Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Memorandum

To: Stephanie Brandenberger, PE
Bridge Engineer

From: Scott Walter, PE *SAW*
Bridge Engineering Manager – Glendive District

Date: August 17, 2018

Subject: STPB 204-1(2)1
Dodson South Canal – 1M S Dodson
UPN 9553001
Work Type 221 - Bridge Replacement with no added capacity

Please approve the attached Preliminary Field Review Report.

Approved *Stephanie Brandenberger* Date *August 17, 2018*

Stephanie Brandenberger
Bridge Engineer

We are requesting comments from those on the distribution list. We will assume their concurrence if we receive no comments within two weeks of the approval date.

Distribution:
Shane Mintz, Glendive District Administrator
Stephanie Brandenberger, Bridge Engineer
Lesly Tribelhorn, Highways Engineer
Roy Peterson, Traffic and Safety Engineer
Robert Stapley, Right-of-Way Bureau Chief
Lynn Zanto, Rail, Transit, & Planning Division Administrator
Kevin Christensen, Construction Engineer
Jeff Jackson, Acting Materials Engineer
Jon Swartz, Maintenance Division Administrator

Distribution (electronic only)
Tom Martin, Environmental Services Bureau Chief

cc:
Scott Walter, P.E., EPS Project Manager, Glendive District Bridge Master file

e-copies:
Located at the end of this document

Introduction

A field review for the Dodson South Canal – 1M S of Dodson was held on August 16, 2018. The following people were present:

Megan Cail – Project Design Engineer	Road Design
Scott Walter – Bridge Engineering Manager	Bridge Bureau
Marc Wotring – District Hydraulics Engineer	Hydraulics Section
Jim Frank – Preconstruction Engineer	Glendive District
Carson Buffington – Wolf Point Maintenance Chief	Glendive District
Jay Fleming – Construction Operations Engineer	Glendive District
Bob Evans – Geotechnical Engineer	Geotechnical Section
Paul Jensen – Wolf Point Maintenance Superintendent	Glendive District

The following report is a summary of the input received, the field review, and the preliminary scope for the project.

Proposed Scope of Work

The proposed scope of the project is to replace the existing structure over the Dodson South Canal with a new bridge. The project will include minor road work to tie into the bridge ends, approach guardrail as needed, and appropriate accommodation of a private road approach. The overall objective is to replace the bridge on the existing alignment and approximate existing grade using a bridge system and construction methods that minimize grade and alignment adjustment.

This project will be designed in enhanced workspace as agreed during the review.

Needs and Objectives

The bridge over the Dodson South Canal is experiencing deterioration of its substructure which is likely to compromise the overall safety and commercial effectiveness of the route in the long-term. The structure has been identified as structurally deficient. Due to the bridge substructure's poor condition, the "no-build" option is not a feasible, long-term alternative. The route is used extensively to move agricultural equipment and products, and as a major collector to provide access to the greater transportation system.

Public Summary

To address the deterioration issues with the Bridge over Dodson South Canal located approximately 1 mile south of Dodson, MT in Phillips County, the replacement of the existing bridge with a new bridge structure has been proposed as part of this project. In addition, railing improvements and other minor enhancements are to be considered to improve safety at the bridge location.

Project Location and Limits

The existing bridge, crossing the Dodson South Canal, is located on Secondary Highway 204 (Stage Road) in Phillips County, approximately 1.5 miles south of Dodson, MT (T 30 N, R 27 E, SEC 8).

The proposed project length will depend primarily on the amount of roadwork required to tie the bridge ends and approaches to the existing roadway alignment according to the requirements for rural, major collector secondary highways. This is estimated to be limited to approximately 300 feet from each end of the existing bridge.

Work Zone Safety and Mobility

At this time, Level 3 construction zone impacts are anticipated for this project as defined in the Work Zone Safety and Mobility (WZSM) guidance. The plans package will include a Transportation Management Plan (TMP) consisting mainly of a Traffic Control Plan (TCP). These issues are discussed in more detail under the Traffic Control and Public Involvement sections of this report.

