

Dyckman Avenue over Black River: A Movable Bridge Rehabilitation

South Haven, Michigan



Dyckman Avenue Bascule Bridge Rehabilitation 2014-15

March 23, 2016

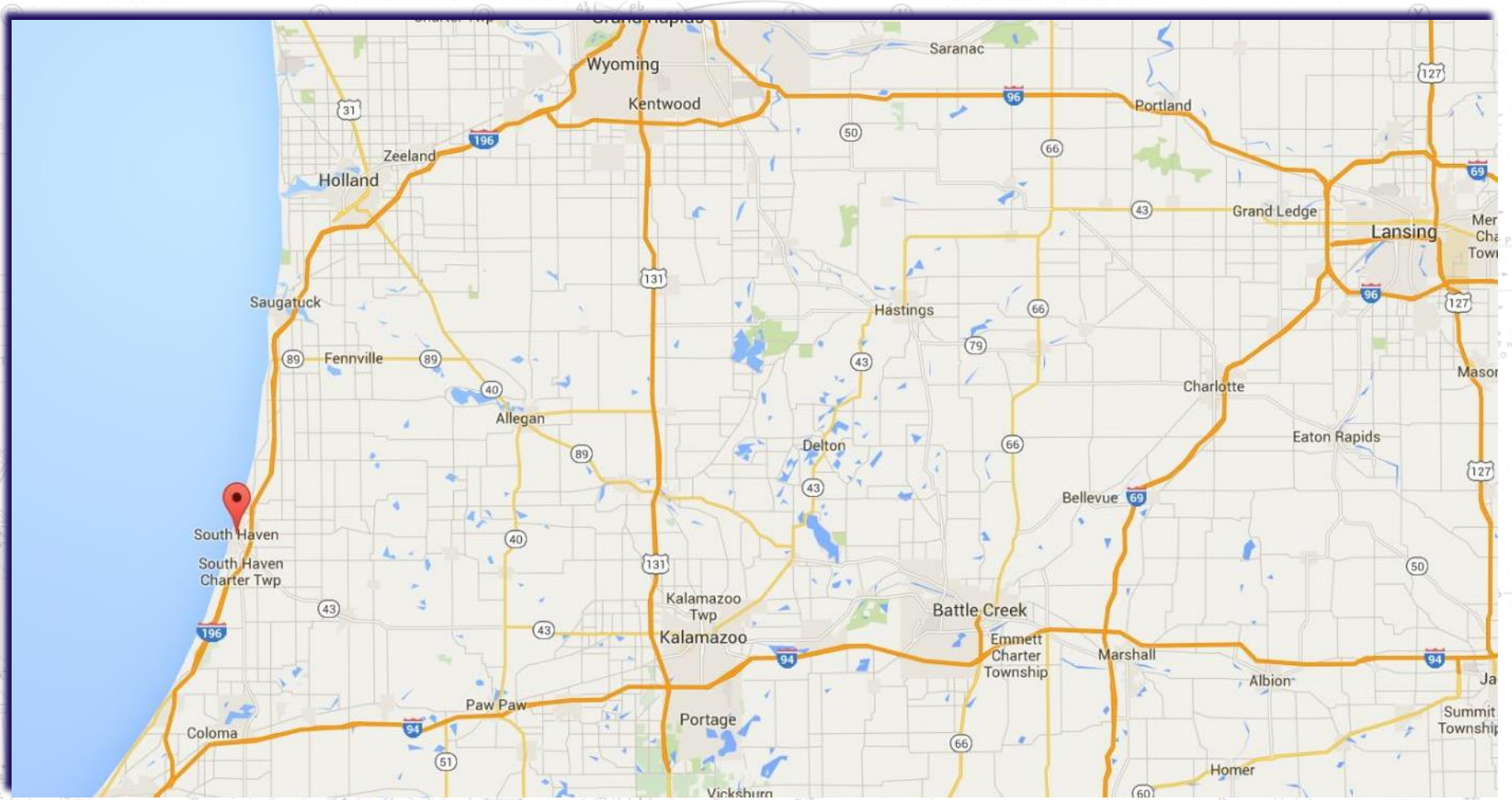
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K1652 101AD

Summary of Presentation

- Project Location
- History
- Condition Assessment
- Funding
- Design
- Construction
- Acknowledgements
- Questions





