

Noble County Highway Department

Transportation Asset Management - Bridges

2018 Bridge Rehabilitation and Replacement Plan



Prepared by: Zachary S. Smith, P.E.

Date: January 22, 2018

1118 E. Main St.

Albion, IN 46701

260-636-2124

zsmith@nobleco.us

Table of Contents

Transportation Asset Management Plan - Bridge Plan 2018.....

Purpose 1

Bridge Asset Management..... 1

Bridge Inventory..... 1

Bridge Condition Update..... 1

Funding Mechanism..... 2

Prioritization..... 3

Bridge Replacement List 4

Bridge Replacement Plan 6

Purpose

This document was developed in conjunction with the *Bridge Inventory Report* as a budgetary and scheduling tool for bridge rehabilitation and maintenance projects based on funding type and priority. This plan provides a prioritization method to match available funding mechanisms with bridge repair needs to maintain the entire system as economically and effectively as possible. The plan will be updated on a two year interval to coincide with the biannual bridge inspections.

Bridge Asset Management

The Noble County Highway's approach to all asset management consist of the same four steps: inspection, evaluation, prioritization and action. Inspection is completed per federal requirements and is contracted out to a bridge inspection consultant on a four year cycle. The bridge condition data and available funding are evaluated and maintenance and replacement prioritized based on the factors below. Replacement, maintenance and funding application are completed annually and the plan is updated to reflect the improvements. This cycle is repeated annually to continually stay on course as new bridge condition data becomes available.

Bridge Inventory

Noble County currently maintains sixty-three (63) bridges within their jurisdiction. All structures are inspected on a 24 month cycle. Structures with a rating of 4 or less in a critical category are inspected on a 12 month cycle. The inspections are published biannually as the *Noble County Bridge Inventory Report* and publicly viewable at the Noble County Courthouse and the Noble County Highway Department.

Bridge inspection is contracted out in four year increments to comply with federal requirements. Noble County's current cycle is 2015-2018 with an inspection month of April. Underwater inspection (5 year cycle) are scheduled for 2019. Currently, eight bridges are inspected on a 12 month cycle (6, 55, 73, 77, 134, 136, 139 & 147.)

Lastly, load ratings are conducted at the time of inspection. Any bridges not meeting load requirements are posted with weight restrictions. Currently, there are two bridges that are posted; Bridge 134 at 4 tons and Bridge 136 at 6 tons. These structures are Noble County's top priority for replacement.

Bridge Condition Update

The most recent bridge condition data is available in the 2017 Bridge Inventory Report. No additional structures were added to the replacement list at this time. The following bridges were replaced between 2015 and 2017: bridge 16, 24 and 82. Additionally, bridge 135 was demolished and permanently closed at this time. These resulted in a reduction from sixteen to twelve bridges (6, 33, 44, 55, 59, 69, 73, 77, 134, 136, 147 & 200) scheduled for replacements. Of these twelve, five are currently under development through either the LPA program or local replacement.

In addition to replacement needs; a list of maintenance and preservation items is also included with inspections. This includes repairs, preservation treatments, scour protection and regular maintenance. The following is a list of improvements and repairs completed between 2015 and 2017:

Bridge Replacement - Bridge 82 was replaced in 2016 with a new three-sided concrete box culvert. Bridge 16 and 24 were replaced in 2017 with a composite spread box beam concrete deck structures.

Scour Protection - A combination of flowable fill, revetment riprap and/or sheet piling were used as needed to improve or correct scour protection on the following four bridges: 1, 4, 23 & 99.

Timber repair - Spreader beam bolt were tightened on the following bridges: 3, 52, 53, 71, 74 & 91.

Guardrail repair - Guardrail was repaired on the following bridges: 5 & 90.

Debris Removal - An obstruction caused by debris was removed from bridge 200.

Deck Cleaning - Deck cleaning is completed on all structures as needed prior to bridge inspection.

Routine maintenance is completed in addition to the above mentioned items on a regular basis utilizing the detailed maintenance list found on pages 5-7 of the *Bridge Inventory Report*. Maintenance work is completed using highway department crews were applicable. Additional work is contracted out when either cost effective or required.