Physical Characteristics

The intent of the project is to construct the new canal crossing with a new bridge structure on the existing alignment and approximate existing grade. This proposed alignment will result in reduced need for right-of-way (ROW) acquisitions as well as reduced road and earthwork during construction.

The terrain adjacent to the project is rolling hills and appears to be used primarily for livestock grazing and farming. It is also not anticipated that the use of the land adjacent to the project will change in the near future. No building structures were observed in the vicinity of the jobsite.

This highway provides local access to the greater transportation network and is classified as a major collector. The route is identified as a school bus route and may also serve as a mail route. It is not believed that the proposed project will alter the existing traffic volumes or characteristics of the highway.

The existing bridge is located within a 300-foot vertical curve that comes in at a -4.20% grade from the southwest and goes out at a +0.00% grade to the northeast. The structure and adjacent roadway horizontal alignment appear to be on tangent and built with a 2.00% normal crown.

This project segment of the roadway was constructed in 1955 under Federal Aid Project S-159(1). The roadway consists of (2) 12-foot travel lanes for a total width of 24-feet. During the field review, plant mix surfacing was observed and according to the Montana TIS Road Log has a depth of 0.2-feet on a 1.2-foot base. The existing fill slopes appear to be built at 4:1. According to the Pavement Condition Treatment Report the corridor at this location has a Ride Index of 68.3 (Fair), a Rut Index of 80.0 (Good), Alligator Crack Index [ACI] of 88.4 (Good), and a Miscellaneous Crack Index [MCI] of 94.4 (Good). Recommended pavement treatment for this section of roadway is listed as “AC Thin Overlay”. “As-built” plans for the road are available.

General Information - Existing Bridge
Bridge over Dodson South Canal

Year Built	1954 {Under Federal Aid Project S 159(1)U2}
NBI Number / MDT Structure ID	S00204001+04001 / 06367
Length, ft.	63.0
MDT Drawing Number	3346
Width (Curb to Curb), ft.	24.0
Number of Spans	3
Approx. Span Lengths, ft.	1 @ 19.0, 1@ 25.0, 1 @ 19.0 (Center to Center of End Bents = 63.0)
Bridge Rail Type	Timber Railing with Timber Posts and Curbing
Deck Type	Timber Planking with Bituminous Overlay [Deck Rating = 7-Good]
Superstructure Type	Timber Stringers [Superstructure Rating = 7-Good]
Substructure Type	Timber caps on timber piling [Substructure Rating = 4-Poor]
Sufficiency Rating	53.8
Structure Sufficiency Status	Structurally Deficient
Posting	Equal to or Above Legal Loads
Location Designation	Rural
Vertical Clearance, ft.	Unlimited

Bridge over Dodson South Canal

Traffic Data

RP 1.0 to RP 1.6	
2018 AADT	110 – Present
Year AADT	120 – Letting Year
Year AADT	140 – Design Year
DHV	20
T	19.1%
ESAL	9
AGR	1.0%

Crash Analysis

As requested, a safety analysis was completed on a portion of Secondary Highway 204 (C000204S, S-204) from reference posts 1.0 to 2.0 for the 10-year period from January 1, 2008 through December 31, 2017. Montana Highway Patrol records show 0 crashes along this section of roadway for the dates January 1, 2008 through December 31, 2017. Montana Highway Patrol records show no additional crashes along this section of roadway for the dates January 1, 2018 through May 31, 2018.

There have been no crash clusters and/or safety projects identified within this section of roadway during the study period.

