3 and 11 of the Project Concept mention the usage of rumble strips along with the needs test recommendation comment of "The cost of additional paved shoulder width would be excessively disproportionate to the need or probable use per section 2.4 of the Complete Streets Policy."
Yes, this project will utilize rumble strips. See the note above about the complete streets policy.

12. CENTERLINE RUMBLES

- a. Similar to last years projects, would District like to use Penetrating Engineered Fog Seal for Centerline Rumble Strips? The Penetrating Engineered Fog Seal is a Special Provision (SP).
This project will utilize centerline rumble strips with penetrating engineered fog seal without using the sinusoidal grooving. Note the need for an SP above based on prior projects.

13. PROPOSED GRANULAR SHOULDER

- a. Option 1, per Concept, 0.5' wide granular shoulders. Do not utilize option 1.
- b. Option 2, Road Design recommendation, Granular Fillet per 7145-M. Proceed with the granular fillet as proposed by Road Design. The existing conditions are not workable to provide additional standard granular shoulder as proposed with option 1.

14. PATCHING

- a. Existing PCC Patches have been identified in "IA 149 Wapello (100) exist patch and culvert ext repair locations 9 28 2023 (2).xls" at 10 patches and 359.4 SY. Please confirm no additional existing PCC Patches need to be added to the list from three years ago. These locations will be partial depth HMA Patches at a depth of 3" to allow for the HIR process.
EXAMPLE: NHSX-092-9(166)--3H-92 Washington County IA 92 Partial Depth HMA or PCC Repair Patches in tabulation 102-14.
**MP 8.846, South bound traffic, identifies a 121' existing patch in length but also shows it as 12', changing this value gives a new area of 189.8 SY.
Keep the 10 patches as listed above with the correction to the MP 8.846 value. Designer

Note - Important: "These locations will be partial depth HMA Patches at a depth of 3" to allow for the HIR process."

- b. New patches with this project are to be full-deep HMA Patches. A patching tab has been included with the information from the field. Designer Note: Need to remember to add the partial depth from above to the appropriate tabulations.
New patches have been provided in the maintenance tabulations.
- c. NOTE: Two PCC Patches are identified. These occur within the UAC existing PCC around a prior bridge project and appear to be broken panels at the interface between the existing composite pavement and the full depth PCC.

15. SIDEROAD AND ENTRANCE TREATMENT

- a. Existing Gravel Sideroads without Existing Paved Fillet
 - i. Proposed fillets to 10' from the Edge of Thru Lane. *Pending Wapello County to be contacted on an Agreement for 50' paved fillet extensions.
Refer to AGREEMENTS, Jared will be contacting Wapello County.
- b. Existing Gravel Sideroads with Existing Paved Fillet
 - i. Previous recommendation from District 5 on similar projects was to remove the existing paved fillets and replace them with new paved fillets. Proceed with as listed.
- c. Existing Paved Sideroads and Existing Paved Entrances
 - i. HMA Runouts. Proceed with as listed.
- d. Existing Gravel Entrances without Existing Paved Fillets
 - i. Proposed 4' paved fillets at entrances are not required as we already have 4' paved shoulders. Proceed with as listed.
- e. Existing Gravel Entrances with Existing Paved Fillets.
 - i. Proposed removing the existing fillet and placing typical shoulder construction (4' paved shoulder and granular fillet). Proceed with as listed.

16. FORESLOPE FLATTENING

- a. The Project Concept Identifies IA 149 as an NHS Route on the first page; however, page 9 of the Project Concept identifies IA 149 as a non-NHS route and to UAC existing entrance / transverse slopes. Please confirm if IA 149 is or is not an NHS Route and if foreslope flattening is required or already completed if needed.
This section of IA 149 is not an NHS Route according to data from GIS (<https://iowadot.maps.arcgis.com/apps/mapviewer/index.html?webmap=ded32b1054a44351b8e3933f01327cbf>) and therefore Foreslope Flattening at sideroads and entrances is not required if confirmed.
Foreslope flattening will not be required with this project as the project is not an NHS Route.

17. CONCRETE RAILROAD HEADERS

- a. Is the District aware of any Concrete Railroad Headers beneath the IA 149 Mainline that needs to be removed? A glance at the Rail Line Abandoned KMZ did not seem to indicate any concrete railroad headers being present within the proposed project limits.
There are no concrete railroad headers noted as being present within the project limits, no further action needed.

18. LONGITUDINAL SUBDRAINS

- a. Page 7 of the Project Concept states "Per 1995 project STPN-63-2(54)--2J-90 there is 0% existing longitudinal subdrain. The proposed improvement includes placing subdrains such that there will be 100% subdrains along 1 side." Please confirm that the subdrain will be included with this project per the Concept. If so, Road Design will coordinate the design with the Soils Bureau.
If the ditching isn't deep enough, do not install subdrain. Install where we can without anything special. Existing conditions are varied but there are areas where subdrain will not be able to be installed.
Follow up items include: Does a drainable subbase exist or is the roadway on subgrade? Does the depth of the ditches allow for installation of subdrain?

19. SLIDE REPAIR

- a. Page 9 of the project concept identifies 'none' for foreslope slide repairs. Please confirm that the status is still accurate and no further action is needed by Design.
No slide repairs were noted for the field exam, no further action is needed.

20. STRUCTURES

- a. FHWA #050691 (Maintenance Number 9009.9S149); 214'-0 x 44'-0 Continuous Concrete Slab Bridge. IA 149 over Cedar Creek (built 2018). No additional action needed with the bridge.
 - i. Existing Guardrail to be Used as Constructed.
 - ii. Existing PCC to be Used as Constructed.
 - iii. No recommendations.
 - iv. Notes include providing HMA Runout to gap the bridge.
- b. NOTE 2: UAC Twin 60" culvert at MP 8. UAC PCC pavement, no existing guardrail, 30 gap for HIR process.
 - i. As built, indicate that the HMA alternative was used instead of PCC. Road Design would like to propose HIR through this 30 section without providing a gap as no PCC appears to be present. Proceed with HIR typical section through the affected area. Refer to TYPICAL SECTIONS for further details.

21. GUARDRAIL

- a. Are there any areas that require guardrail treatment? (See Structures for UAC guardrail.)
No additional areas needing guardrail were brought up.

22. SPECIAL FEATURES

- a. Are there any special features not shown on the plans (Schools or businesses with particular entrance needs, mailboxes, signage, structures, traffic signal detector loops at signalized intersections) that need to be taken into consideration, either design or Traffic Control-wise?

No additional special features were noted as needing to be addressed.

23. RIGHT OF WAY

- a. Will any Right of Way (ROW) be necessary for this project or the pipe repairs? The existing ROW KMZ appears to show tight ROW for most of the project. See the next section for further comments.

All work will remain within ROW.

24. CULVERTS AND PIPES

- a. A Drainage Structure Repair Work (DE3R_CULV) sheet has been provided by construction field tabulations. There are five line items in the supplied tabulation. Designer Note: Items will need to be evaluated for impact to the roadway for TC Standards and DR-101 (flowable mortar and flooded backfill).

Refer to RIGHT OF WAY. All work that can be performed shall be performed within the Right of Way.

i. MP 10.784, 24" RCP

1. Remove headwall / install C collar. New 8' LT and 4' Rt.

The LT side may require work outside of ROW. All accomplishable work to remain within ROW.

ii. MP 10.874, 24" RCP

1. Remove headwall / install C collar. New 8' LT and 4' Rt.

The LT side may require work outside of ROW. All accomplishable work to remain within ROW.

iii. MP 11.008, 24" RCP

1. Remove headwall / install C collar. New 8' LT.

iv. MP 9.022, 72" RCP

This location requires work beyond the scope of this project, will not be addressed with this project, and will need to be as it's own future project. However, this area will be added to the clearing and grubbing on the RT side within ROW so evaluation of the issue may occur.

- ~~1. Remove and Reinstall RT. (16' RT)~~

- ~~2. Will require coordination with roadside to add the 100-23 rock erosion control table for the requested 80' x 30' Type 4 Rock Splash Basin (See SRP EC-301).~~

~~Clearing and grubbing is also specified near this location.~~

~~Review location for any ROW conflicts.~~

v. MP 7.519, 24" RCP

1. Remove headwall / install C collar DR-122. New 4' RT.

Add LT to the required work. Remove Headwall and also Extend 4' LT, include new apron. Existing conditions are 6' from outside edge of the white edge line to the face of the headwall.

Clearing and grubbing required for the RT side, along with a 4' extension and Rip Rap to the ROW line. Note existing pipe lengths to be removed and replaced with new pipe as well.

2. No clearing and grubbing is listed at this location, will any be needed for the work? From Google Earth there appears to be brush located at the outlet along with possible restrictive workspace to keep within ROW.

Refer to notes above.

25. EXISTING DRAINAGE PROBLEMS

- a. Are there any existing drainage problems within the rural area that may need to be mitigated (shoulder washout, standing water, etc.)?

No additional areas were brought up to be addressed.

26. EXISTING EROSION PROBLEMS

- a. Are there any existing erosion problems within the rural area that may need to be mitigated (slides, ditch reshaping, curb overtaken with grass/debris, etc.)?

No additional existing erosion problems were brought up to be included with this project. Note the CULVERT at MP 9.022 which is beyond the scope of this project.

27. STREAM/WATERWAY CHARACTERISTICS

- a. Is this waterway (Cedar Creek, STA 1493+11.50 / MP 9.9) on the state water trail or paddling route according to the Iowa Department of Natural Resources State Water Trails Map and the IDNR Paddling Route Interactive GIS Map.

No further action is needed by road design.

28. FIELD MAINTENANCE TABULATIONS

- a. Field maintenance tabulations have been provided by the District (DistrictDesign\Construction\Field Tabs\ on 20260303).

Refer to CULVERTS for additional details and Clearing and Grubbing additions to what is already tabulated by maintenance.

29. STOCKPILED MATERIALS

No materials will be stockpiled with this project, no further action needed.

- a. Confirm if Maintenance would like the following Stockpiled Materials:

~~i. HMA Millings~~

ii. Class 13 Excavation No

~~iii. Steel Beam Guardrail W-Beam~~

~~iv. Steel Beam Guardrail Posts~~

~~v. Cable Guardrail~~

~~vi. Cable Guardrail Posts~~

- b. Verify the location of Stockpiled Materials (Primary Location? Secondary Location? Is there a preferred distribution of materials across the sites?)

c. Maintenance Contact Person and Phone Number:

30. CONTINGENCY PERCENTAGES

Road Design will utilize the contingency percentages as listed below for this project.

- a. HMA Pavement Contingency for Irregularities: 5% is typical. Please confirm.
- b. Granular Shoulder (if found to be applicable): 20% is typical. Please confirm.
- c. Patches Contingency (if found to be applicable): 15% is typical. Please confirm.

31. HMA PAVEMENT SAMPLES

- a. Confirm that HMA Pavement Samples Bid Item needs to be included with this project.
This bid item will be required with this project and shall be included in the plan-set.

32. TIED PROJECTS

- a. Are there any projects expected to be Tied to this project?
District was not aware of any tied projects to be included.

33. TRAFFIC CONTROL PLAN

- a. Are there any special Traffic Control Notes that District would like to include on the Traffic Control Plan Tabulations.
Follow-up Item: Notes and development of the line shift for construction around the Cedar Creek Bridge will need to be evaluated to avoid the UAC PCC Shoulder that projects into the NB traveled lane. One option is to provide a transition to 11' lanes to avoid different elevations for the thru traffic.