Funding Mechanisms

Noble County is one of 16 counties whose road and bridge data was used in the Indiana Soybean Alliance study titled "*Agriculture, Road Conditions, and Road Funding: Making the Case*" to determine state wide local highway funding needs. At the time of their study, they took a detailed look at 15 of the 16 bridges currently on the bridge replacement list and estimated a cost of \$15,260,472 for replacement structures. Using local funds (\$415,000 per year), it would take the equivalent of 36.6 years of funding to meet our current need. This would address only the bridges currently on the list and not account for future needs.

The following is an overview of funding types available for bridge preservation or maintenance:

Local Public Agency (LPA) Grant - The LPA grant is an 80/20 match program of federal funds that is administered by INDOT at a somewhat random frequency. These funds come with the stipulation that projects will meet all federal requirements.

Cumulative Capital Development (CCD) Fund - The CCD Fund is the major annual funding mechanism for bridge preservation and maintenance. This fund generates ~\$415,000 annually.

Rainy Day Fund - The rainy day fund is managed by the Noble County Council and in the events that additional bridge funding is needed, a request can be made to use this funds. Due to the nature of this fund, it is not accounted for in our long term planning.

Highway General Fund - The highway general fund is the main operating for the Noble County Highway Department. Currently, all money from this fund is dedicated to other transportation items (roads, signs, striping, highway staff, etc...) There is future potential that this fund could be used once the Noble County Highway system is improved to average PASER rating of 7.0.

CCMG Grant - The Local Road and Bridge Matching Grant (Community Crossing) was launched with the 2016 road funding bill and provides funding at 50/50 or 75/20 up to one million dollars in funding for road or bridge projects.

Following the 2013 inspection report, there was a large list of bridges, sixteen in total, that were in need of replacement (one out of four.) Combined with limited funding option this created a unique challenge. In order to make measurable progress, a large amount of grant funding is required annually.

In order to meet this need, multiple grant applications are submitted at each call for projects for both the LPA and CCMG program. The current plan focuses on using local funds to replace smaller and simple bridges (i.e. single span less than 45') and to use grant application on larger and more complex structures. The attached Bridge Replacement Plan has funding split between local and federal (LPA) funds. The plan assumes the award of one LPA bridge replacement grant annually. Community Crossing grants are utilized towards construction costs for shovel ready projects on the local end to help conserve CCD bridge funds for future projects.

Prioritization

Whenever practical, repair recommendations from the bridge inventory report are followed to significantly increase the life and safety of all bridges. In many cases, extensive repairs are not feasible since the structures would still be deficient in other aforementioned vital areas. Rusting is a major problem on any bridge consisting of steel members which results deterioration of members can greatly decrease a structure's future usable life. Cleaning and painting is prioritized

as preventative maintenance. However, there are still several bridges that are beyond the point of rehabilitation and require full replacement.

With limited funding sources, it is critical that our bridges be replaced in the most effective order. The following are the factors we use to prioritize the bridge replacement schedule.

The Average Daily Traffic on a bridge measures its importance to the County's transportation system. Therefore, structures which receive high traffic counts are given priority over those bridges which handle only a few vehicles per day.

The Structural Condition of a bridge helps estimate the length of time the structure can safely carry traffic at its present capacity. Many structures have deteriorated from age, weathering or other factors. The lower the condition ratings, the higher the replacement priority.

Bridge Alignment and Width is a major indicator of the safety of the structure to the traveling public. Factors included are horizontal and vertical alignment to the approaches in relationship to the bridge. Bridges with alignment and width safety issues are given higher priority.

Load Capacity indicates the safe load that can repeatedly travel over the bridge in its present structural condition. Structures with low load capacities or load postings are given higher replacement priorities.

Waterway Adequacy indicates if the waterway area under the structure is large enough to handle floodwaters. Existing channel alignment in relationship to the substructure is also analyzed.