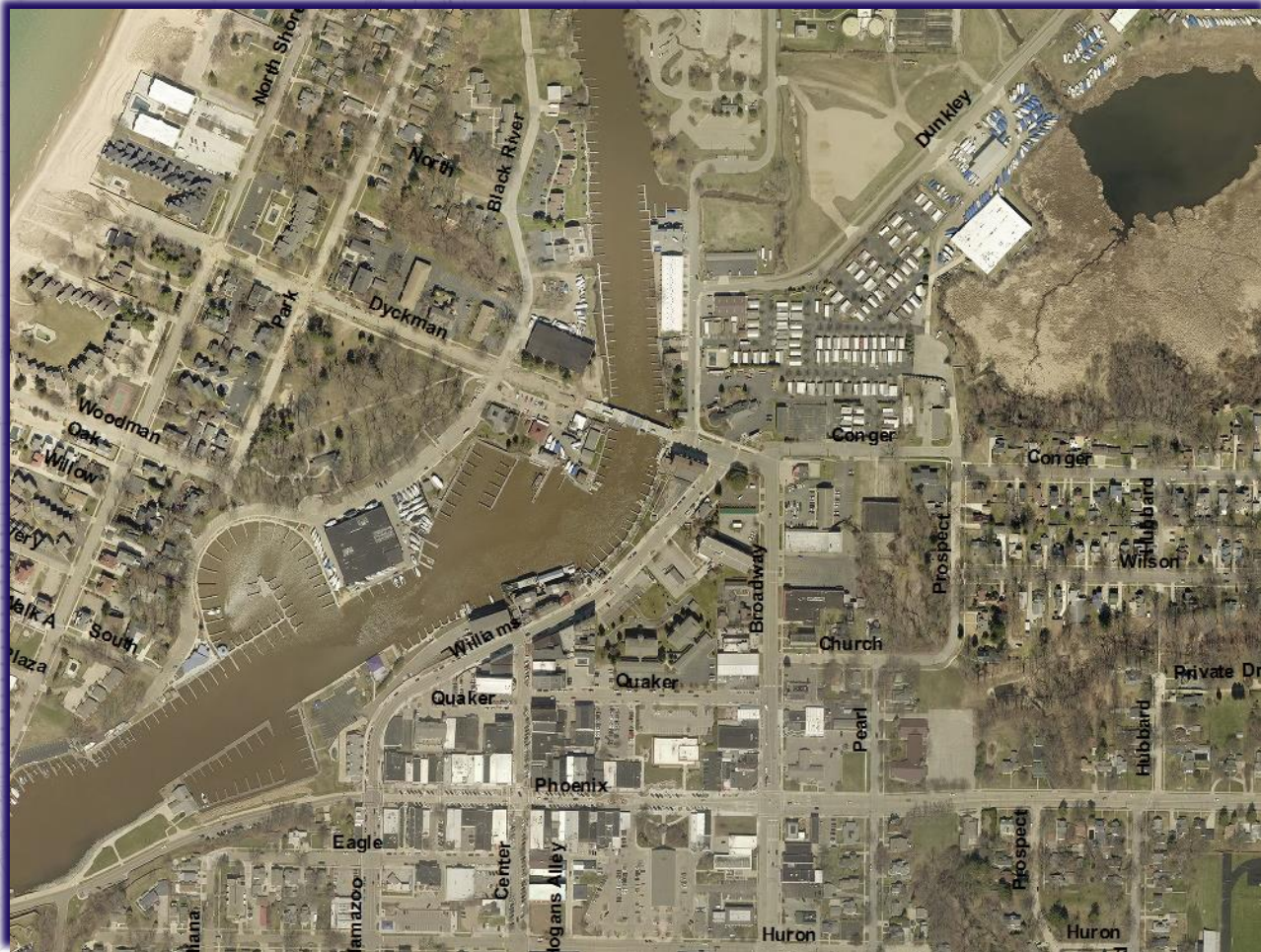
Location of South Haven, Michigan

Project Location

Dyckman Avenue Bascule Bridge Rehabilitation 2014-15

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Location of Dyckman Ave Bridge

Project Location

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History

- Four Movable Bridges at Dyckman Avenue crossing of the Black River
- First Bridge constructed in 1856
- Construction cost was \$1,120
- Timber drawbridge
- Second Bridge constructed in 1877
- Timber drawbridge



History

- Third Bridge constructed in 1890
- Steel through Truss Swing Bridge
- In service for 78 years



NOTE TO SHOP:
SEE DRAWING 101D FOR
CUTTING DIAGRAM OF WEB
RS - ps - ps

FAR.PLT.03
SEQ. CODE 19871

MICHIGAN STATE HIGHWAY DEPT.
HARBOR NEW BAYVIEW - 410E
ONE BLACK BAY
BRIDGE OUT OF SERVICE
SINCE BAYVIEW MICHIGAN
PROJECT BY STATE 1987

Michigan Bridge
Division of
United States Steel

GARY
BRIDGE 21

ER 5-847 R/E 5-847
SHENEFELT *269 S.B. 1987

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History

- Current Bridge constructed in 1967-68
- Designed by State Highway Department
- Cost of Construction was \$782,157
- Double Bascule Span
- Hydraulic Cylinders as Prime Mover



General Plan of Structure

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QUANTITIES		
Item	Unit	Quantity
Removing Existing Structure	L.S.	2,000
Channel Excavation	Cu Yds	2,000
Field Office	L.S.	-
Temporary Pedestrian Bridge	L.S.	-

* Existing Structure to be removed a minimum of 2' feet below the limits for Channel Excavation

GENERAL NOTES

UPPER BRIDGES
204' or 205' Located approximately 3 miles upstream has a waterway area of 915 sq ft below high water El. 585.5

101' or 100' Located approximately 6 miles upstream has a drainage area of 233 sq miles and the waterway area retained using 2' x 10' in 1000' formula is 760 sq ft. The waterway area subject below high water El. 585.0 is 960 sq ft.

Proposed structure provides a waterway area of 1425 sq ft below high water El. 584.0. Existing swing bridge provides a waterway area of 1410 sq ft above high water El. 584.0

The design of this structure is based on the M.S.H.D. Specs. for Design of Highway Bridges, 1958 Edition, 11210-44 loading. Max Live Load plus impact deflection equals 1/800 of span length and 1/800 of cantilever arm.

The design of the Bascule Span is also based on the A.A.S.H.O. Specs. for Highway Bridges, 1953 Edition.

All structural steel shall conform to the A.S.T.M Specs. Designation: A36 unless noted.
All welding shall be in accordance with the American Welding Society's Spec. for Welded Manway and Railway Bridges (D6.0-66) and the Specifications.
Traffic is to be detoured by the Department during construction.
The top of Road Slab and top of Sidewalks are parallel to the vertical curve and tangents.

NEW TO NAVIGATION LIGHTS
"A" - 180° Green when 1117' span is fully open and 180° Red for all other positions of lift span.
"B" - 180° Red

M-43 CROSSING THE BLACK RIVER IN THE CITY OF SOUTH HAVEN

HAZLET & ERDAL CONSULTING ENGINEERS FILE NO. 400

9-21-66

WED SPEC 5-26

B01 or B0032C





Approach Span Construction

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History





Bascule Span Installation

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History



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Condition Assessment

- Identify Scope of Rehabilitation Needs
- Review 1993 Repairs
- Work Started in 2007
- Efforts Continued through 2010