34. SPECIAL EVENTS

- a. Are there any Special Events that need to be identified on the J Sheets? If so, what are the schedules?
No Special Events were noted for the J Sheets. No further action needed.

35. SUGGESETED STAGING NOTES

- a. Review of the Suggested Sequence of Construction. HIR and HMA Base Widening notes listed earlier.
No changes needed. Of importance is the HMA Base Widening occurring before the HIR process. See HOT-IN-PLACE RECYCLING (HIR) for further details on the suggested sequence of construction.

36. AGREEMENTS

- a. WAPELLO COUNTY: Pages 5 and 10 of the Project Concept mentions that Wapello County is to be contacted to determine if they would like to participate in a Preconstruction Agreement for the paving of the gravel public side road intersections per Standard Detail 7149. Please confirm if there are any agreements with Wapello County or if they need to be contacted.
Jared will be contacting the Counties to inquire about participation for paved fillet extensions.
- b. Other possible agreements:
 - i. Wapello Keokuk Rd is on the Wapello and Keokuk county line and is a minimum maintenance B road with an existing paved fillet (not 50' extended)
Fifty foot paved fillets are not provided for minimum B maintenance roads.
 - ii. Wapello Mahaska Rd is on the Wapello and Keokuk County line and is an existing granular road with an existing paved fillet (not 50' extended).
 - iii. Another Granular Side road is present within Mahaska County. G77, 335th Street, near the EOP with an existing paved fillet (not 50' extended).

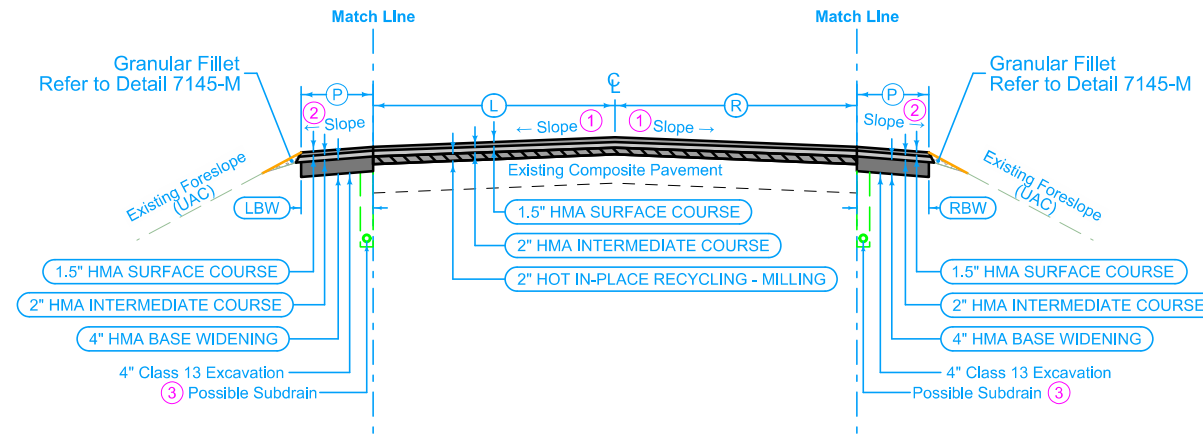
37. LETTING DATES

- a. The letting date is currently scheduled for 12-15-2026. The Road Design Team does not have any exceptions regarding this date currently. No change to the letting date required.

Combination Shoulder (with 4' Widening)

3R_Shldr_C_Overlay_ Modified				
STATION TO STATION		(P) Feet	(LBW) Feet	
1349+45	1486+40	4	4	
1501+57	1553+24.2 (E1)	4	4	
853+05 (E1)	852+20	4	4	

STATION EQUATION (E1) 1553+24.2 (BK) = 853+05 (AH)



Combination Shoulder (with 4' Widening)

3R_Shldr_C_Overlay_ Modified				
STATION TO STATION		(P) Feet	(RBW) Feet	
1349+45	1486+40	4	4	
1501+57	1553+24.2 (E1)	4	4	
853+05 (E1)	852+20	4	4	

STATION EQUATION (E1) 1553+24.2 (BK) = 853+05 (AH)

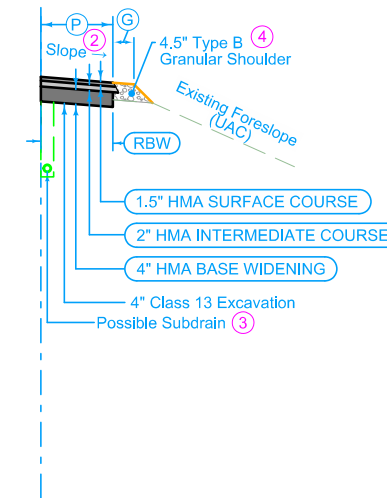
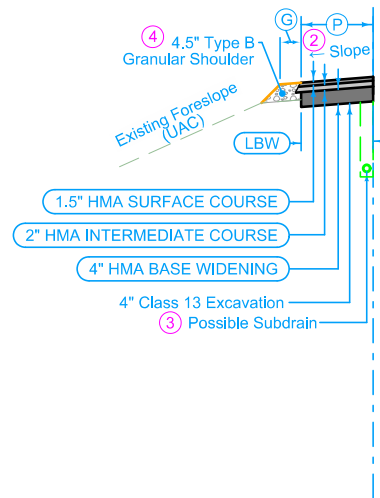
3R_MillingOverlay_ MODIFIED				
STATION TO STATION		(L) Feet	(R) Feet	Remarks
1349+45	1486+40	12	12	HIR Begins at 1351+20, HIR Stops at 1484+65
1501+57	1553+24.2 (E1)	12	12	HIR Resumes at 1503+32
853+05 (E1)	852+20	12	12	

STATION EQUATION (E1) 1553+24.2 (BK) = 853+05 (AH)

Combination Shoulder (with 4' Widening)

3R_Shldr_C_Overlay_ Modified				
STATION TO STATION		(P) Feet	(G) Feet	(LBW) Feet
1349+45	1486+40	4	0.5	4
1501+57	1553+24.2 (E1)	4	0.5	4
853+05 (E1)	852+20	4	0.5	4

STATION EQUATION (E1) 1553+24.2 (BK) = 853+05 (AH)



Combination Shoulder (with 4' Widening)

3R_Shldr_C_Overlay_ Modified				
STATION TO STATION		(P) Feet	(G) Feet	(RBW) Feet
1349+45	1486+40	4	0.5	4
1501+57	1553+24.2 (E1)	4	0.5	4
853+05 (E1)	852+20	4	0.5	4

STATION EQUATION (E1) 1553+24.2 (BK) = 853+05 (AH)

- ① Finished slope shall match existing pavement except the minimum allowable slope is 2.0% and the maximum allowable slope is 3.0%. Section may be modified as directed by the Engineer through areas of special shaping.
- ② Finished slope of Shoulder shall have a minimum allowable slope of 4% and a maximum allowable slope of 6%. Section may be modified as directed by the Engineer through areas of special shaping.
- ③ UAC existing subdrain. All subdrain shall remain functional at all times (do not plug or crush). New subdrain shall be in contact with the granular material below the existing mainline pavement (see Tab 104-9 on CS sheets for proposed locations).
- ④ The surface of the existing granular shoulder is estimated to be 1.0" below the surface of the edge of the existing pavement.

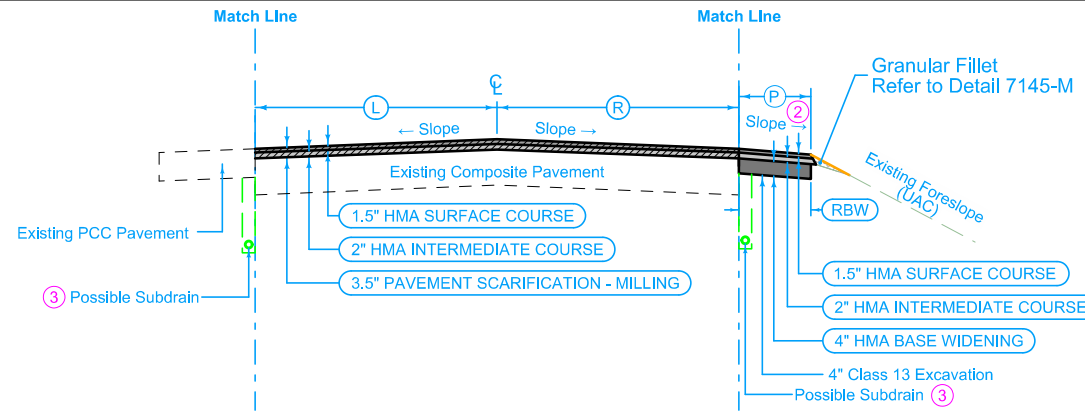
General Notes:

- 1. Section and Stationing is shown in the Direction of NB Traffic.
- 2. Stationing on typical sections does not include gapping for paved sideroads and paved entrances. Refer to Details.
- 3. See Tab 100-25 for Pavement quantities.
- 4. See Tab 106-5 for Base Widening quantities.
- 5. See Tab 112-9 for Granular Shoulder quantities.

**IA 149 Mainline Hot In-Place Recycling, HMA Resurfacing,
and Paved Shoulders**
(Beginning of Project to Area around Bridge FHWA 50691 at MP 9.9)
(From Area around Bridge FHWA 50691 at MP 9.9 to Wapello / Mahaska/ Keokuk County line)

Existing PCC Shoulder (UAC)

3R_Shldr_C_Overlay_ Modified				
STATION TO STATION		(P) Feet	(G) Feet	(LBW) Feet
1486+40	1489+00	UAC	UAC	UAC
1499+57	1501+57	UAC	UAC	UAC



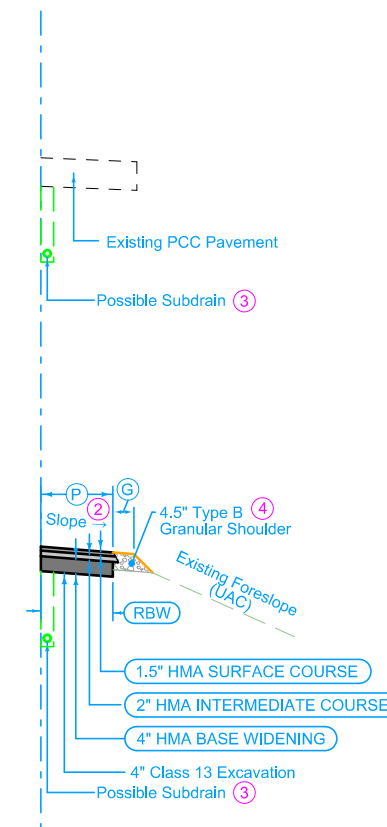
3R_MillingOverlay_ MODIFIED					
STATION TO STATION		(C) Feet	(L) Feet	(R) Feet	Remarks
1486+40	1489+00	24	12	12	
1499+57	1501+57	24	12	12	

Combination Shoulder (with 4' Widening)

3R_Shldr_C_Overlay_ Modified				
STATION TO STATION		(P) Feet	(G) Feet	(LBW) Feet
1486+40	1488+00	4	4	
1500+35	1501+57	4	4	

Existing PCC Shoulder (UAC)

3R_Shldr_C_Overlay_ Modified				
STATION TO STATION		(P) Feet	(G) Feet	(LBW) Feet
1488+00	1489+00	UAC	UAC	UAC
1499+57	1500+35	UAC	UAC	UAC



Combination Shoulder (with 4' Widening)

3R_Shldr_C_Overlay_ Modified				
STATION TO STATION		(P) Feet	(G) Feet	(LBW) Feet
1486+40	1488+00	4	0.5	4
1500+35	1501+57	4	0.5	4

- ① Finished slope shall match existing pavement except the minimum allowable slope is 2.0% and the maximum allowable slope is 3.0%. Section may be modified as directed by the Engineer through areas of special shapng.
- ② Finished slope of Shoulder shall have a minimum allowable slope of 4% and a maximum allowable slope of 6%. Section may be modified as directed by the Engineer through areas of special shapng.
- ③ UAC existing subdrain. All subdrain shall remain functional at all times (do not plug or crush). New subdrain shall be in contact with the granular material below the existing mainline pavement (see Tab 104-9 on CS sheets for proposed locations).
- ④ The surface of the existing granular shoulder is estimated to be 1.0" below the surface of the edge of the existing pavement.

