



REHABILITATION STRUCTURE SURVEY REPORT

Wisconsin Department of Transportation
DT1696 4/2017

RECEIVED
5/31/2019
BUREAU OF STRUCTURES

☒ Grade Separation ☐ Stream Crossing ☐ Culvert

☐ Railroad ☐ Retaining Wall ☐ Noise Barrier

☐ Sign Structure ☐ Other: _____

For guidance see: <http://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/strct/survey.aspx>

Design Project ID 1360-11-00	Construction Project ID 1360-11-70	Highway (Project Name) Grantosa Drive WB over STH 145			
Final Plan Due Date 12/03/19	Preliminary Plan Due Date 01/01/19	☐ Town ☐ Village ☒ City Milwaukee			
PS&E Date 02/01/20	Letting Date 05/01/20	County Milwaukee			
Structure Number B-40-280		Section 34	Town 08N	Range 21E	
Station 20+29.64	Latitude: 430645.22 Longitude: 880008.74	☐ YES ☒ NO Structure Located on National Highway System			
For Survey and CADD Files Horizontal Coordinate System: NAD 83 (2011) Vertical Datum: NAVD 88 (2012) Wisconsin County Coordinate System, Milwaukee County Zone		Traffic Forecast Data			
		Design Year	Average Daily Traffic (ADT)	Roadway Design Speed	Functional Class
		Feature On 2040	9900	35	Minor Arterial
		Feature Under 2040	30000	55	Principal Arterial
Region Contact: Christine Hanna, P.E. (Area Code) Telephone Number(s): (262) 548-8809 Email: Christine.Hanna@dot.wi.gov		Consultant Contact: Kevin Wood, P.E. (Area Code) Telephone Number(s): (414) 266-9144 Email: kevin.wood@graef-usa.com			

Work To Be Performed

Field Information Required Item Number (see Pages 2-4)

- ☒ A. Structural Repair 1-3, 22
- ☐ B. Overlay 1-3, 10-22, 26-28, 32, 34
- ☐ Concrete Overlay ☐ Asphalt Overlay
☐ Polymer Modified Asphalt Overlay ☐ Thin Bonded Polymer Overlay
☐ Other: _____
- ☒ C. New Bearings 3, 8, 9, 22
- ☒ D. New Railings 15-17, 20-23
- ☐ E. Curb and Sidewalk Repair 2, 3, 16, 22, 23
- ☒ F. Abutment Repair 2, 3, 12, 16
- ☒ G. Pier Repair 2, 3, 12, 16
- ☒ H. New Deck 1-6, 9, 10, 13-28, 32-34
- ☐ I. Widening 1-28, 30, 32-35
- ☐ J. Joint Repair 2, 3, 8, 16, 19, 22
- ☒ K. Surface Repair 2, 3, 22
- ☐ L. Raising Bridge 3, 6, 9, 16, 20-24
- ☒ M. Slope Stabilization 1-3, 30
- ☐ N. Scour Repair 1, 2 or 3, 16, 19, 21, 27, 29, 31-35
- ☒ O. Painting 16, 22, 24
- ☐ P. Other: _____

Field Information Required

If no structure number exists provide the following: Small County Map on which the location of proposed structure is shown in red and any highway relocation in green. In addition, provide Location Map of scale not less than 1" = 2000' showing the structure location and number.