Concrete Deck

Condition Assessment

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Traffic Gate Operator

Condition Assessment



South Haven



Bascule Span Sidewalk

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Condition Assessment

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Bascule Span Deck Grating

Condition Assessment





Floor Beams

Condition Assessment





Main Cylinder

Condition Assessment





Brake Cylinder

Condition Assessment

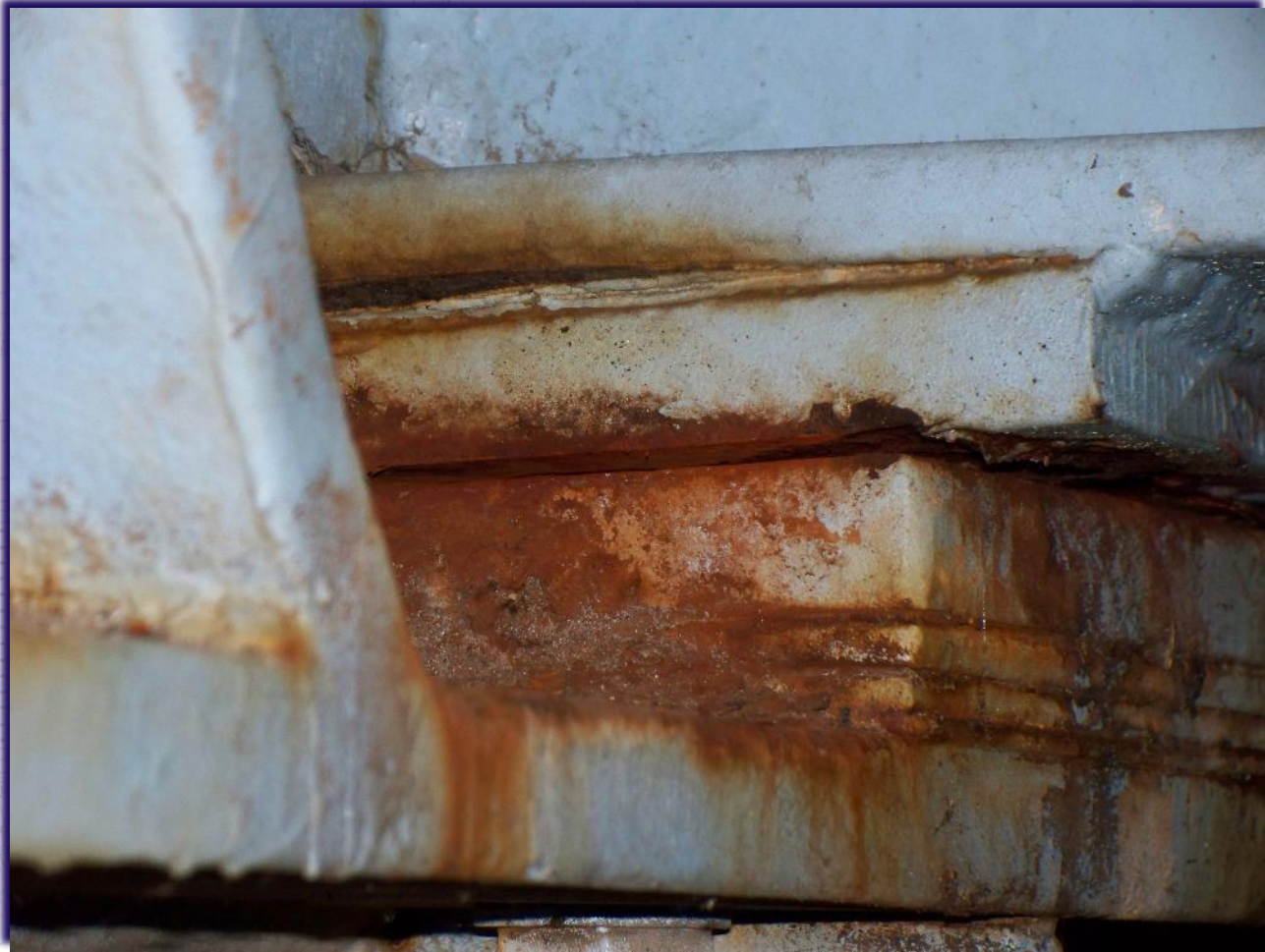




Position Sensor

Condition Assessment

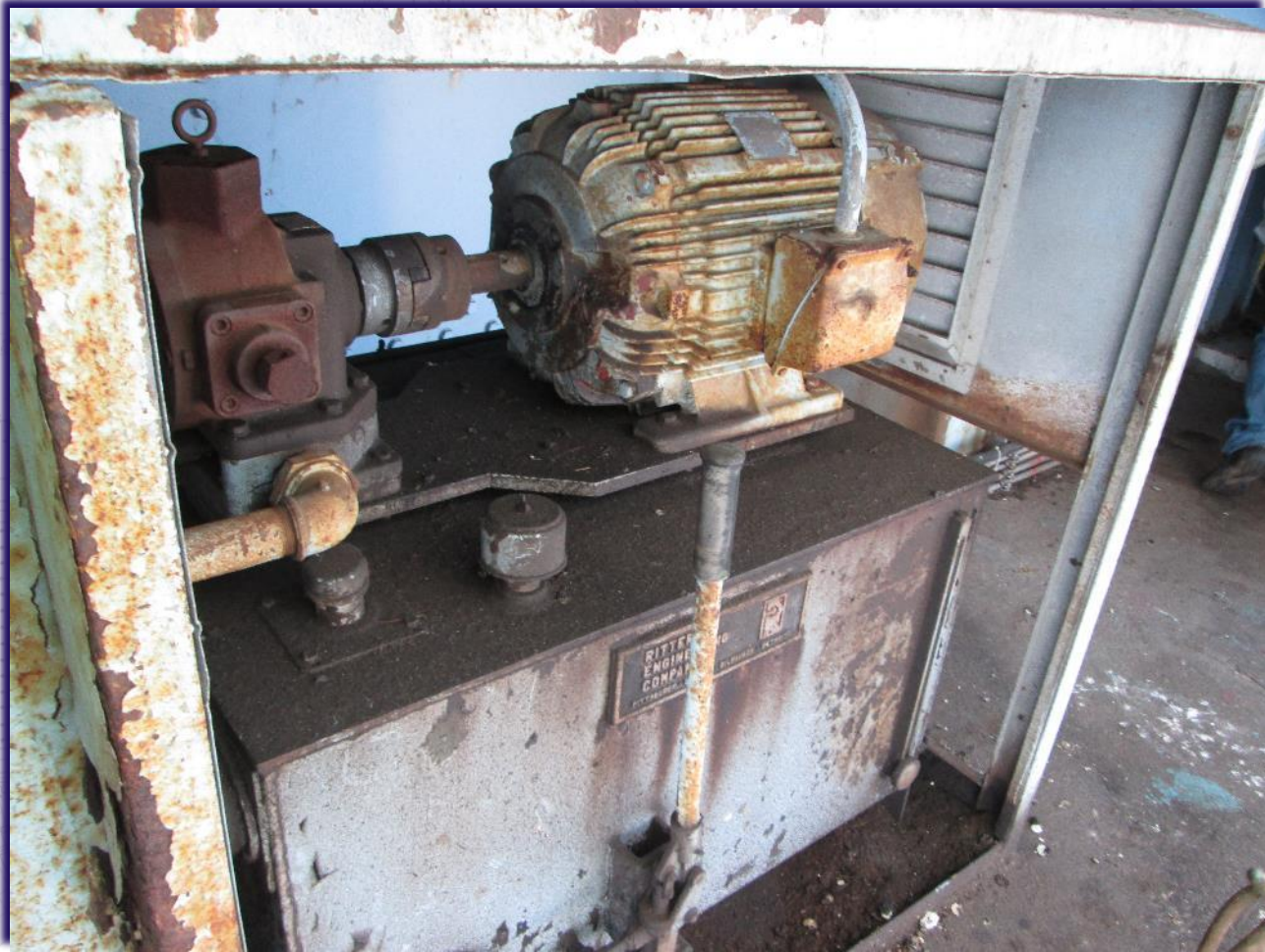




Tail Bearing

Condition Assessment





Hydraulic Power Unit

Condition Assessment





Hydraulic Controls

Condition Assessment

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Hydraulic Control Tubing

Condition Assessment



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Submarine Cables

Condition Assessment

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Condition Assessment

- Concrete Deck Overlay
- Riveted Steel Grid Deck and Floor Beams
- Non-skid Steel Plate Sidewalks
- Submarine Cables
- Hydraulic Cylinders, Power Units, and Controls
- Scour Countermeasures
- Shimming and Balancing