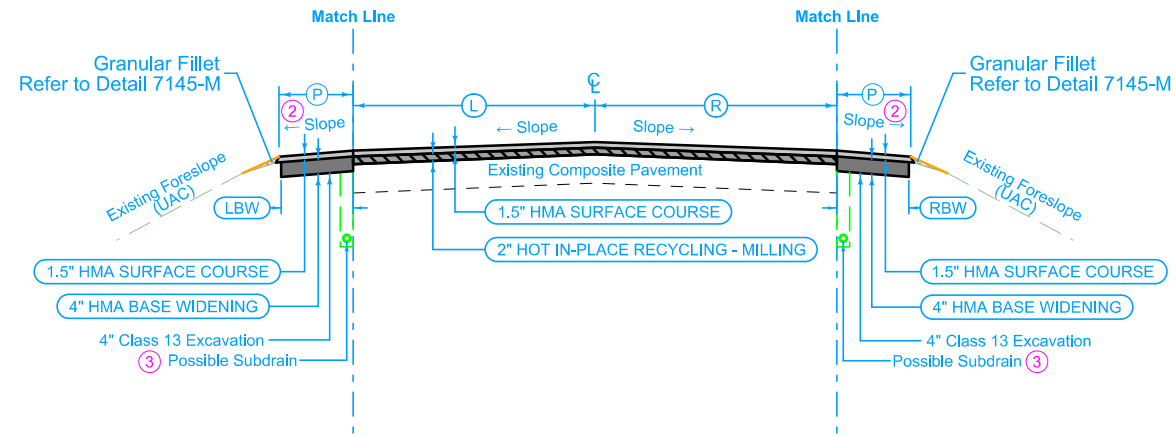
General Notes:

- 1. Section and Stationing is shown in the Direction of NB Traffic.
- 2. Stationing on typical sections does not include gapping for paved sideroads and paved entrances. Refer to Details.
- 3. See Tab 100-25 for Pavement quantities.
- 4. See Tab 106-5 for Base Widening quantities.
- 5. See Tab 112-9 for Granular Shoulder quantities.

**IA 149 Mainline HMA Resurfacing
and Paved Shoulders
(Area around Bridge FHWA 50691 at MP 9.9)**

Combination Shoulder (with 4' Widening)

3R_Shldr_C_Overlay_ Modified				
STATION TO STATION		(P) Feet	(LBW) Feet	
852+20	821+55	4	4	



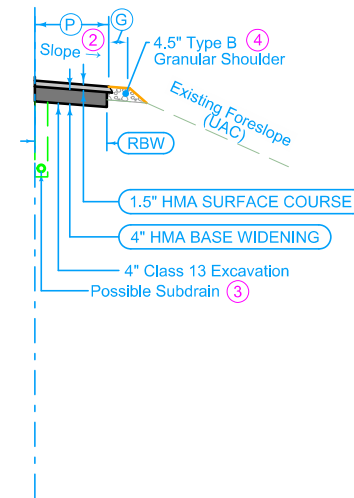
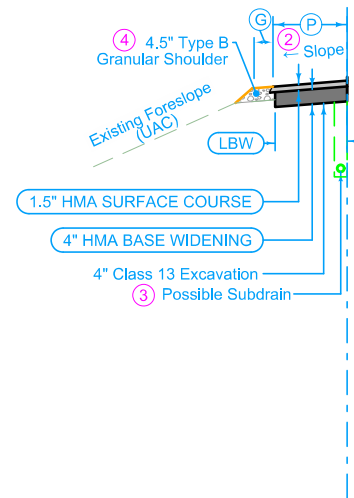
3R_MillingOverlay_ MODIFIED				
STATION TO STATION		(L) Feet	(R) Feet	Remarks
852+20	821+55	12	12	HIR Ends at 823+30

Combination Shoulder (with 4' Widening)

3R_Shldr_C_Overlay_ Modified				
STATION TO STATION		(P) Feet	(RBW) Feet	
852+20	821+55	4	4	

Combination Shoulder (with 4' Widening)

3R_Shldr_C_Overlay_ Modified				
STATION TO STATION		(P) Feet	(G) Feet	(LBW) Feet
852+20	821+55	4	0.5	4



Combination Shoulder (with 4' Widening)

3R_Shldr_C_Overlay_ Modified				
STATION TO STATION		(P) Feet	(G) Feet	(RBW) Feet
852+20	821+55	4	0.5	4

- ① Finished slope shall match existing pavement except the minimum allowable slope is 2.0% and the maximum allowable slope is 3.0%. Section may be modified as directed by the Engineer through areas of special shaping.
- ② Finished slope of Shoulder shall have a minimum allowable slope of 4% and a maximum allowable slope of 6%. Section may be modified as directed by the Engineer through areas of special shaping.
- ③ UAC existing subdrain. All subdrain shall remain functional at all times (do not plug or crush). New subdrain shall be in contact with the granular material below the existing mainline pavement (see Tab 104-9 on CS sheets for proposed locations).
- ④ The surface of the existing granular shoulder is estimated to be 1.0" below the surface of the edge of the existing pavement.

General Notes:

- 1. Section and Stationing is shown in the Direction of NB Traffic.
- 2. Stationing on typical sections does not include gapping for paved sideroads and paved entrances. Refer to Details.
- 3. See Tab 100-25 for Pavement quantities.
- 4. See Tab 106-5 for Base Widening quantities.
- 5. See Tab 112-9 for Granular Shoulder quantities.

**IA 149 Mainline Hot In-Place Recycling, HMA Resurfacing Pavement,
& Paved Shoulders**
(From Wapello / Mahaska / Keokuk County line to End of Project)

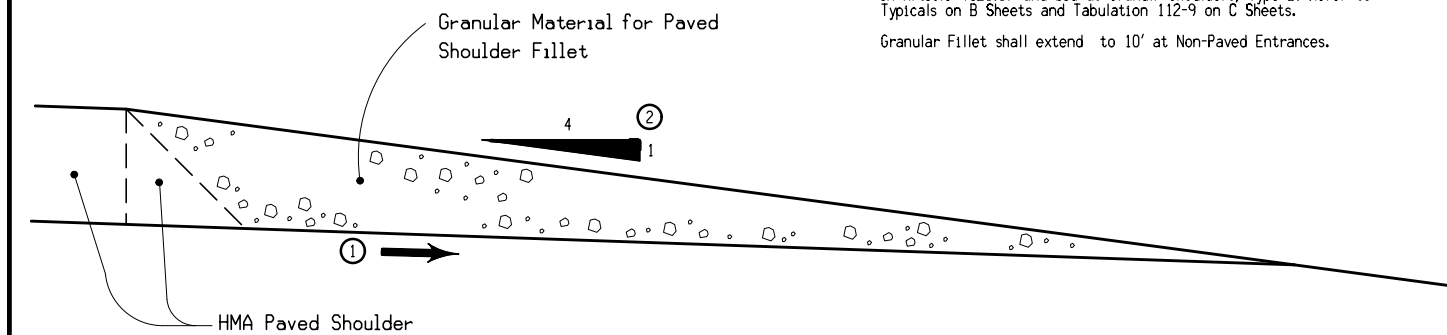
7145-M
Modified

Notes:

This typical illustrates the construction requirements for a Granular Material fillet at the edge of a paved shoulder.