Major Design Features

a. **Design Speed.** The design speed for rural, major collector roads in rolling terrain is 50 mph. All design features will meet the criteria for a 50-mph design speed. The posted speed limit for general traffic is 70 – mph (daytime) / 65 - mph (night) and for trucks is 60 – mph (daytime) / 55 – mph (night).

b. **Horizontal Alignment**. The existing road appears to be on a tangent horizontal alignment throughout the anticipated project limits. It is recommended that the bridge replacement be constructed on the existing PTW using the existing roadway elevations as much as practical. The proposed alignment will provide the desirable SSD for a 50 - mph design speed. The intent of this proposed alignment is to minimize ROW acquisition, roadwork & earthwork, and to reduce construction time and traffic disruption

c. **Vertical Alignment**. The vertical alignment consists of a 300-foot vertical curve that comes in at a -4.20% grade from the southwest and goes out at a +0.00% grade to the northeast. The bridge is located within this curve. The intent of the project is to replace the bridge on the existing grade as much as practical using construction methods that minimize grade adjustment; however, an effort will be made to design the new structure alignment such that it is on a tangent grade. Once ground survey is received, the grades to the northeast and southwest will be analyzed for adequate stopping sight distance requirements. The need to provide adequate storm water drainage longitudinally off of the new structure will be considered when finalizing the vertical alignment. Adequate connections of the road approaches to the new alignment will be provided.

d. **Typical Sections and Surfacing**. The typical section width will taper from the 28.0' wide bridge to the existing roadway width. The road crown will be 2.0% to match the new bridge crown and the existing roadway. It is estimated that the typical surfacing section will consist of 1.0 feet of base with 0.3 feet of plant mix surfacing. The Department's Surfacing Section will provide a recommendation for the final section and surfacing design.

e. **Geotechnical Considerations**. There were no unique geotechnical issues noted during the review. A substructure investigation will be needed for the design of the replacement bridge.

f. **Hydraulics**. For the Dodson South Canal water from the Milk River is diverted at the Dodson Diversion Dam, located approximately 5 miles west of Dodson, MT. This diversion dam was constructed in 1910 for water diversion only and was not intended to provide flood control to the area. The canal is under the authority of the Bureau of Reclamation and is operated by the Malta Irrigation District. Records show that the canal has a peak discharge of 594 cfs with a mean discharge of 310 cfs. During the review of the site and the inspection of "as-built' plans, it was determined that debris and ice collections do not exist. Phillips County participates in the National Flood Insurance Program and this structure is located within the Milk River floodplain; therefore, a floodplain permit will be required. A comprehensive Location Hydraulics Study Report will be prepared by the Hydraulics Section at a later date which will provide greater detail into the hydraulic characteristics of the site as well as any hydraulics specific survey needs. This project is not expected to affect any other drainages or irrigation facilities.

g. **Bridges.** The existing bridge over the Dodson South Canal will be removed and salvaged as appropriate and replaced with a bridge structure on a conventional piling foundation system. The bridge replacement will provide a 28'-0" roadway width using a standard W-740 box beam or T-101 bridge railing system and then taper into the existing roadway width at the project ends. Traffic is expected to be maintained during construction activities through the use of a temporary detour located adjacent to the structure. The Fish, Wildlife and Park (FWP) Department will be contacted to determine the extent of interest for salvaging the existing bridge's timber stringers. If there is no interest from the FWP then Phillips County will be contact to determine salvaging interest. If it is determined that Phillips County is not interested in the salvageable material then the contractor will be directed to remove and dispose of the structure in accordance with applicable laws and the Department's

specifications. "As-built" drawings are available for the existing structure. {See MDT Drawing Number 3346.]

h. **Traffic.** There were no unique traffic issues identified during the review. All signing will be upgraded.

i. **Pedestrian/Bicycle/ADA**. No dedicated pedestrian, bicycle, or ADA facilities were observed in the proposed project area. Due to the scope of this project, no dedicated pedestrian, bicycle, or ADA facilities are anticipated for inclusion.