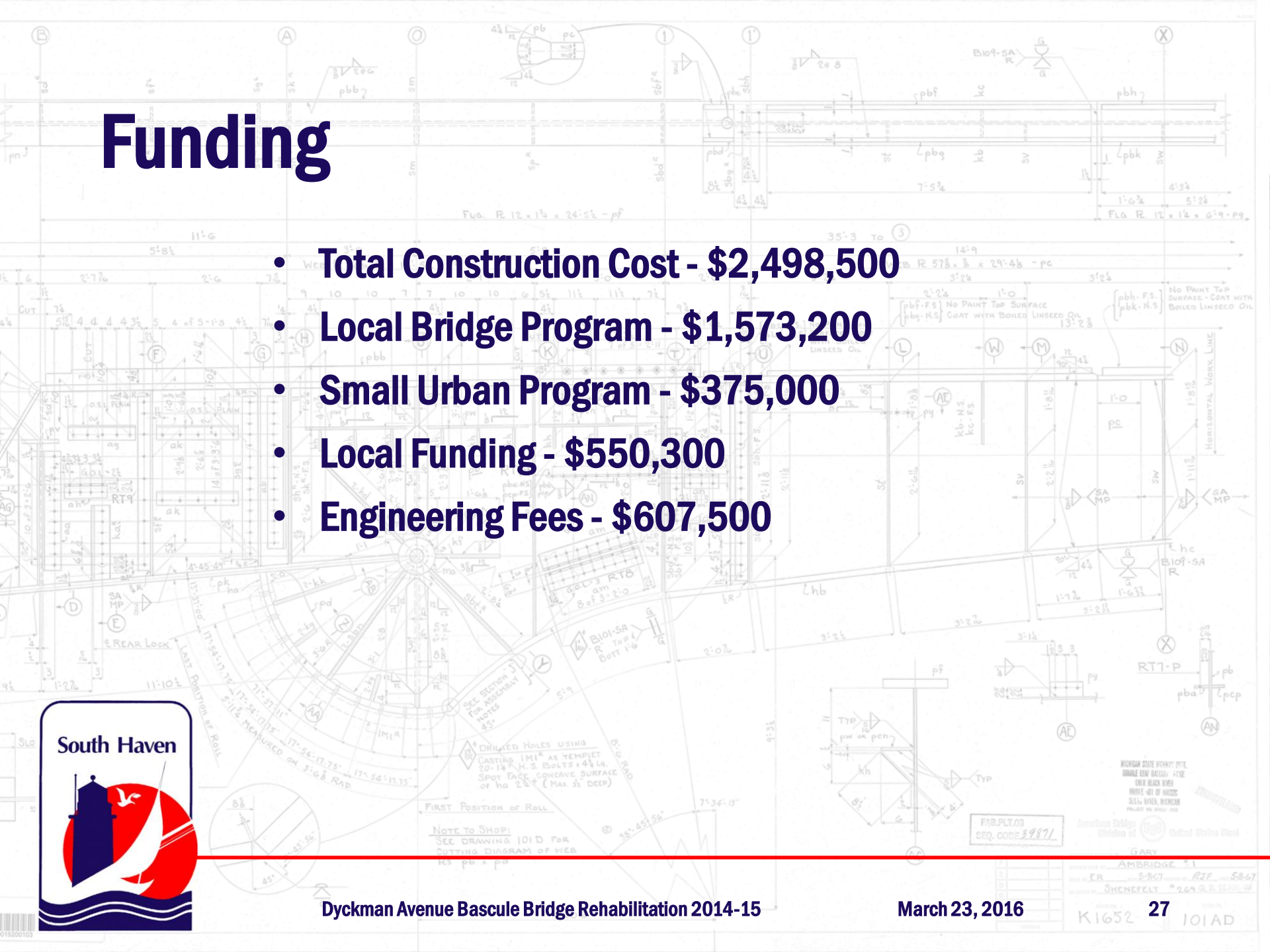
Funding

- Local Bridge Program Application Submitted in 2009, 2010, and 2011
- Regional Bridge Council Commitment
- Movable Bridges considered Major Structures
- Selected for Funding in 2014 FY



Funding

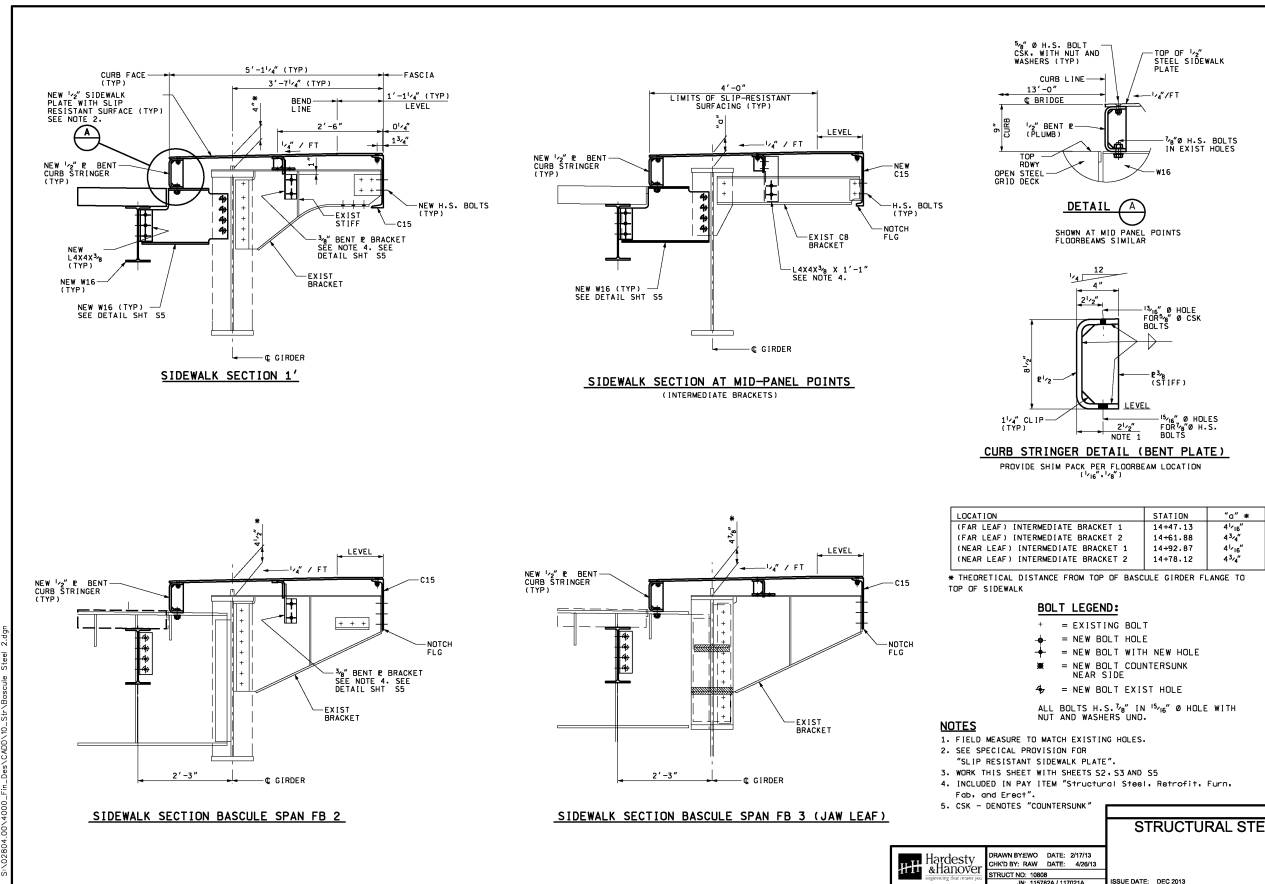
- Total Construction Cost - \$2,498,500
- Local Bridge Program - \$1,573,200
- Small Urban Program - \$375,000
- Local Funding - \$550,300
- Engineering Fees - \$607,500