Replacement Cost / Funding Source - Large structures cost a great deal to replace and are impractical to replace using traditional funding. Instead, the large structures are separated out and programmed for Federal LPA (80/20) grants. The remaining smaller bridges are replaced using local funds and utilizing a cost effective design. Community crossing grants are used towards construction costs were applicable.

Bridge Replacement List

The following is a summary of all current bridges that are in need of reconstruction:

*Bridge 136** - Bridge 136 is a steel pony truss bridge (107' span) with a timber deck that was constructed in 1906. It carries CR 400 E over CSX RR. The bridge is structurally deficient with a load ratings of 6 tons. This project was awarded an LPA grant and is under development for construction in FY 2022.

*Noble County has a *Memorandum of Agreement* (MOA) in place with CSX that provides a financial commitment from CSX for the removal of Bridge 135 and the replacement of Bridge 134 and 136.

*Bridge 134** - Bridge 134 is a steel pony truss bridge (107' span) with a timber deck that was constructed in 1906. It carries CR 225 E over CSX RR. The bridge is structurally deficient with a load ratings of 4 tons. This structure was submitted as the top priority for the 2017 LPA call for projects.

Bridge 147 - Bridge 147 is a two span precast box beam bridge (110' span) that was constructed in 1968. The bridge is structurally deficient and is scheduled for reconstruction in 2018 through an LPA grant awarded in 2014.

Bridge 6 - Bridge 6 is a series of four corrugated metal pipes (27' span) that were constructed in 1974. The structure is structurally deficient and is permitted to be replaced with a single box culvert in 2018, which will permanently remove it from the bridge inventory.

Bridge 77 - Bridge 77 is a series of three corrugated metal pipes (28' span) that were constructed in 1968. The structure is structurally deficient and currently under design and scheduled for replacement with a single box culvert in 2018, which will permanently remove it from the bridge inventory.

Bridge 55 - Bridge 55 is a single span precast box beam bridge (66' span) that was constructed in 1958. The bridge is structurally deficient at a sufficiency rating of 48.8 and is scheduled for reconstruction in 2019 using local funds and utilizing a cost effective design.

Bridge 33 - Bridge 33 is a single span precast box beam bridge (34' span) that was constructed in 1920 and reconstructed in 1973. The bridge is functionally obsolete and is scheduled for reconstruction in 2020 using local funds and utilizing a cost effective design.

Bridge 73 - Bridge 73 is a single span (28') precast box beam bridge that was constructed in 1930 and reconstructed in 1976. The bridge is structurally deficient and is scheduled for reconstruction in 2022 with a single box culvert that will permanently remove it from the bridge inventory.

Bridge 44 - Bridge 44 is a single span precast box beam bridge (66' span) that was constructed in 1958. The structure has a Sufficiency Rating of 58.7 and is scheduled as No. 2 bridge priority for a LPA Grant, which correlates to a projected replacement date in 2022.

Bridge 59 - Bridge 59 is a single span precast box beam bridge (85' span) that was constructed in 1960. The structure has a Sufficiency Rating of 68.9 and is scheduled as No. 3 bridge priority for a LPA Grant, which correlates to a projected replacement date in 2023.

Bridge 69 - Bridge 69 is a single span precast box beam bridge (86' span) that was constructed in 1971. The structure has a Sufficiency Rating of 68.8 and is scheduled as No. 4 bridge priority for a LPA Grant, which correlates to a projected replacement date in 2024.

Bridge 200 - Bridge 200 is a series of two corrugated metal pipes (29' span) that were constructed in 1970. The structure has a Sufficiency Rating of 85.0, but shows signs of heavy rusting and currently scheduled for replacement with a single box culvert in 2023, which will permanently remove it from the bridge inventory.

Bridge Replacement Plan

Please see the attached *2018 Noble County Bridge Replacement Plan*. The plan lays out the projected schedule and phases for all bridges that are currently scheduled for replacement. All data is updated annually as new inspection, replacement and grant data becomes available.

Additionally, the *Bridge Asset Management Plan* is attached and contains data for all 63 bridges.