- ☒ 1. Most recent inspection report, brief history of bridge construction date, and description of repairs with dates.
- ☒ 2. Outline deficient areas on existing structure plan or drawing.
- ☒ 3. Photographs of details requiring repairs or modifications, such as: bearings, x-frames, joints, etc. Photograph all deficient areas. Clearly label all photographs.
- ☒ 4. Provide proposed typical section for roadway and structure showing dimensions and cross slopes.
- ☒ 5. Survey beam seat or girder elevations at both sides of bridge at all substructure units.
- ☒ 6. Provide cross-section elevations at 10 foot intervals extending across the structure and a minimum of 100 feet beyond each end. Sections should be normal to centerline and show elevations at centerline roadway and gutter line. Take elevations along joints and at floor drains.
- ☐ 7. Show and identify starting stationing on bridge.
- ☒ 8. Record measurement, temperature of the structure, and date taken for each of the following:
 - (a) Joint opening measured normal to joint at centerline of roadway and both curb lines.
 - (b) Clearance between girder ends at piers.
 - (c) Distance from front face of abutment backwall to closest point of girder end measured parallel to girder.
 - (d) Temperature of structure determined by averaging top and under deck (if accessible) readings.
- ☒ 9. Fixed and expansion bearings - condition and orientation.
- ☒ 10. Number and width of proposed pours including construction staging sequence.
- ☐ 11. Location of existing construction joints in the deck.
- ☒ 12. Estimated Quantities:

Preparation, Decks, Type 1	Sq. Yd. <u>0</u>	
Preparation, Decks, Type 2	Sq. Yd. <u>0</u>	
Full Depth Deck Repair	Sq. Yd. <u>0</u>	Galvanic Anodes? <u>No</u>
Concrete Surface Repair Superstructure	Sq. Ft. <u>0</u>	Galvanic Anodes? <u>No</u>
Concrete Surface Repair Substructure	Sq. Ft. <u>47</u>	Galvanic Anodes? <u>No</u>
Curb Repair	LF. <u>0</u>	Galvanic Anodes? <u>No</u>

☒ 13. Sufficiency number: 52.7 (obtain from HSI Bridge Inventory System)

☒ 14. Appraisal and Condition Rating

	Deck Condition	Superstructure Condition	Substructure Condition	Load Capacity Appraisal	Structural EVAL Appraisal
Current	4	5	5	5	5

☒ 15. Load Ratings

	Inventory	Operational
Current Calculated Date: 01/14/2013	HS14	HS24
After Completed by Bridge Designer		

- ☒ 16. Utilities on/near Structure. (WisDOT policy is to avoid placing utilities on the structure.)

☒ Yes ☐ No

Type	Owner and Contact Information	Size	Opening at Abutment	Weight	Pressure
Lighting	WisDOT	2.5 Dia.	N/A, in sidewalk	N/A	N/A

- ☒ 17. Is existing bridge railing deficient?

☐ Yes ☒ No If Yes – Replacement Rail Type:

- ☒ 18. Drains to be:

☐ Raised ☐ Closed ☐ Downspouted ☐ New

- ☒ 19. Traffic maintained on bridge during work?

☐ Yes ☒ No If Yes – Include sketches

- ☒ 20. Will guard rail be attached?

☐ Yes ☒ No If Yes – Which corners?

- ☒ 21. Will work to be performed eliminate all deficiencies?

☒ Yes ☐ No If No – Explain:

- ☒ 22. Hazardous waste (asbestos) to be removed?

☒ Yes ☐ No If Yes – Explain: Asbestos present, lead paint assumed, see additional information

- ☒ 23. Wing location(s) for surface drain anchors: Surface drain located near NW wingwall.

- ☒ 24. Painting?

☒ Yes ☐ No If Yes – Explain on Page 4

(all, part, railing, color system, containment, bid items)

- ☒ 25. Desired roadway width: (new deck / widening) 37'-3" Ft.

Desired sidewalk clear width: Left: 0 Ft. Right: 6 Ft.

- ☒ 26. Maximum increase in grade line elevation 2.5 In.

- ☒ 27. Benchmark description to be shown

- ☒ 28. Desired final cross slopes on bridge 0.02 & 0.03 Ft./Ft.

- ☐ 29. Underwater Inspection Report including:

- Streambed Cross Section With Pier, Footing and Seal Elevations
- Pier Elevation Drawings
- Pier Layout
- Hydrographic Survey

- ☒ 30. Slope stabilization, provide:

Type: slope paving concrete Quantity: 28 CY.