j. **Miscellaneous Features**.
- A farm field / ditch rider road approach with guardrail exists at the north corner of the structure. Any impacts to the approach will be addressed in the road design as deemed necessary.
- A private road approach with a cattleguard and guardrail exists at the east corner of the structure. Any impacts to the approach will be addressed in the road design as deemed necessary.
- No designated parking was observed within the anticipated project limits.
- No mailboxes were observed within the anticipated project limits.
- Fencing running parallel and approximately 70 feet offset to both sides of the PTW is present. Any fencing impacted by the project will be replaced as directed by R/W negotiations.
- Riprap embankment protection used at the bridge will be re-vegetated outside the drip lines of the bridge.
- Guardrail segments located to the north of structure will be removed as part of this project.

k. **Context Sensitive Design Issues**. No unique context sensitive design considerations are anticipated to be included as part of this project.

l. **Permanent Erosion and Sediment Control (PESC) Features**. The surrounding soil appears to consist of silty clays and is generally held intact with substantial vegetative cover. Based on these characteristics, it is assumed that significant erosion events are minimal depending on the storm event. The climate is considered arid and weather conditions are typical of north central Montana. No unique erosion and sediment control design features have been identified at this time.

Other Projects
There are no projects that are currently under construction or will be in the near future that are anticipated to affect this project.

Location Hydraulics Study Report
The Hydraulics Section will prepare and distribute a Location Hydraulics Study Report at a later date.

Design Exceptions
No design exceptions are anticipated for this bridge replacement project; however, design items that do not meet the design criteria for secondary highway / major collectors will be identified and documented in the Scope of Work Report.

Right-of-Way
It has not yet been determined if new right-of-way acquisitions will be needed for this project; however, the need for construction permits is likely. According to the Montana Cadastral all property immediately adjacent to the jobsite is owned by the Gilmore Ranch, Inc. of Dodson, MT.

As part of the project, it is suggested that a discussion occur with the ditch company to gage the feasibility of moving the two ditch access road approaches and abandon the ditch rider road approaches located

immediately north of the bridge ends.

Currently there is no allowance for Right-of-Way (R/W) costs necessary to complete the project. Upon further evaluation of the overall scope of the project, the need for inclusion of R/W related costs and a modification of the current federal aid agreement for R/W will be determined.

Access Control
It is not the intent of this project to restrict or change existing conditions pertaining to drainage or property access. In addition, access control will not be included as part of this project.

Utilities/Railroads
During the field review no overhead utility lines were observed in the general site area; however, evidence of underground utilities located to the east and running along the fence line and parallel to the PTW was observed. A utility survey will be needed to determine the extents of any utility impacts and involvement to the project.

No railroads were observed in the vicinity of the site.

Currently there is no allowance for Incidental Construction (IC) costs necessary to complete the project. Upon receipt and evaluation of the utility survey, the need for inclusion of IC related costs and a modification of the current federal aid agreement for IC will be determined.

Maintenance Items
Maintenance forces have agreed to complete all post-construction permanent pavement striping and seal & cover activities at this time; however, this will be re-evaluated at Scope of Work. No other maintenance issues were identified during the field review.

Intelligent Transportation Systems (ITS) Features
No Intelligent Transportation Systems (ITS) features are anticipated to be included as part of this project. No RWIS or WIM sites are within the project limits.

Experimental Features
No unique experimental features have been identified for inclusion into the project.

Survey
It is recommended that a conventional Digital Terrain Modeling (DTM) topographic survey be performed for this project. It is anticipated that the survey should include approximately 1/4 mile up and back on line of the existing bridge along the PTW and 400 feet offset each side. In addition, since R/W acquisition may be needed, a section corner should be tied in as part of the retracement survey. Additional surveys, including S.U.E., Cadastral, and Hydraulics will be needed. Prior to beginning any survey activities, the Location Hydraulics Study Report should be reviewed for hydraulic survey requirements including the channel bottom elevation.

Public Involvement
Level A is the appropriate level of public involvement at this time and may include some or all of the following:

Level A
1. News release explaining the project and including a department point of contact.