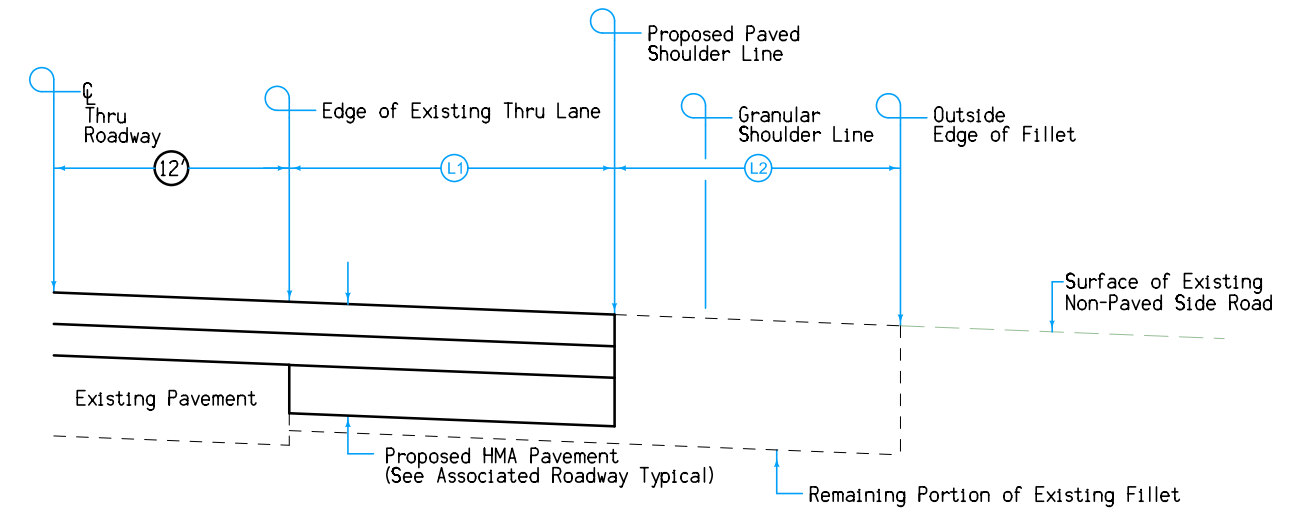
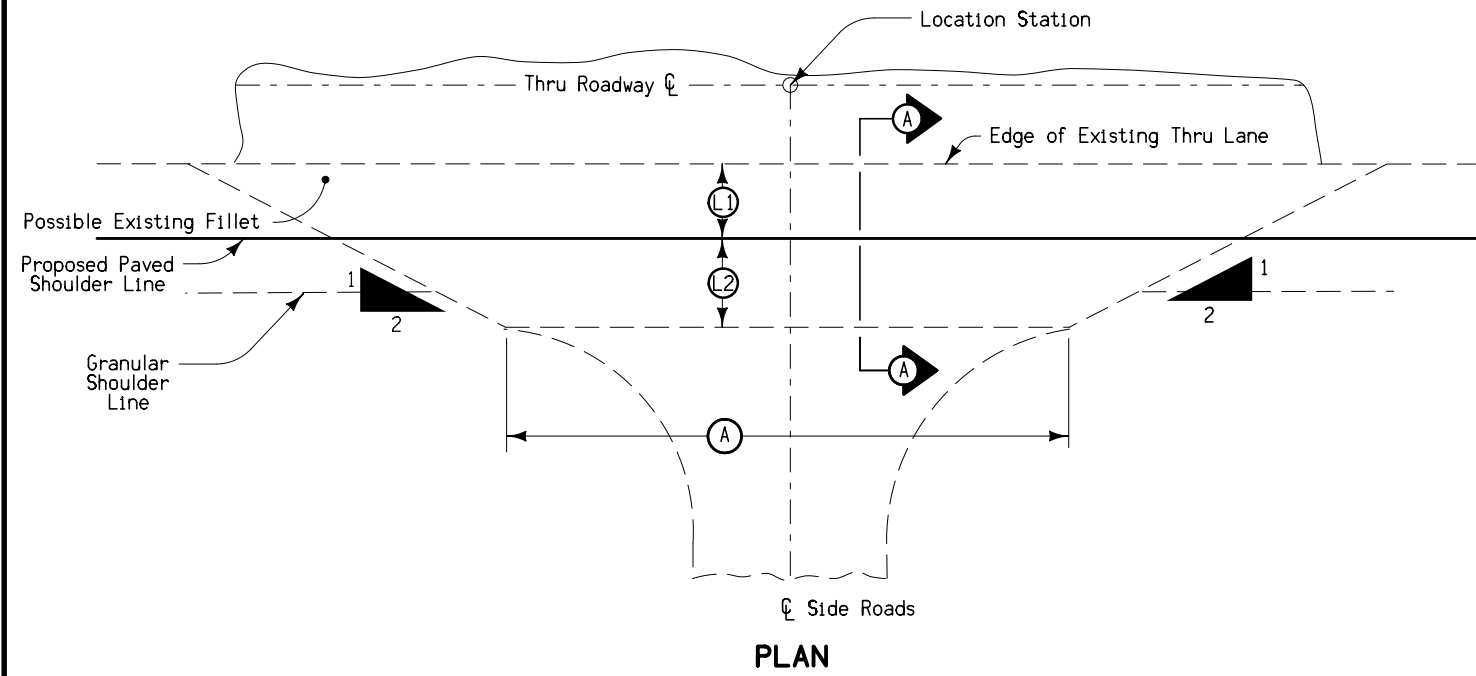
The aggregate used for the Granular Fillet shall meet the requirements of Aggregate for Paved Shoulder Fillet, as specified in Article 4120.07 and bid as Granular Shoulders, Type B. Refer to Typicals on B Sheets and Tabulation 112-9 on C Sheets.

Granular Fillet shall extend to 10' at Non-Paved Entrances.



- ① Match slope of under side of shoulder pavement.
- ② A foreslope of 4:1 or flatter shall be provided.

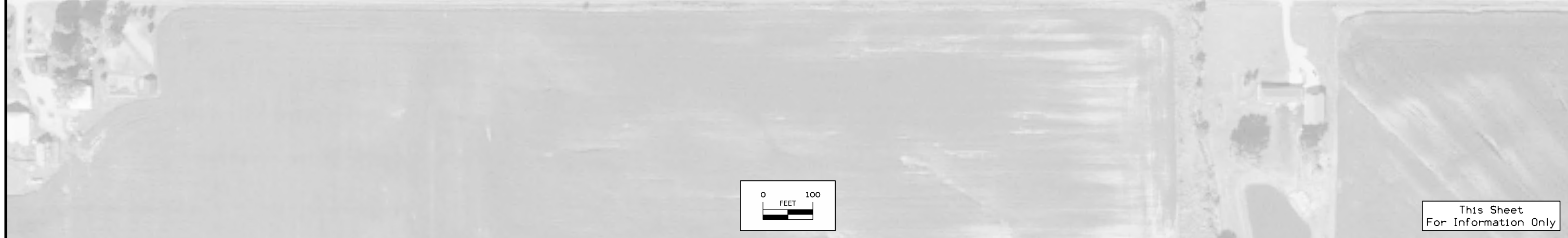
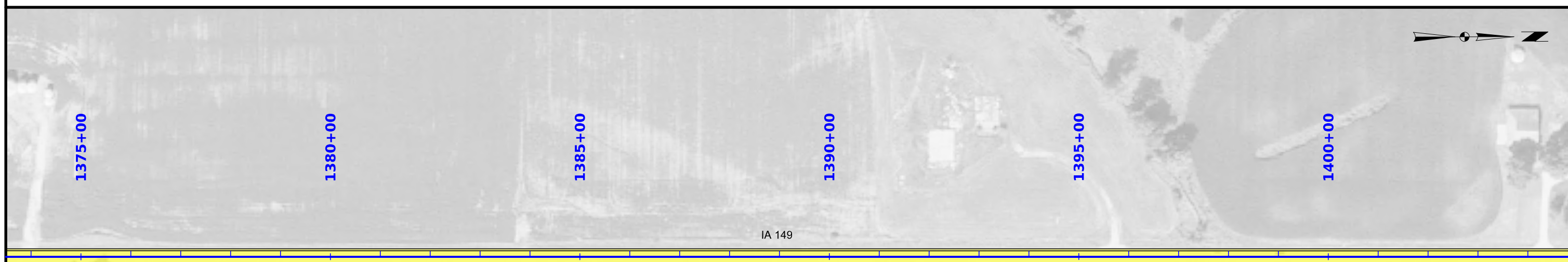
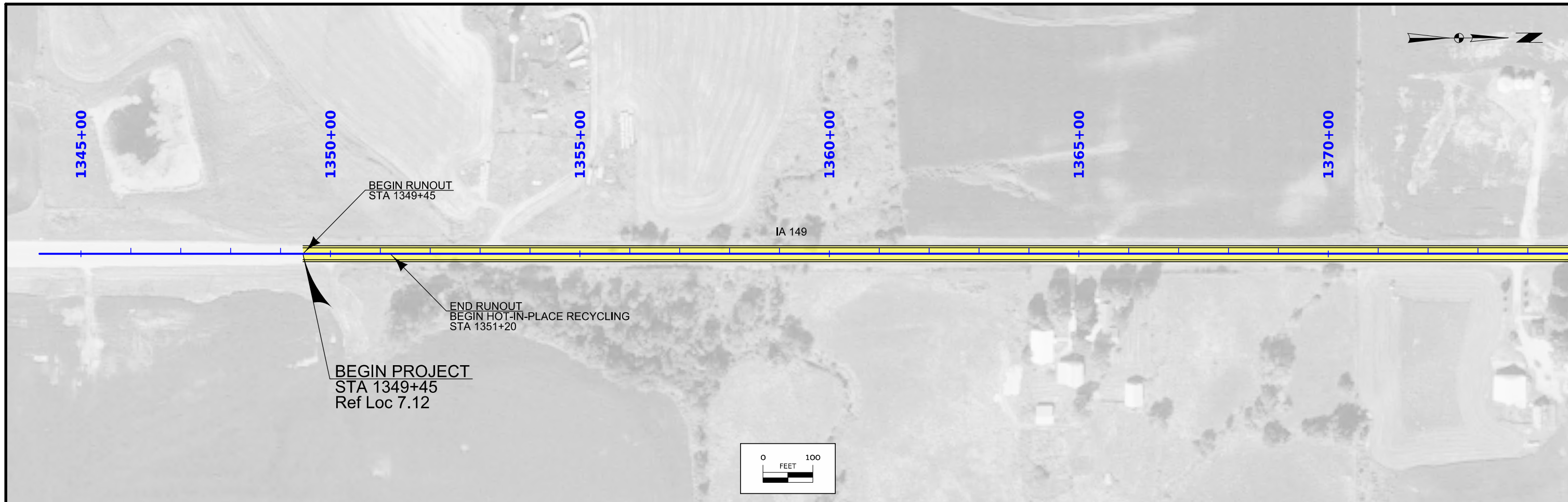
**GRANULAR MATERIAL
FOR PAVED
SHOULDER FILLET**



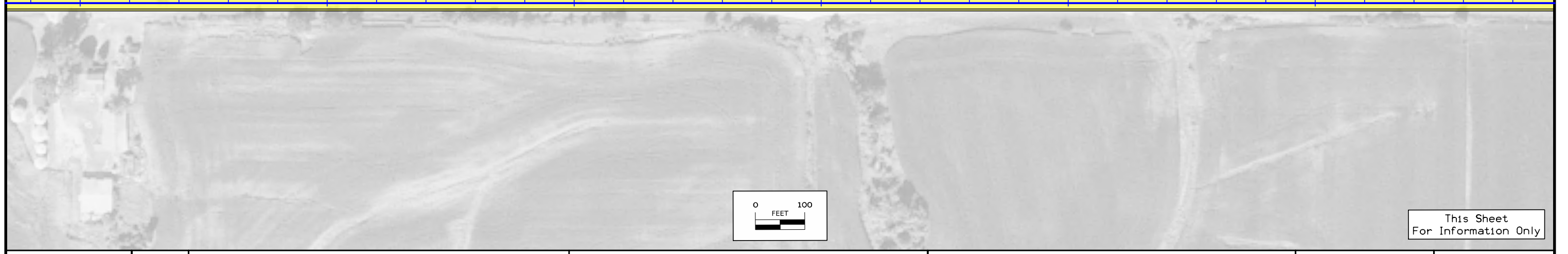
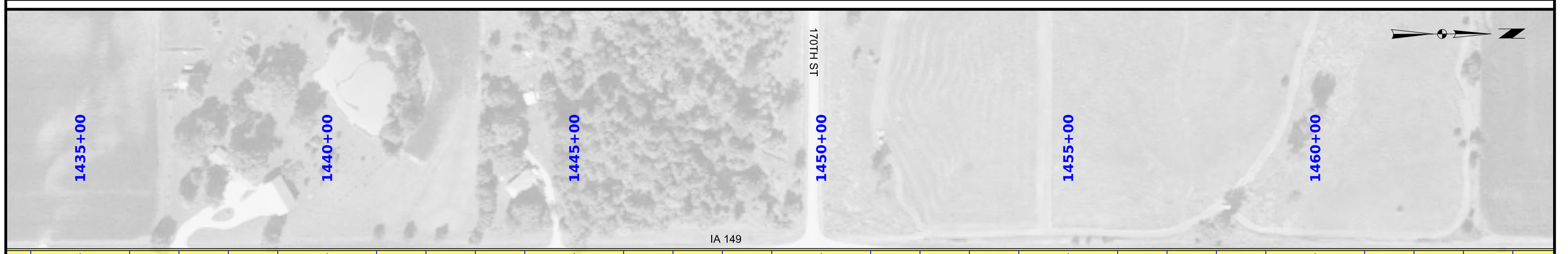
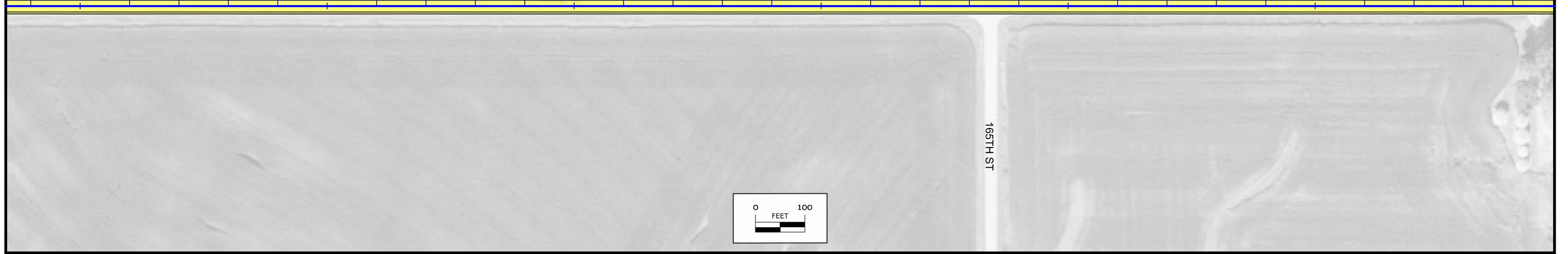
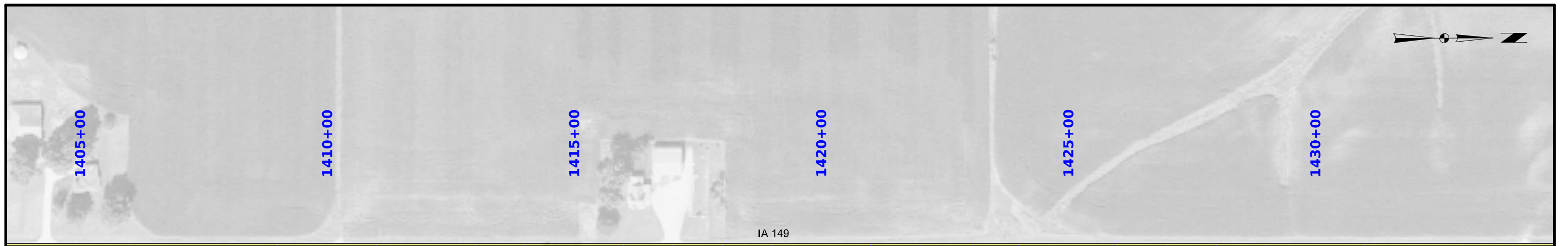
SECTION A-A