Slope: 2 Ft./Ft. Fill: _____ CY.

- ☐ 31. Preliminary layout of grout bags or proposed scour repair.

C.I.P. Articulated Mats (for Scour) _____ CY.

Grout Bags (for Scour) _____ CY.

Heavy Riprap _____ CY.

Extra Heavy Riprap _____ CY.

- ☒ 32. Report submitted with Preliminary Plan requires **no** CADD file submittal (*See ESubmittal instructions*).
- ☒ 33. Report submitted for development of Preliminary Plan to structure design engineer requires CADD file (if available) submittal and Report submittal to Soils Engineer if project involves foundation modifications.
- ☒ 34. Coordinate with structure design engineer **before** going into the field if existing structure has no available plans, if staged construction is planned, or if there are adjoining/adjacent structures that will remain in place.
- ☐ 35. If project involves substructure widening coordinate with structure and/or hydraulic design engineer to determine if information on the separation and/or stream crossing SSR will be required.

Additional Information

Elaborate on other concerns such as: DNR, Local, Utility Conflicts, Aesthetics, Railing Type and Staged Construction.

Please be as detailed and specific as possible.

1. See B-40-0280_oth.pdf for inspection report

Construction History:

1965- New structure
1992-Concrete overlay & expansion device replacement
1993- Added pedestrian fencing
2017-Upper wing replacement (NE wing)

Proposed work:

Deck replacement
Concrete surface repairs.
Abutment conversion to semi-expansion
Repaint steel girders and pier bearings.
Slope paving repair
Top of wingwall/abutment backwall replacement

2. Areas of observed deficiencies include:

East abutment - closed expansion joint (from Inspection Report)
Deteriorated paint system
Missing hold down bolts at west abutment bearing
Voids/settlement of slope paving
Deteriorated wingwalls, abutment backwall, and deck
Diagonal crack at Pier 2, both faces, between column 1 and column 2

The east abutment expansion bearings have moved excessively beyond their intended limits, and several hold-down pins were positioned at the end of the slotted holes and allowed for no further expansion at the inspection temperature of 35°F +/- . The expansion slots had been extended during the 1992 rehabilitation, suggesting the east abutment is rotating and/or sliding towards the roadway below. Survey data also suggests the bridge length (from paving block to paving block) has decreased by approximately eight inches compared to as-built drawings. A structures alternative study was conducted, and the preferred alternative of east and west abutment conversion to a semi-expansion abutment was recommended. BOS provided concurrence. See B-40-0280_oth.pdf Attachment 4 for the alternative study report and associated e-mails.

The crack at both faces of Pier 2 between Columns 1 and 2, will be investigated from potential FRP reinforcement.

See B-40-0280_oth.pdf for deficient areas quantification.

3. See B-40-0280_pic.pdf for photographs of deterioration.

5. Surveyed elevations at beam seats are as follows:

West Abutment: Girder 1= 699.66
Girder 2= 699.87
Girder 3= 700.06
Girder 4= 700.19
Girder 5= 700.30

Girder 6= 699.44

Pier 1: Girder 1= 699.64
Girder 2= 699.98
Girder 3= 700.16
Girder 4= 700.32
Girder 5= 700.47
Girder 6= 700.64

Pier 2: Girder 1= 699.50
Girder 2= 699.80
Girder 3= 700.04
Girder 4= 700.22
Girder 5= 700.40
Girder 6= 700.58

Pier 3: Girder 1= 698.76
Girder 2= 699.09
Girder 3= 699.32
Girder 4= 699.50
Girder 5= 699.67
Girder 6= 699.87

East Abutment: Girder 1= 698.37
Girder 2= 698.63
Girder 3= 698.83
Girder 4= 699.02
Girder 5= 699.22
Girder 6= 699.41

8. a. Joint openings, measured normal to joint opening at west abutment:

- at C/L of roadway= 1/4"
- at NW curb line= 3/8"
- at SW curb line= 3/8"

Joint openings, measured normal to joint opening at east abutment:

- at C/L of roadway= 3/8"
- at NE curb line= 1/4"
- at SE curb line= 3/8"

b. N/A, continuous girders.

c. West Abutment: Girder 1= 10"

Girder 2= 5 1/2"

Girder 3= 5 5/8"

Girder 4= 5 1/2"

Girder 5= 5 1/8"

Girder 6= 4 5/8"

East Abutment: Girder 1= 0 3/4"

Girder 2= 2"

Girder 3= 2 1/2"

Girder 4= 3"

Girder 5= 3"

Girder 6= 4 1/4"

d. Air temperature at time of recording was 35°F +/-

Assessment of bearings indicates abutment bearings should be replaced. Pier bearings to be cleaned and painted along with the girders per "STRUCTURE REPAINTING RECYCLED ABRASIVE B-40-280".

9. Replacement bearings include expansion bearings at both abutments. All interior bearings have hold down devices while fascia girders do not have hold down devices. The hold down devices are limiting expansion of the girder as the web was observed to be tight against the hold down pin on a number of girders. Interior girder bearings are corroded. Fascia girder bearings are heavily corroded and displaced (expanded) farther than intended. Existing bearings generally follow

current WisDOT details for "TFE Expansion Bearings" with modifications for hold downs at interior girders. Existing bearing orientation is per WisDOT standard 27.08. As part of converting the existing abutments to semi-expansion, the existing steel expansion bearings at the abutments will be replaced with non-laminated elastomeric bearing pads.

10. Construction will not be staged, bridge will be closed to traffic during construction. Transverse deck joints will be detailed if required to satisfy the requirements of AASHTO LRFD 6.10.3.4.

12. Concrete Surface Repair substructure was taken as 47 SF. See B-40-0280_oth.pdf.

16. There are no utilities hanging at underside of structure. Existing lighting conduit runs through sidewalk. There are (2) existing light poles on north edge of structure.

Lighting conduit box at column 2 of Pier 1 and 3. Conduit routes up abutment face of column/pier for lighting under structure.

17. Proposed railing is as follows:

- North edge/sidewalk edge: Vertical Face Parapet 'A' with Tubular Steel Railing Screening
- South edge: Single Slope Parapet 32SS with Tubular Steel Railing Screening (Standard 30.11)

18. No existing drains on bridge. There are no new floor drains on proposed deck replacement.

22. Gaskets under railing tested positive for asbestos, see B-40-0280_oth.pdf for report.

Based upon the age of the existing paint system, the assumption is made that the existing paint system contains lead.

24. Scope of structure painting includes all structural steel surfaces (girders, diaphragms, bearings). Paint will be a system per the departments approved products for structure repainting. Paint will be blue AMS Standard Color Numer 25240 . Girder ends that are embeded in concrete at the semi-expansion abutments will be metalized for corrosion protection. Swallow nests were not observed on the structure. Square footage of painted steel, as noted on the plans, was taken from inpection report. This quantity will be verified for final plan submittal.

Paint bid items will be as follows:

517.0900.S - Preparation and Coating of Top Flanges B-40-280

517.1800.S - Structure Repainting Recycled Abrasive B-40-280

517.4500.S - Negative Pressure Containment and Collection of Waste Materials B-40-280

517.6001.S - Portable Decontamination Facility

SPV.0105 - Metalizing B-40-280

26. Based on survey/LiDAR data and preliminary haunch heights, an increase in grade of 2.5" is anticipated.

28. Cross slope of proposed deck replacement is 2% & 3%.

30. Quantities shown for slope paving concrete assume (5) berm panels at 6'-0" x 4'-4" = 15 SY and (44) embankment panels at 6'-0" x 8'-0" = 235 SY. 4" thick panels assumed.