Due to the nature of the work and the limited effects on the area residents, a public informational meeting is not expected to be necessary. Representatives of the Department will discuss the project with affected landowners if right-of-way acquisition or construction permits are required. The ditch company will be contacted during project design development and construction activities to coordinate and mitigate any impacts to the function or use of the irrigation canal.

No other groups having unique needs or specific concerns have been identified.

Based on the relatively low traffic volumes, the availability of traffic maintenance through the use of a detour bridge, and the nature and typical use of the route, the design team determined that the project public involvement impact rating is low.

Environmental Considerations

According to the FWP's Montana Fisheries Information System (MFISH) the Dodson South Canal at the proposed project site is not noted as a viable warm water fishery; however, during the field review the presence of fish species was observed.

Field observations conclude that the project site is not extensively used for fishing, swimming, floating, or other water-based recreational activities. Based on the presence of several game animal species in the area, it is likely that hunting opportunities are available.

Although the canal is intended for use for irrigation purposes, the area surrounding the project appears to possess a multitude of upland game birds, waterfowl, furbearing species, and small & big game animals that appear to use the Dodson South Canal and its riparian area. Although bird nests were not observed under the structure due to the current water level, significant numbers of birds observed at the bridge site indicate that the presence of bird's nests is likely. Consideration of this should be taken into account during project development. A comprehensive biological resources report will follow later which will provide greater detail and verification of the extent of plant and animal species of the area.

Wetlands were observed in the project area and will be considered during the design of the project.

Pending verification by the Environmental Services Bureau (ESB), it is expected that NEPA compliance can be met through an Individual Programmatic Categorical Exclusion. A Clean Water Act Section 404 permit will be required. In addition, an SPA-124 notification authorized by the FWP will also be required for this project. Pending verification by the ESB, a Nationwide Programmatic Section 4(f) Evaluation form for Historic Bridges will not be required.

There are no known archaeological sites or hazardous waste sites near the project site, however a more detailed study will be performed in order to verify this.

For permitting purposes, it is requested that the ESB determine and provide an Ordinary High Water Mark (OHWM) elevation at this location.

Energy Savings/Eco-Friendly Considerations

No unique energy savings/eco-friendly considerations were identified during the field review.

Traffic Control

Due to the intent of replacing the existing structure with a new bridge on the current alignment, traffic will be maintained through the use of a temporary, single-lane detour bridge until the new structure is completed and opened to traffic. The location of the detour will most likely be located to the west of the PTW. The detour will be adequately offset in order to accommodate construction activities and to provide for sufficient work zone safety.

A Transportation Management Plan (TMP) consisting of a Traffic Control Plan (TCP) is appropriate for this project and will be included in the plans package.

Preliminary Construction Cost Estimate
The project was nominated for $1,280,000 (CN only). The project is partial G-match eligible.

	Estimated cost	Inflation (INF) (from PPMS)	TOTAL costs w/INF + IDC (from PPMS)
STPB CN	**$900,000**	**$120,000**	**$1,130,000**
G-Match CN	**$40,000**	**$5,000**	**$50,000**
TOTAL CN	**$940,000**	**$125,000**	**$1,180,000**
CE (15%)	**$140,000**	**$20,000**	**$180,000**
Project TOTAL from all of the funding types above:			
Project TOTAL CN+CE	**$1,080,000**	**$145,000**	**$1,360,000**

The estimate above includes $100,000 traffic control, 15% allowance for contingency, and 18% for mobilization. The pro-rata estimates are applied to the sum total of all bid items and included in the non-G-match CN line. Traffic control, contingency, and mobilization are not applied to G-match bid items during project development. The Contract Plans Bureau will apply traffic control and mobilization pro-rata (as appropriate) when preparing the Engineer's Estimate for programming CN and advertising for bids.

Note: Inflation is calculated in PPMS to the letting date. If there is no letting date, the project is assumed to be inside the current TCP and is given a maximum of 5 years until letting. IDC is calculated at 10.49% for FY 2019.