GENERAL NOTES:
 1. Refer to Tab 100-25 (HMA Pavement) and 106-5 (Base Widening) on the C Sheets for HMA Pavement, Widening, and Excavation Quantities associated with Dimension (L1).
 2. Refer to Tab 100-25 (HMA Pavement) for HMA Pavement Quantities associated with Dimension (L2).

**FILLET FOR NON-PAVED SIDE ROADS
 (EXISTING PAVED FILLET GREATER THAN PROPOSED PAVED SHOULDER LINE)**



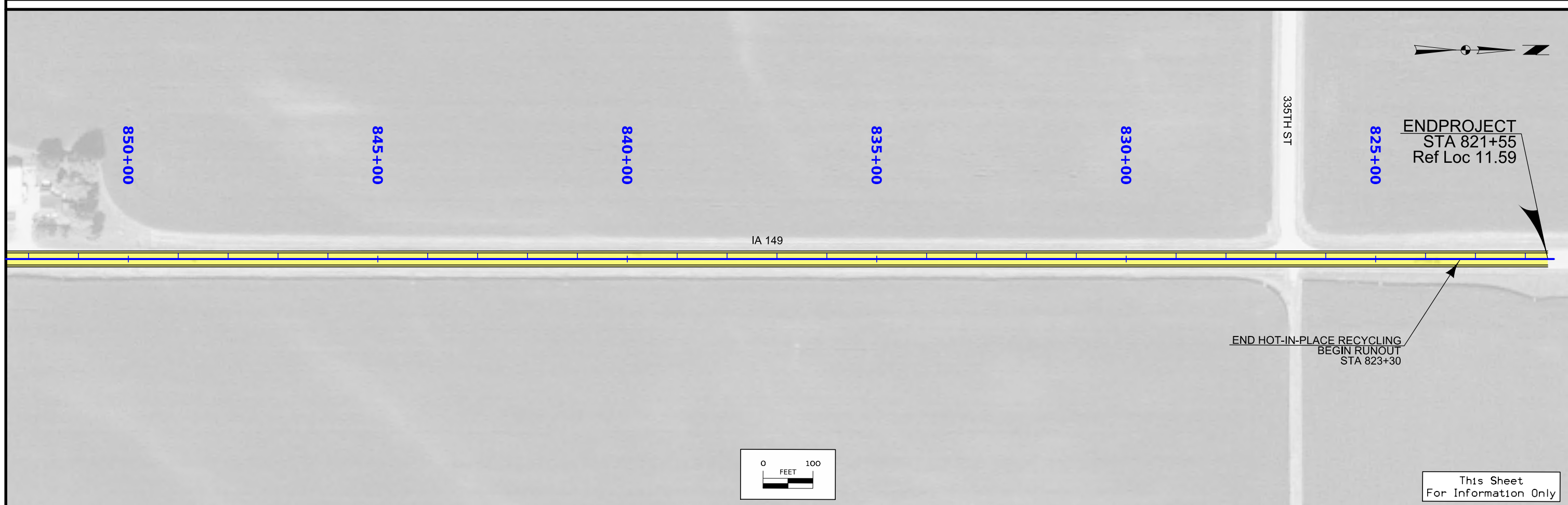
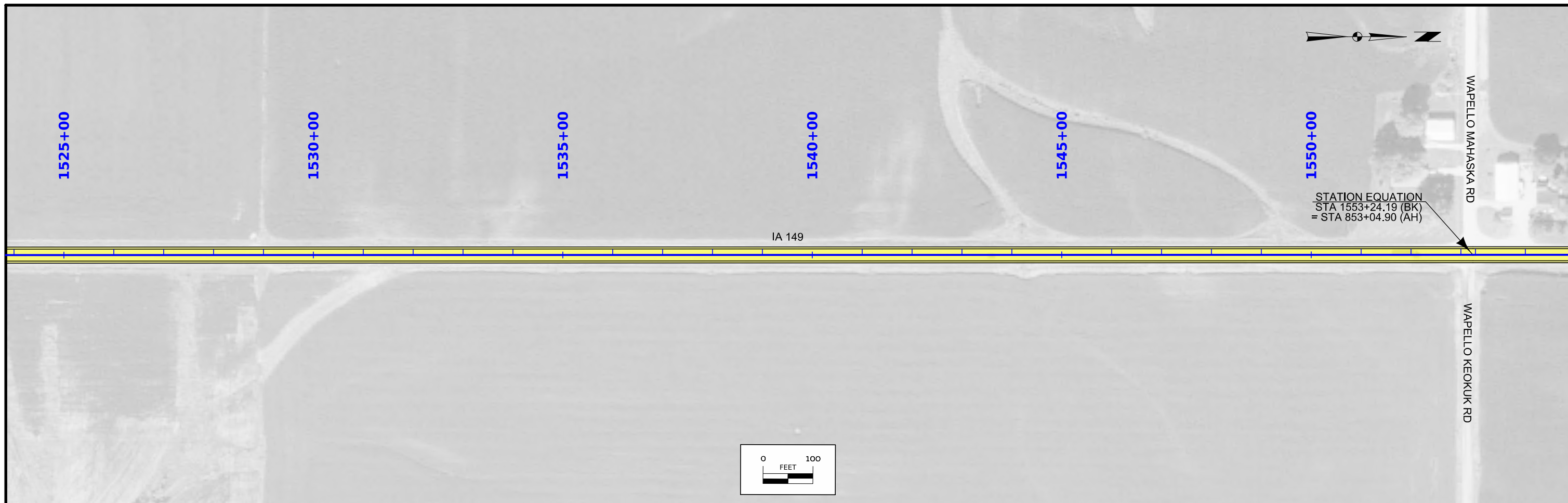
This Sheet
For Information Only



This Sheet
For Information Only



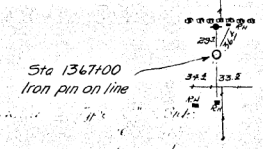
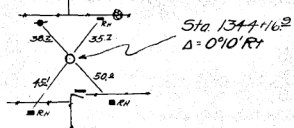
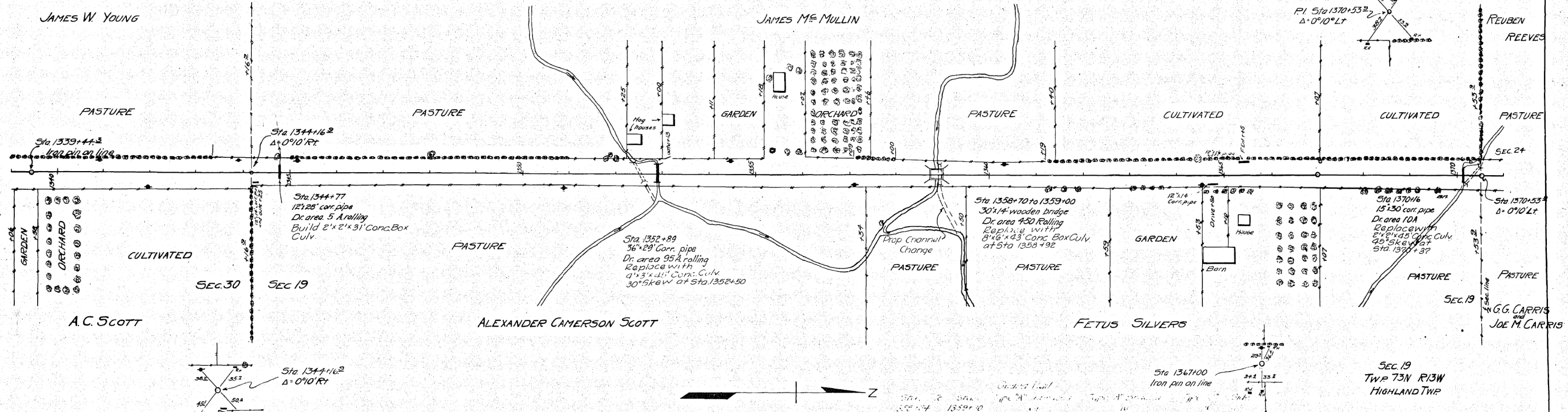
This Sheet
For Information Only



This Sheet
For Information Only

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	IOWA	159		27	108

SEC 24
TWP 73N R14W
RICHLAND TWP



CUTCY	283	382	178	12	0	0	50	441	780	441	200	149	52	0	19	195	644	715	224	0	0	0	0	50	307	100	428	526	511	109	0	0
FILLCY	0	0	4	152	285	252	96	0	0	0	156	459	474	307	241	37	0	0	181	772	499	363	448	341	44	0	0	0	0	0	0	
	135	133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	C = F + 15% = 380		C = F + 15% = 528		C = 1081 F + 15% = 1291		C = 1435 F + 15% = 1598		C = 146 F + 15% = 1237																							

BENCH MARKS
Sta 1358+88 X on E headwall of culvert Elev 785.83
Sta 1359+65 40' W spike in root of 2" Maple 794.24
Sta 1373+78 40' W " " " 809.59