Design Phase

- Great Lakes Engineering Group, LLC – Underwater Inspection/Scour Mitigation
- Hardesty & Hanover – Structural, Mechanical & Electrical Engineering
- City Staff – Traffic Control Plan
- Spicer Group – Construction Observation & Administration





Non-skid Steel Plate Sidewalks

Design Phase

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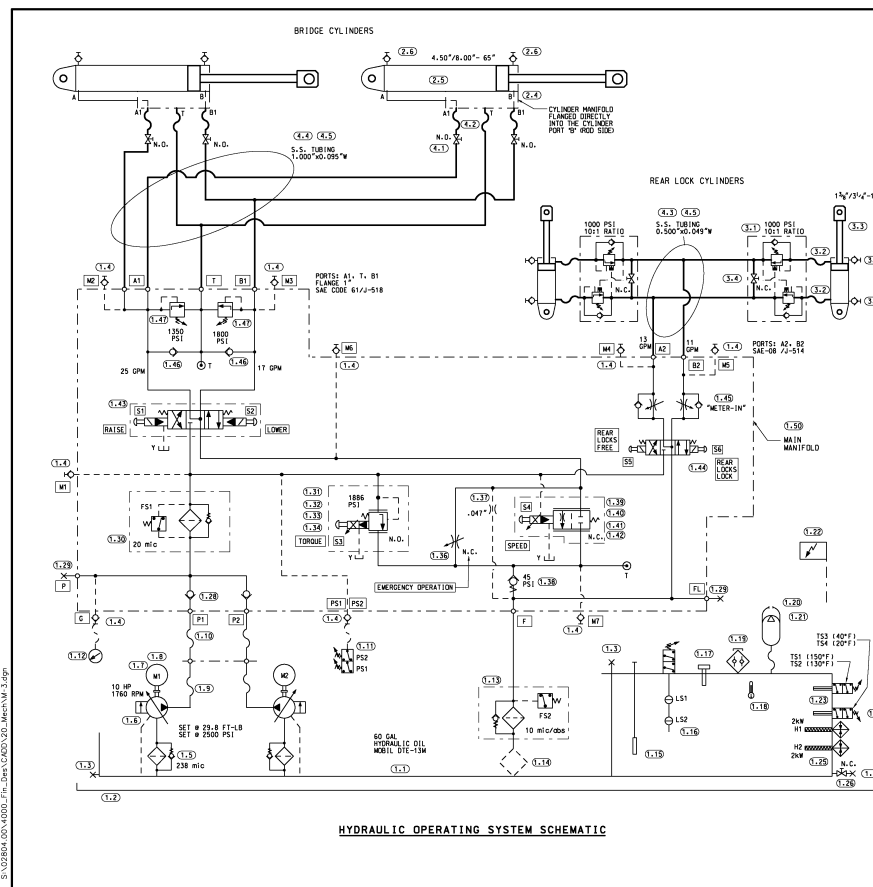