Preliminary Engineering
The current Preliminary Engineering cost estimate including inflation and IDC is $129,000 as calculated in PPMS. After functional activity review and the completion of the override process, a refined estimate of Preliminary Engineering costs will be made available and the need for a PE modification to the federal aid agreement will be determined.

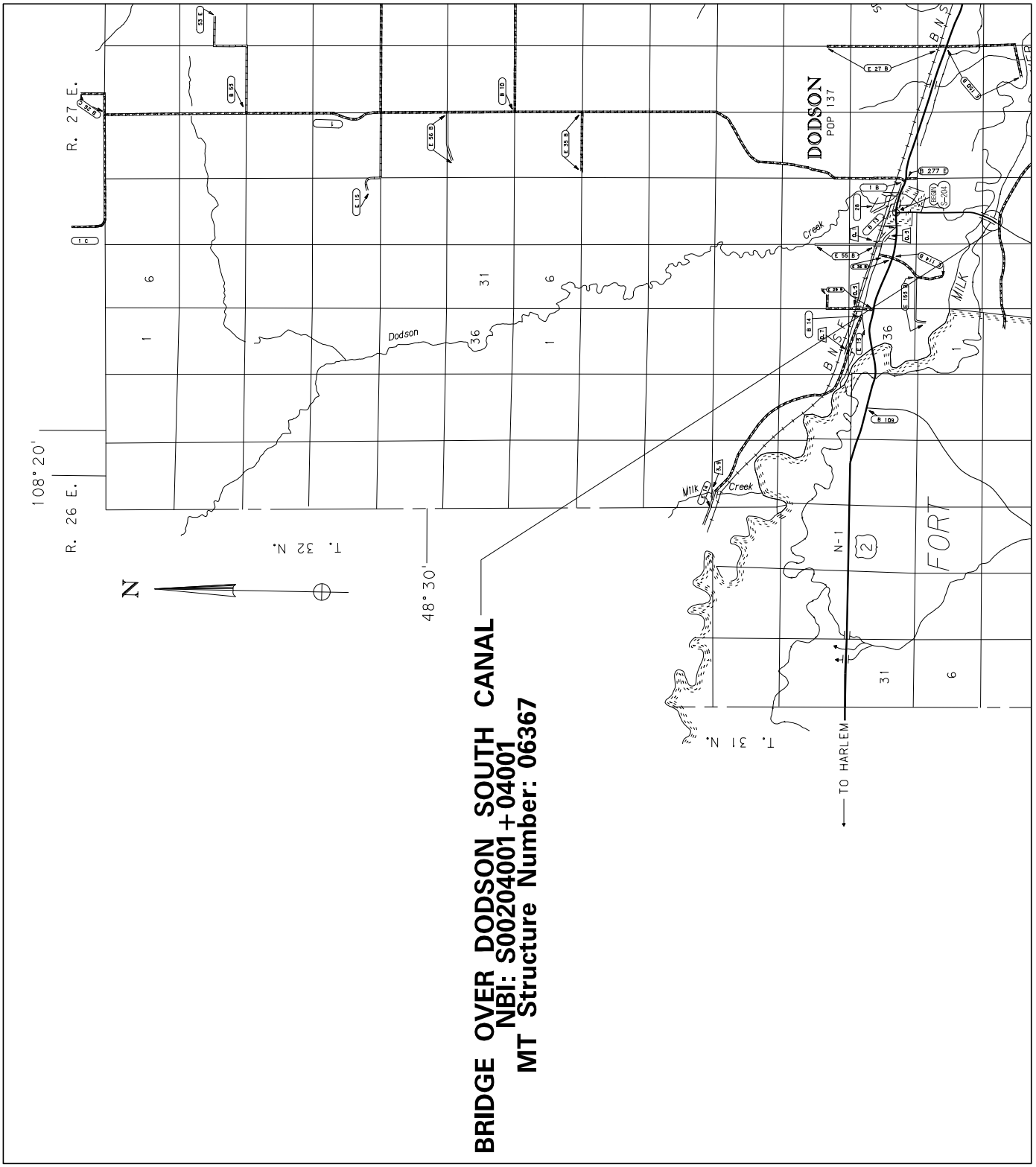
Project and Risk Management
The Bridge Bureau is currently managing this project with Scott Walter as the Project Design Manager. The District Road Design Unit located in Helena will be the lead for the road design portion of the project. This project is not considered a Project of Division Interest (PoDI) by FHWA.