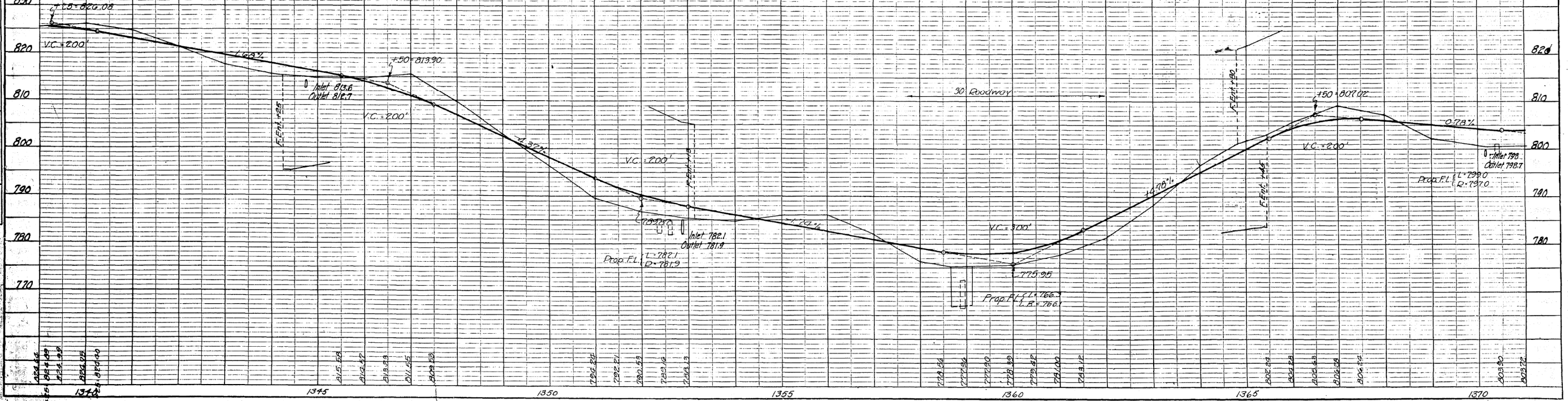


PLATE 1 - PLAN-PROFILE B. P. R. STANDARD

This Sheet
For Information Only

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
8	IOWA	139		31	108

SEC. 12
TWP 73N. R. 14W.
RICHLAND TOWNSHIP

SEC. 12

GEO. B. DEVOL

CHRISTIAN SCHAFER

CULTIVATED

PASTURE

PASTURE

GARDEN

PASTURE

CULTIVATED

CULTIVATED

PASTURE

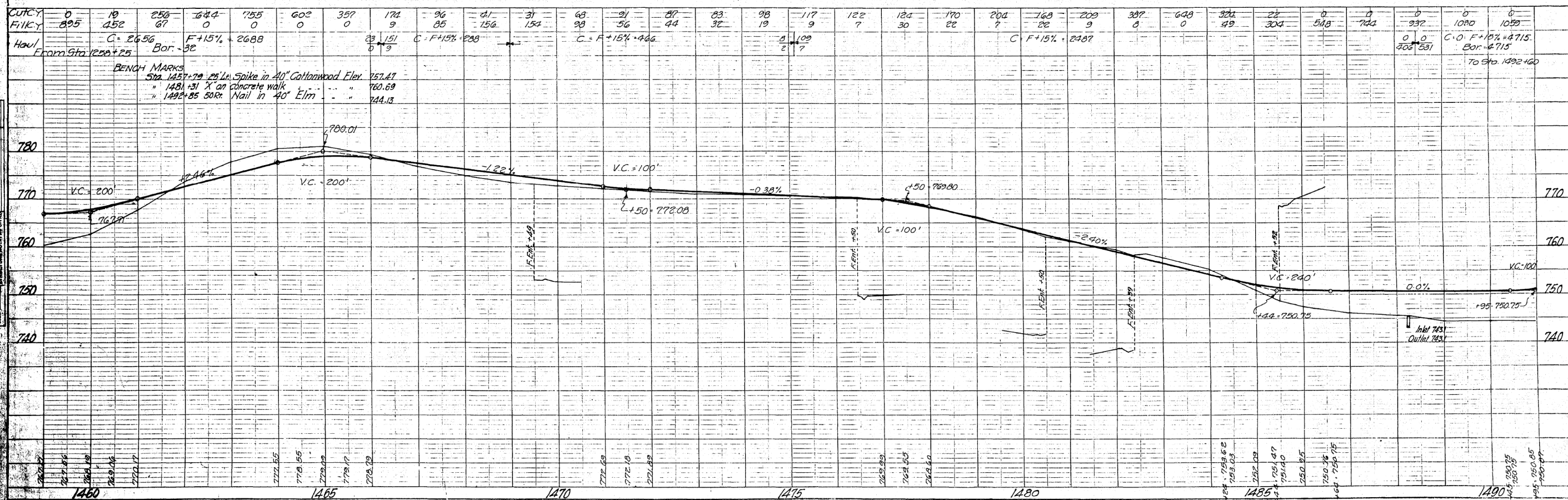
J. E. MULLENIX

CHAS. MULLENIX

SEC. 7

SEC. 7
TWP 73N. R. 13W.
HIGHLAND TWP.

3' and 4' side
Sta. 1476+00
1476+00
1476+00



DATE	BY	REVISION

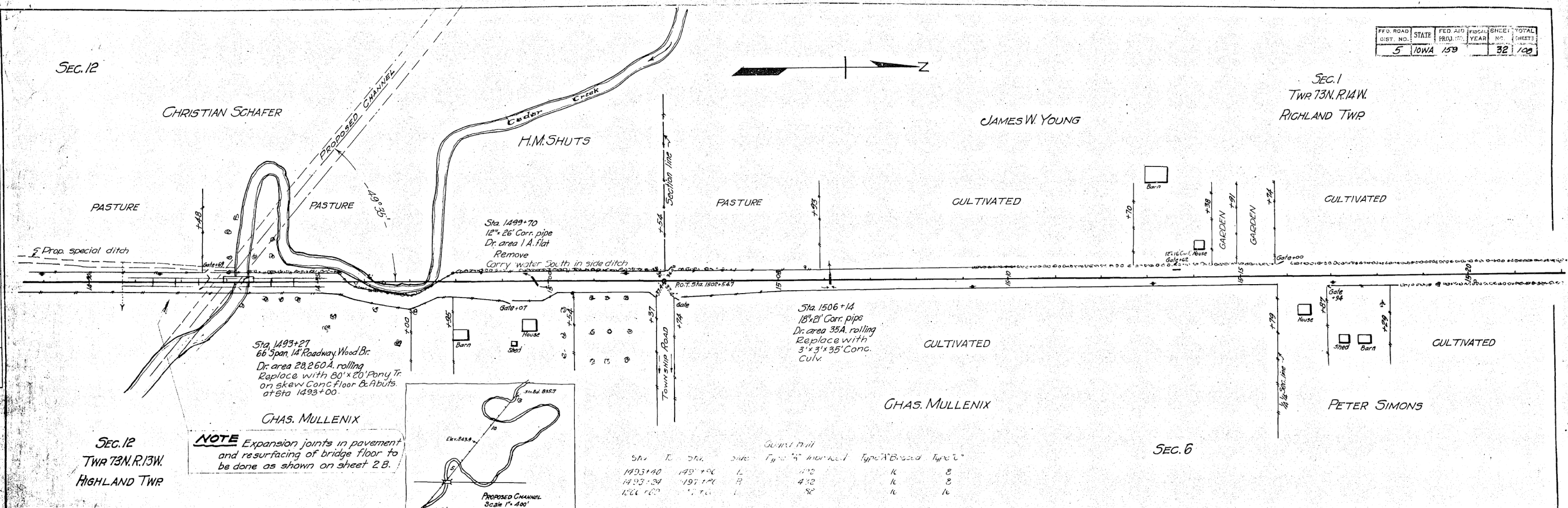
NO.	DESCRIPTION

This Sheet
For Information Only

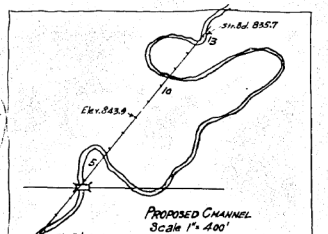
SEC. 12

SEC. 1
TWR 73N. R. 14W.
RICHLAND TWP.

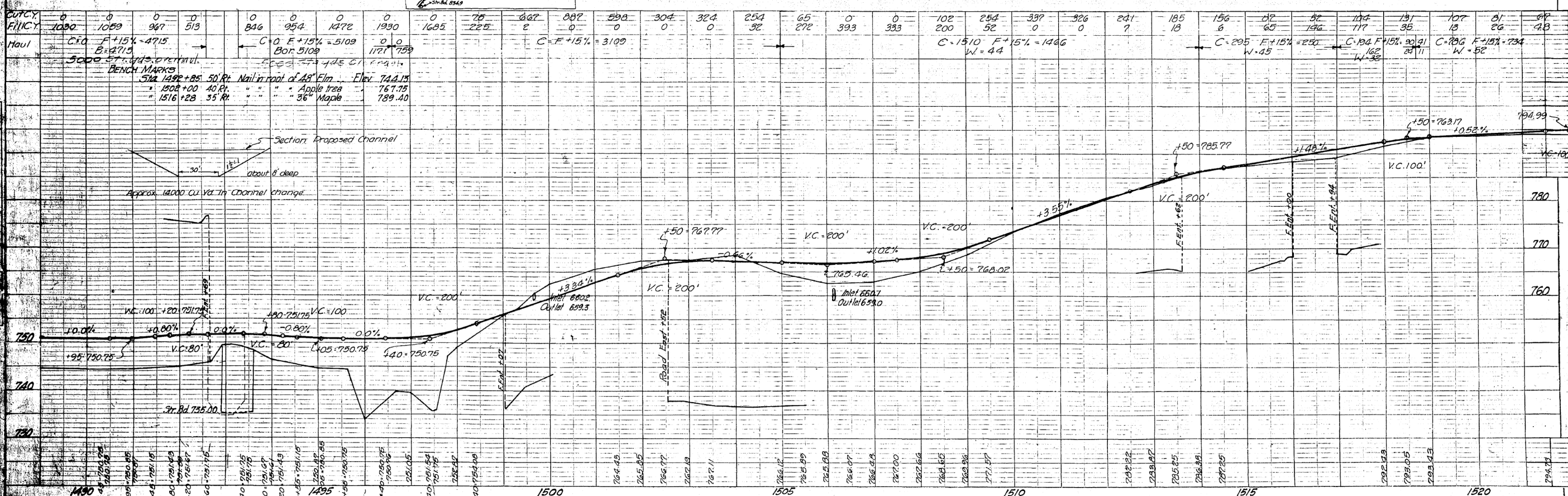
PLAN
SURVEYED BY
ALUMINUM CHECKED
DATE BOOK
BY OF WORK CHECKED



NOTE Expansion joints in pavement and resurfacing of bridge floor to be done as shown on sheet 2.B.