Hydraulic Schematic

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Design Phase



DRAWN BY: WJ DATE: 03/23/15
CHECKED BY: DTS DATE: 06/09/15
STRICTLY NO. 1000

HYDRAULIC SCHEMATIC

ISSUE DATE: DEC 2013

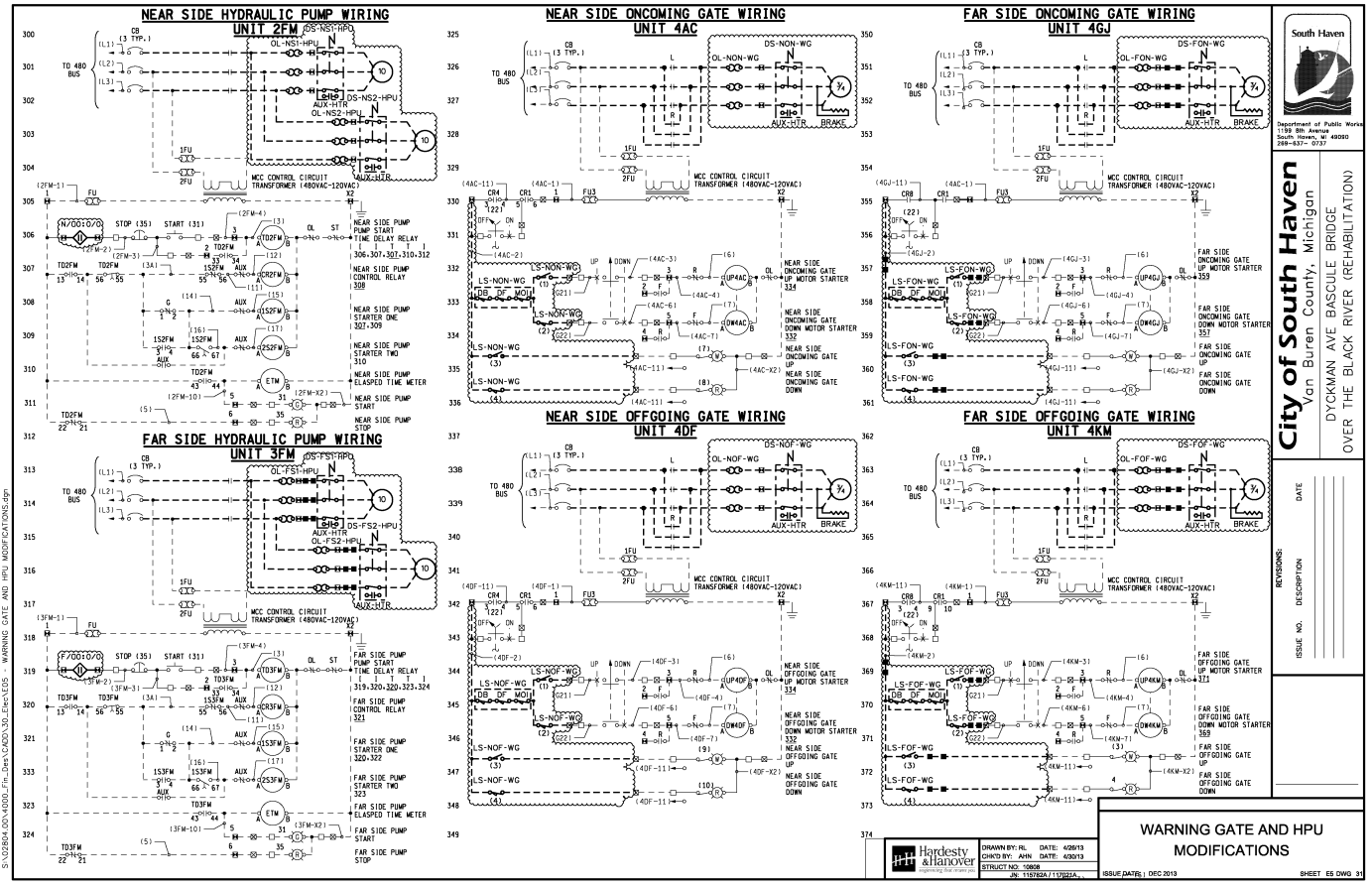
SHEET MW DWG 22



Department of Public Works
139 5th Avenue
South Haven, MI 49080
248-527-0777

City of South Haven
Van Buren County, Michigan
DYCKMAN AVE BASCULE BRIDGE
OVER THE BLACK RIVER (REHABILITATION)

REVISIONS:		
ISSUE NO.	DESCRIPTION	DATE



Electric Schematic

Design Phase

Construction Phase

- 2014-15 Winter Construction
- Construction started October 13, 2014
- Completion date of April 30, 2015
- Long Lead Time Items: Hydraulic Cylinders and Open Steel Grid Decking





Deck Removals

Construction Phase

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New Floor Beams

Construction Phase

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Steel Curb Beam

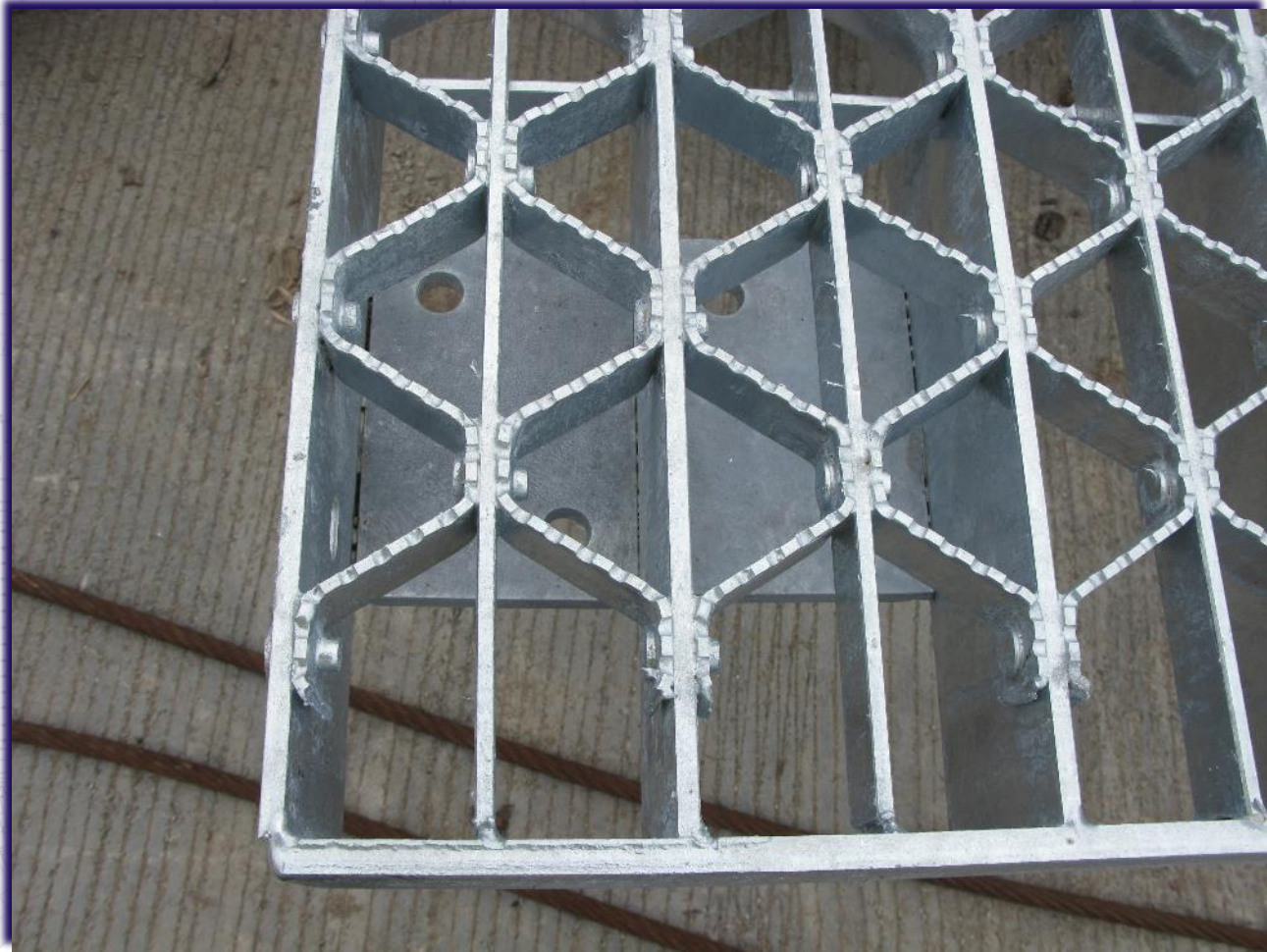
Construction Phase

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Open Steel Deck Grid

Construction Phase

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Open Steel Grid Deck

Construction Phase

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Non-skid Steel Plate Sidewalks