Due to the nature of the anticipated project scope, the overall level of risk to the project costs and schedule are deemed to be low.

Ready Date
At this time a ready date is not available on the Engineering Project Scheduler (EPS); however, upon completion of the activity override process a formal schedule will be established. The project is currently not included in the current Tentative Construction Plan (TCP) ; however, the project was originally nominated with an anticipated letting date of June 2022.

The current PE End Date is December 2024.

Site Map


BRIDGE OVER DODSON SOUTH CANAL
NBI: S00204001+04001
MT Structure Number: 06367
DODSON
POP 137
FORT
MILK
Dodson Creek
Milk Creek
B N S F
R. 27 E.
R. 26 E.
108° 20'
48° 30'
T. 32 N.
T. 31 N.
N
TO HARLEM

e-copies:

Dustin Rouse, Preconstruction Engineer
James Combs, Highways Design Engineer
Dave Hedstrom, Hydraulics Engineer
Bryce Larsen, Sup., Photogrammetry & Survey
Danielle Bolan, Traffic Operations Engineer
Ivan Ulberg, Traffic Design Engineer
Patricia Burke, Safety Engineer
Chad Richards, Engineering Cost Analyst
John Pirre, Engineering Information Services
Jan Nesset, Public Involvement Officer
Sue Sillick, Research Section Supervisor
Lisa Hurley, Fiscal Programming Section
Kurtis Miros, Engineering Division
Jeff Nehring, Engineering Division
Wayne Noem, Secondary Roads Engineer
Sheila Ludlow, Bicycle/Pedestrian Coordinator
Michelle Wheat, Bicycle/Pedestrian Coordinator
Tom Martin, Environmental Services Bureau Chief
Joe Radonich, Remediation and Assessment
Darin Reynolds, Construction Bureau – VA Engineer
Gabe Priebe, Utilities Engineering Manager
David Hoerning, Lands Section Supervisor
Jerilee Weibel, Acquisition Section Supervisor
Joe Zody, R/W Access Management Section Manager
Jim Davies, Pavement Analysis Engineer
Vacant, Surfacing Design Supervisor
Jeff Jackson, Geotechnical Engineer
Paul Johnson, Project Analysis Bureau
Jean Riley, Planner
Tom Gocksch, ESB, Engineering Section Supervisor
Dawn Stratton, Fiscal Programming Section
Amanda Jackson, Eng. Mnr., Bridge Management System
Damian Krings, Road Design Engineer
Becky Duke, Traffic Data Collection Section Sup.(WIM)
Doug McBroom, Maintenance Operations Mgr (RWIS)
Matt Maze, ADA Coordinator
Bill Semmens, Environmental Resources Section Sup.
Jon Axline, Historian
Vacant, Reclamation Specialist

James Frank, Preconstruction Engineer
Jaronn Boysun, Materials Lab
Patty Patterson, Right of Way Supervisor
Clay Blackwell, Construction Engineer
Marc Wotring, Hydraulics Engineer
LeRoy Wosoba, Traffic Project Engineer
Larry Sickerson, Biologist
Steve Heidner, Projects Engineer
Troy Hafele, District Utility Agent
Carson Buffington, Maintenance Chief
Thomas Christensen, Right of Way Design Supervisor
Jay Fleming, Construction Ops Engineer
Scott Walter, Bridge Area Engineer
Bob Evans, Geotechnical Specialist
Grant Rodway, Project Development Engineer
Linda Switzer, District MCS Captain
Greg Zeihen, Surfacing Design
TJ Ramaeker, Constructability Reviewer