Sta.	E. Elev.	Dr. Area	Dr. Type	Flow	Velocity	Time	Notes
1493+10	149+96	L	12"	1.12	1.6	8	
1493+24	197+94	R	12"	4.32	1.6	8	
1506+14	170	L	18"	1.12	1.6	8	

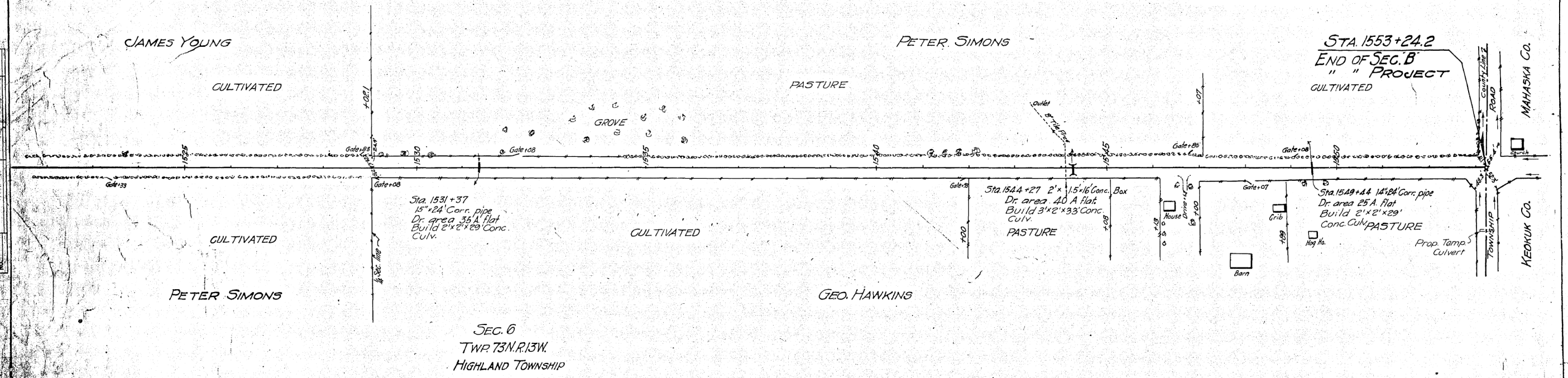


This Sheet For Information Only

Revised for Paving April 1996

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	IANA	159		33	108

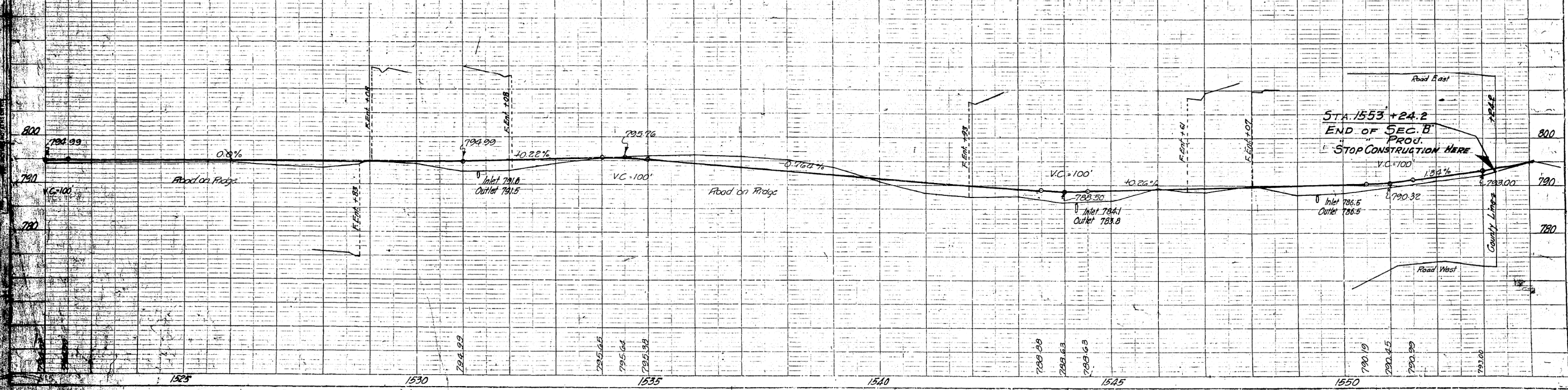
SEC. 1
TWP. 73N. R. 14W.
RICHLAND TOWNSHIP



SEC. 6
TWP. 73N. R. 13W.
HIGHLAND TOWNSHIP

CUTCY	65	67	78	93	100	89	135	151	83	?	30	68	141	296	437	500	455	228	39	0	15	11	4	76	87	122	104	5	35	48	74
FILCY	80	83	78	70	98	133	76	54	174	268	207	93	?	0	0	0	0	17	200	322	270	278	296	126	44	41	104	200	152	93	59
Notes	C=286 F+15%=734 W=52		F+15%=734		C=352 F+15%=350 W=2		C=352 F+15%=350 W=2		C=656 F+15%=656		C=1570 F+15%=1590 Bor=20		C=1570 F+15%=1590 Bor=20		C=1570 F+15%=1590 Bor=20		C=1570 F+15%=1590 Bor=20		C=1570 F+15%=1590 Bor=20		C=1570 F+15%=1590 Bor=20		C=1570 F+15%=1590 Bor=20		C=1570 F+15%=1590 Bor=20		C=1570 F+15%=1590 Bor=20		C=1570 F+15%=1590 Bor=20		

BENCH MARKS
Sta. 1531+78 2 Nails in 48" Cottonwood Elev. 794.48
" 1546+50 " " " 36" Maple 180' N. of Culv. " 789.36
" 1553+60 " " " " " 125' West " 795.36



This Sheet
For Information Only

ESTABLISHED WIDTH OF RIGHT OF WAY _____ FT.

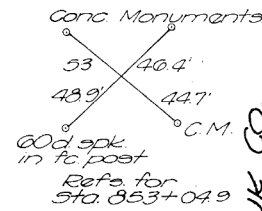


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	Iowa	510		35	100

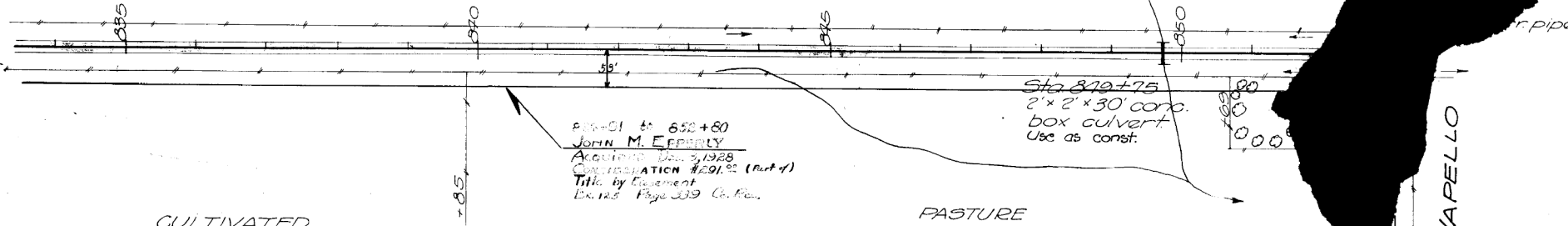
KEOKUK CO.
BENTON TWP
T.74N.R.13W
SEC. 31

EDWIN S WOODWARD

CULTIVATED



Sta. 853+04.9
END OF PROJECT
END SEC. D
STOP CONST. HERE.



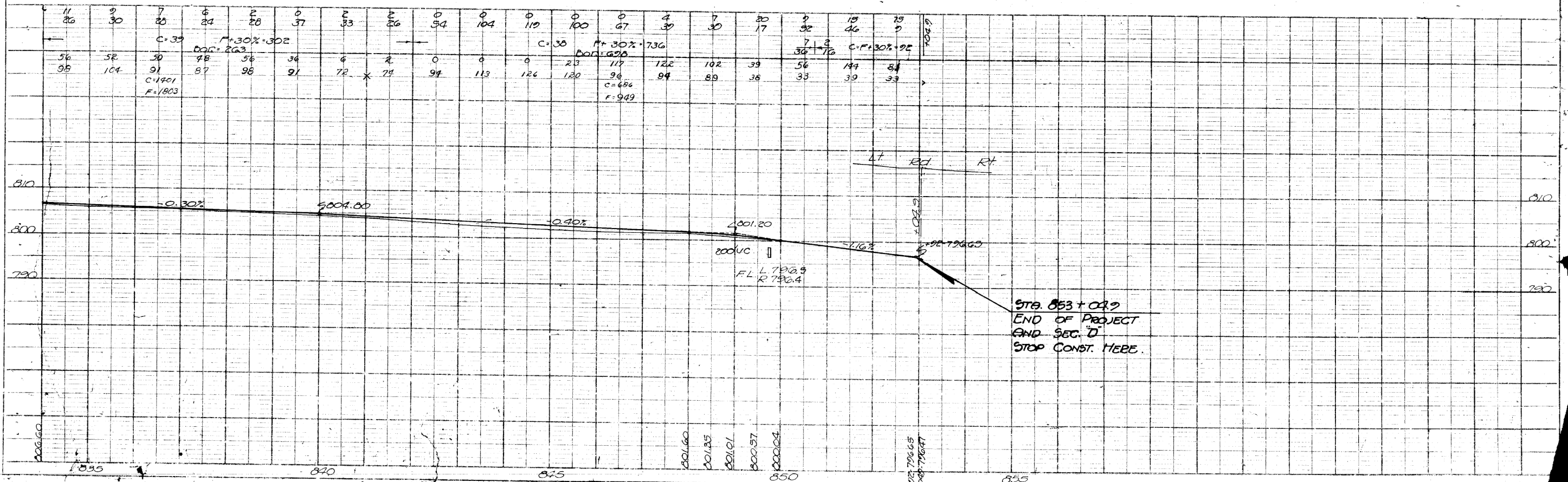
CULTIVATED

PASTURE

JOHN M. EPPERLY

MAHASKA CO
CEDAR TWP
T.74N.R.14W
SEC. 30

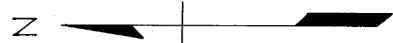
Bench Marks:
No. 77 - Sta. 839+86 - R.R. spike in fence post 35' Rt. --- Elev. 803.37
No. 78 - Sta. 849+74 - Mark X on hdwall culv. 15' Rt. --- Elev. 800.52



Sta. 853+04.9
END OF PROJECT
END SEC. D
STOP CONST. HERE.

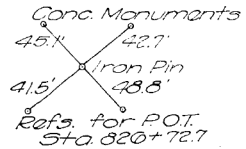
This Sheet For Information Only

ESTABLISHED WIDTH OF RIGHT OF WAY _____ FT.