Construction Phase

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Submarine Cable

Construction Phase

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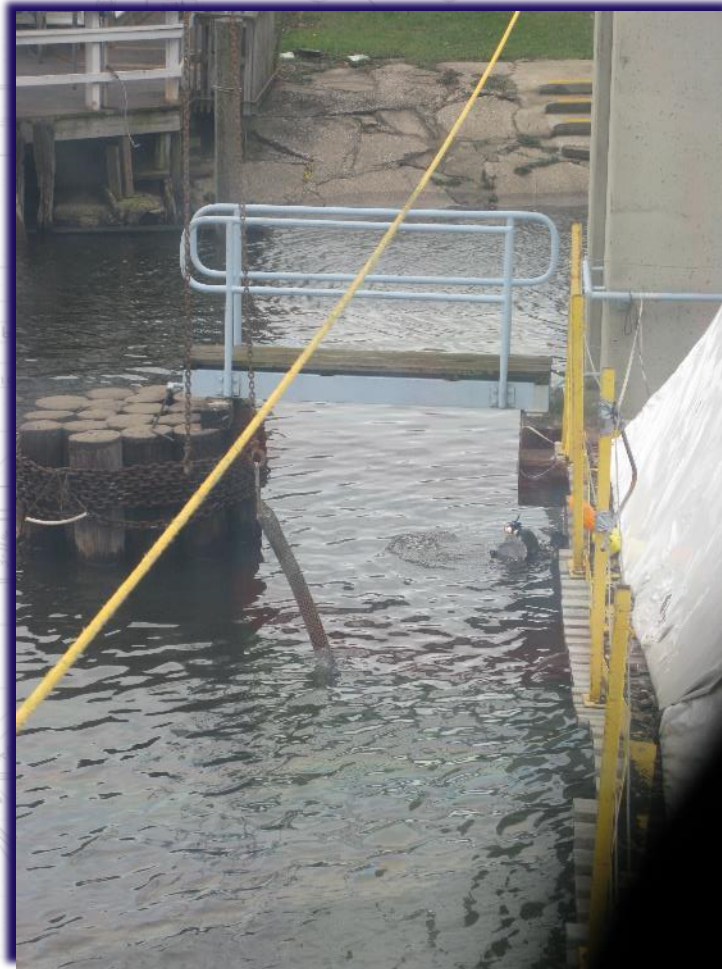
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Submarine Cable



Construction Phase

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Hydraulic Power Unit



Construction Phase

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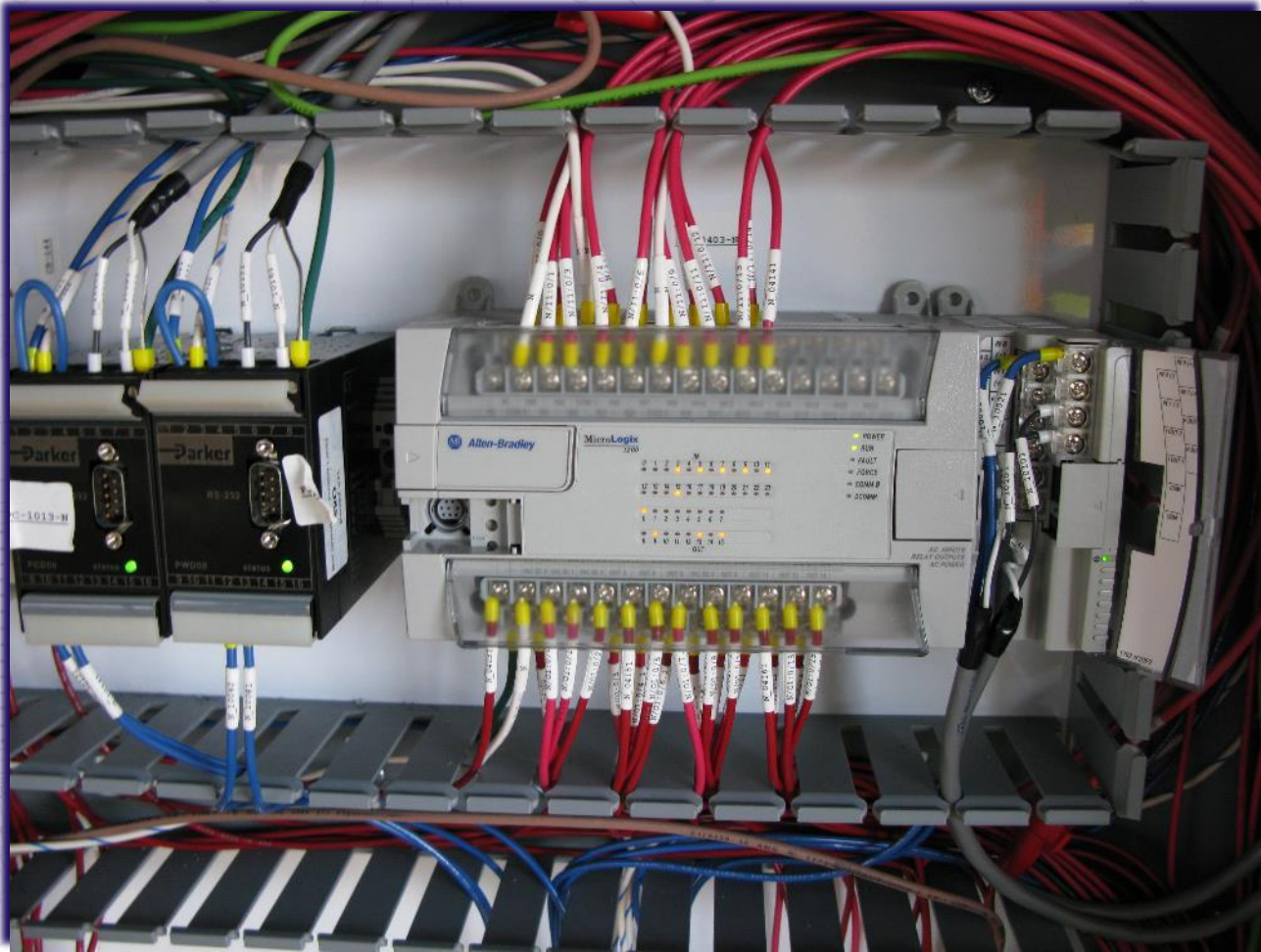
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Hydraulic Control Valves



Construction Phase



Programmable Logic Controller

Construction Phase





Main Hydraulic Cylinder



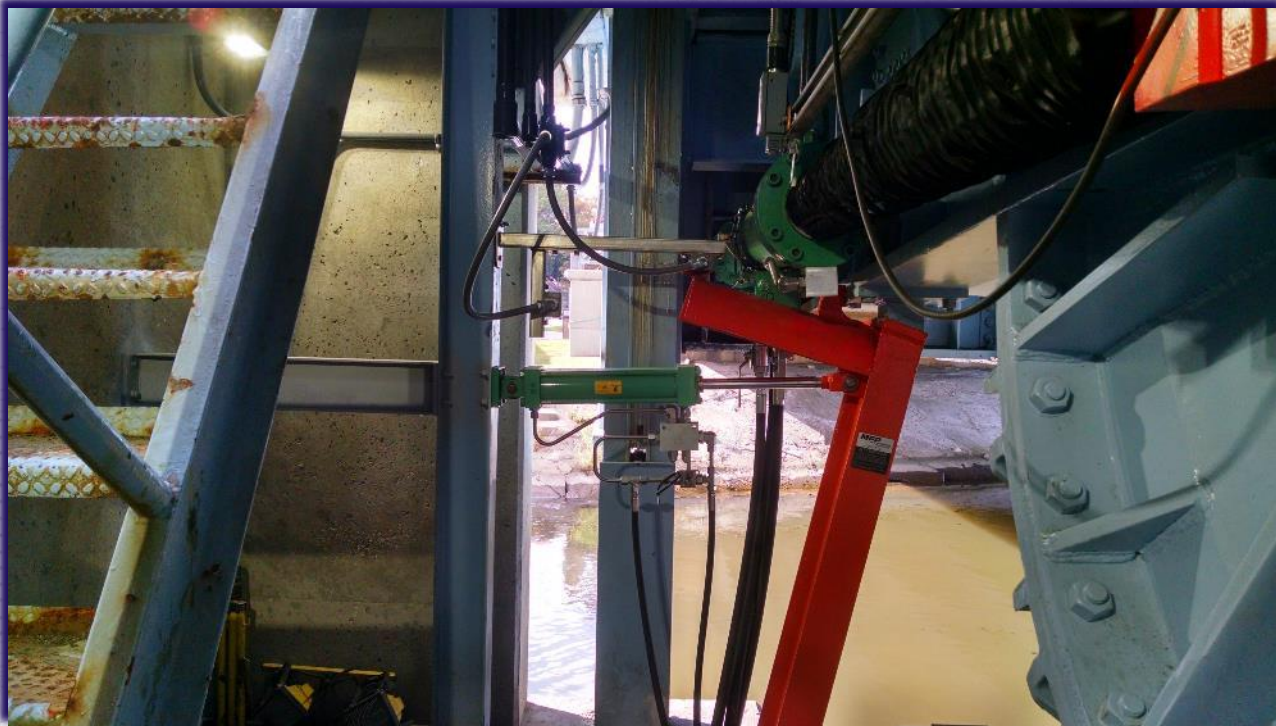
Construction Phase

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Tail Lock Cylinder

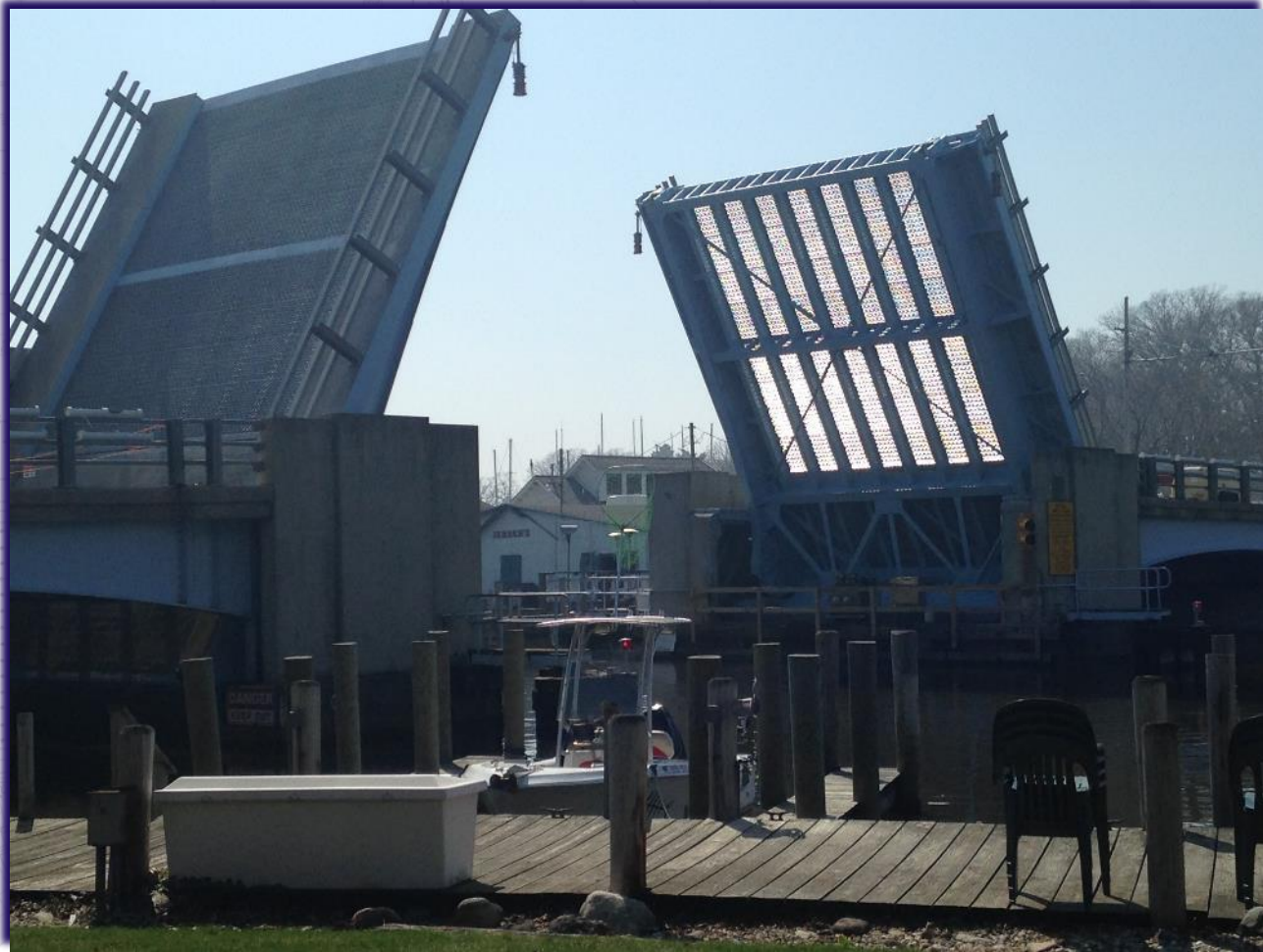
Construction Phase

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Video of Opening

Construction Phase

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Acknowledgements

- MDOT Staff
- RBC and LBAB Volunteers
- Consultants
- Contractor (Anlaan Corporation)
- Citizens of South Haven



Questions



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