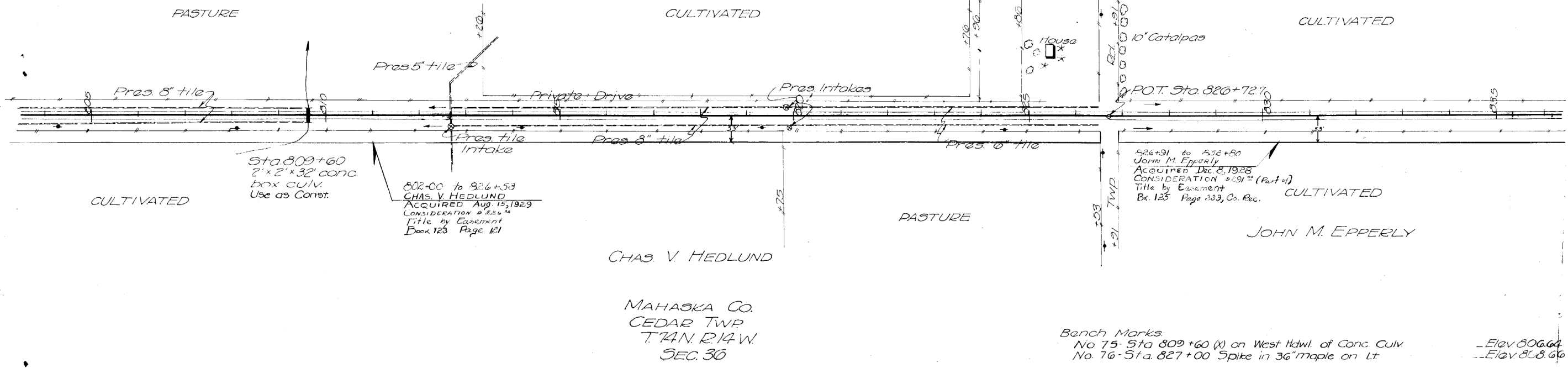
KEOKUK CO.
BENTON TWP
T.74N. R.13W
SEC. 31

LUCY A. WOODWARD



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	Iowa	510		39	126

EDWIN S. WOODWARD



Sta. 809+60
2' x 2' x 32' conc.
box CULV.
Use as Const.

802+00 to 826+53
CHAS. V. HEDLUND
ACQUIRED Aug. 15, 1929
CONSIDERATION \$226
Title by Easement
Book 123 Page 161

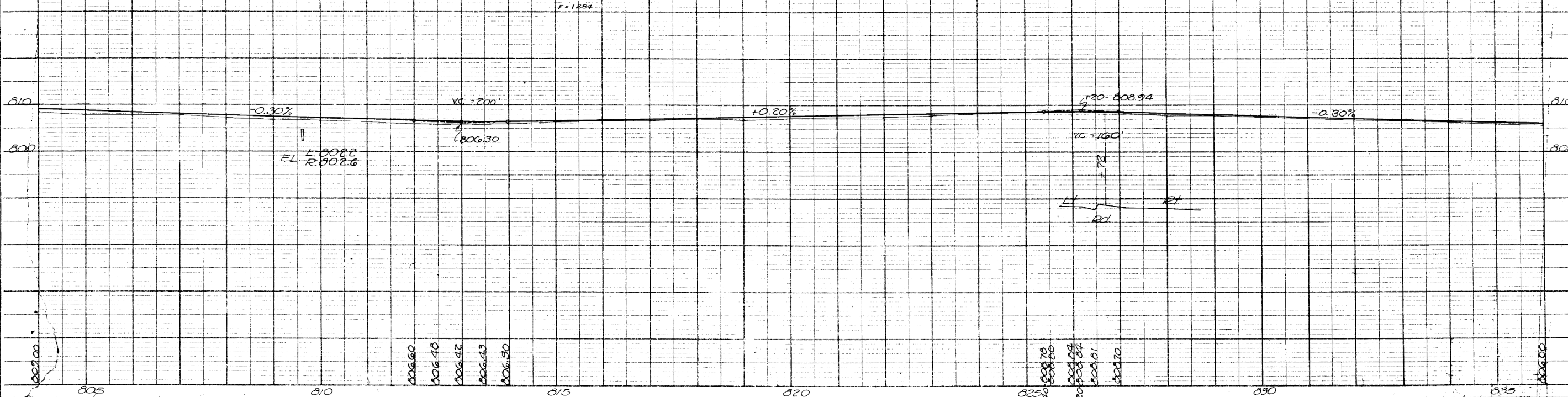
826+91 to 832+80
JOHN M. EPPERLY
ACQUIRED Dec. 8, 1928
CONSIDERATION \$291 (Part-1)
Title by Easement
Bk. 123 Page 333, Co. Rec.

CHAS. V. HEDLUND

MAHASKA CO.
CEDAR TWP
T.74N. R.14W
SEC. 36

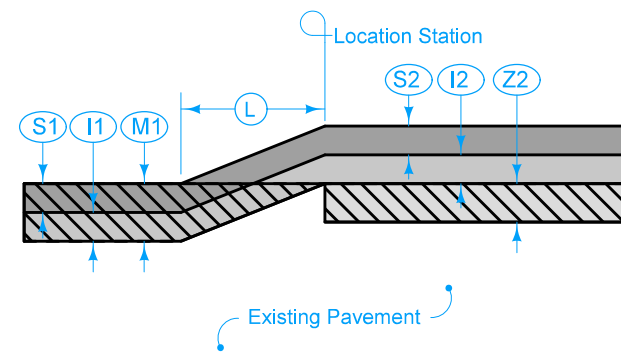
Bench Marks
No. 75 - Sta. 809+60 (X) on West Hdwl. of Conc. Culv. - Elev 806.64
No. 76 - Sta. 827+00 Spike in 36' maple on Lt. - Elev 808.66

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
C=27 F+30%=563 P.O.T.=334					C=32 F+30%=339 P.O.T.=307					C=42 F+30%=312 P.O.T.=270					C=43 F+30%=261 P.O.T.=216																
0	0	0	5	4	5	74	82	96	122	142	128	119	133	128	111	100	94	91	106	140	111	41	82	74	89	69	33	37	50	56	52
144	87	70	82	87	65	87	87	76	67	63	61	65	46	59	74	74	87	72	65	72	67	65	80	82	94	119	98	96	34	98	104

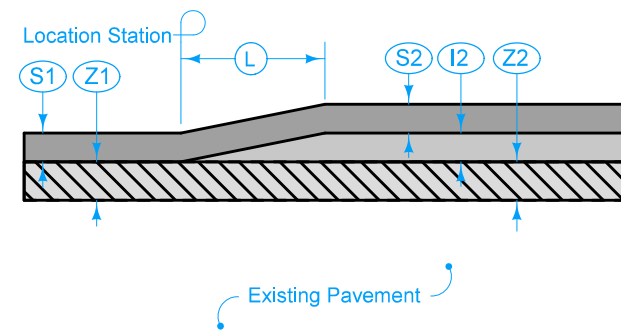


Mahaska COUNTY, PROJ. NO. P.510 SHEET NO. 39

This Sheet For Information Only



TYPE 'R5-M1'
 RUNOUT FOR TRANSITION
 FROM INTERMEDIATE COURSE - SURFACE COURSE TO
 COLD IN-PLACE RECYCLING - INTERMEDIATE COURSE - SURFACE COURSE



TYPE 'R5-M2'
 RUNOUT FOR TRANSITION
 FROM HOT IN-PLACE RECYCLING - SURFACE COURSE TO
 HOT IN-PLACE RECYCLING - INTERMEDIATE COURSE - SURFACE COURSE

- Ⓢ# HMA Surface Course
- Ⓜ# HMA Intermediate Course
- Ⓩ# Hot In-Place Recycling
- Ⓜ# Milling
- Ⓛ Runout Length

Posted Speed Limit (mph)	Runout Ratio (ft per inch)
Over 40	50
20 to 40	25
Under 20	10*

* Based on turning maneuvers at side roads and intersections.

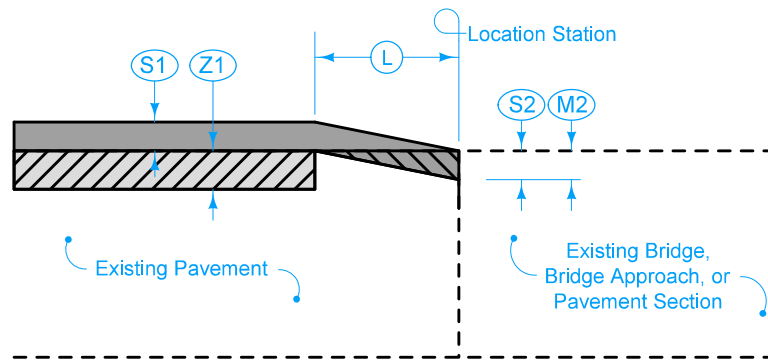
Contract Item:
 Pavement Scarification

Tabulations:
 100-25
 102-16

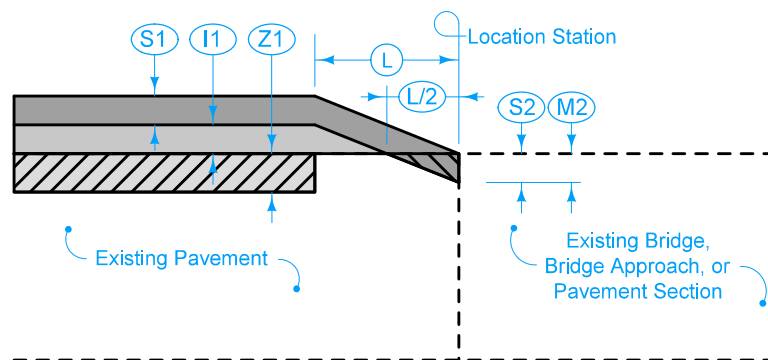
MODIFIED

MODIFICATIONS: Created Runouts 'R5-M1' and 'R5-M2'.
 Removed runouts not applicable to this project.

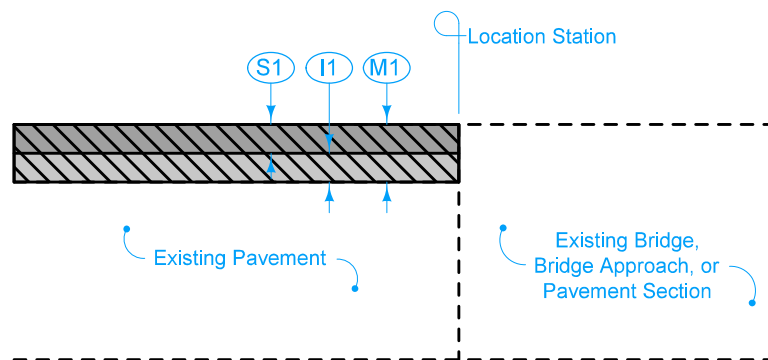
RUNOUTS FOR RESURFACING
PR-201 SHEET 1 of 1



TYPE 'N1-M1'
SURFACE NOTCH - HOT IN-PLACE RECYCLING
RUNOUT FOR SINGLE COURSE RESURFACING



TYPE 'N3-M1'
SURFACE NOTCH - HOT IN-PLACE RECYCLING - INTERMEDIATE
RUNOUT FOR DOUBLE COURSE RESURFACING



TYPE 'N4-M1'
DOUBLE COURSE
RESURFACING OF MILLED AREAS

- (S#) HMA Surface Course
- (I#) HMA Intermediate Course
- (Z#) Hot In-Place Recycling
- (M#) Milling
- (L) Runout Length

Posted Speed Limit (mph)	Runout Ratio (ft per inch)
Over 40	50
20 to 40	25
Under 20	10*

* Based on turning maneuvers at side roads and intersections.

Contract Item:
Pavement Scarification

Tabulations:
100-25
102-16

MODIFIED
MODIFICATIONS: Created Notches 'N1-M1', 'N3-M1', and 'N4-M1'. Removed notches not applicable to this project.
NOTCHES FOR RESURFACING (WITH OR WITHOUT RUNOUT)
PR-202 SHEET 1 of 1