COUNTY CULVERT INSPECTIONS

Presented by
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Emojis for Engineers

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Outline

- Focus is the inspection of <20’ span structures
  - MiSIM Chapter 12
- Three main counties GLEG performs inspections for
  - Washtenaw County Road Commission
  - Bay County Road Commission
  - Road Commission of Oakland County
- Discuss how the process differs between counties
  - Inspection process
  - Reporting process
  - Naming convention of culverts
  - Replacement process
- Q&A

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County Culvert Inspections

MiSIM Chapter 12 deals with non-NBI Structures

- Inspection Documentation
- Inspector Qualifications
- Culverts
- Railroad Structures over Roadways
- Pedestrian Structures over Roadways

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Washtenaw County Road Commission

- County has roughly 2,500 culverts in the inventory
  - 79% of inventory has 4’ span or less
  - 21% of inventory has span that ranges from 5’ to 20’
  - GLEG focuses on inspecting the culverts that range from 5’ to 20’
- Inventory mainly consists of concrete and steel
- Washtenaw has inspection structures less than 20' long for over 25 years
- Significantly expanded culvert inspection program around 6 years ago

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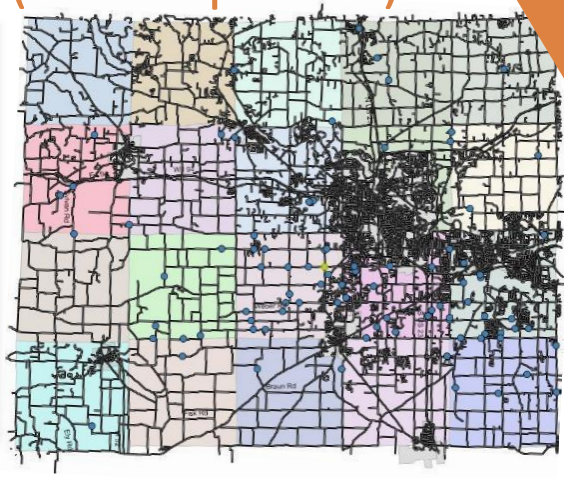
Washtenaw County (<20’ Inspection)

- County has 20 townships
- Inspection process:
  - County has four rows (tiers) of townships. Each row (tier) is five townships wide
  - Every year, a different tier of townships is inspected
    - For example – Tier 1 is inspected in 2021, Tier 2 is inspected in 2022, Tier 3 is inspected in 2023, and Tier 4 is inspected in 2024



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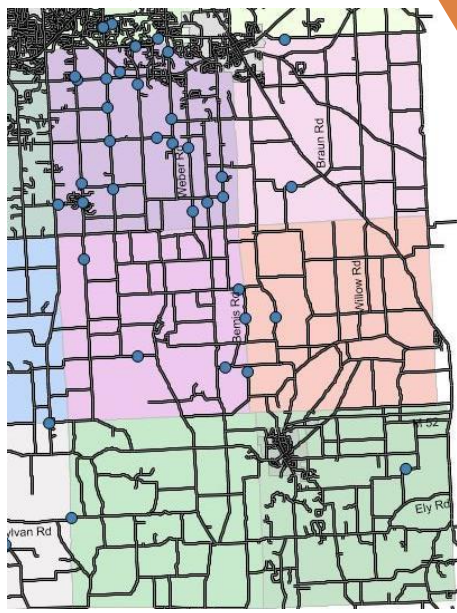
Washtenaw County (<20’ Inspection)

- Inspection process:
  - In addition to the tier system, every culvert that is rated a 3 or less (serious condition and worse) is inspected every two years
- Roadsoft Laptop Data Collector used as primary source for culvert inventory
  - Every year GLEG receives a Roadsoft file from the County with the assigned inspections for the year
  - Roadsoft file contains the culvert location and general information



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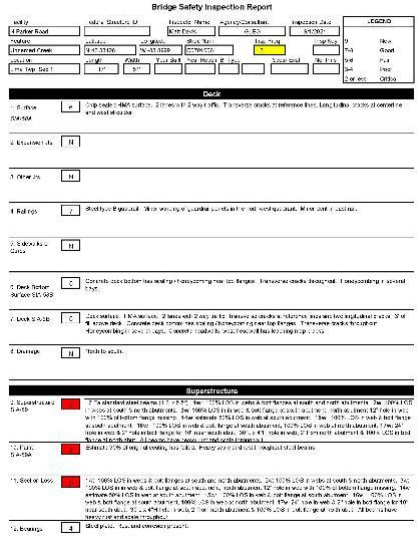
Washtenaw County (<20’ Inspection)

- Culvert reporting process:
  - All comments and ratings are entered into an Excel template that was created by GLEG
  - GLEG created a separate template for culverts and bridges


Bridge Safety Inspection Report

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Washtenaw County (<20’ Inspection)

- Culvert reporting process
  - All typical photos and additional deterioration photos are entered into a photo log template that was created by GLEG and a PDF is created
  - After all the inspection reports and photo logs are created, they are uploaded into the Roadsoft file that is provided by the county
  - As well as uploading the inspection report and photo log, the rating for the culvert and the channel are updated within the Roadsoft file

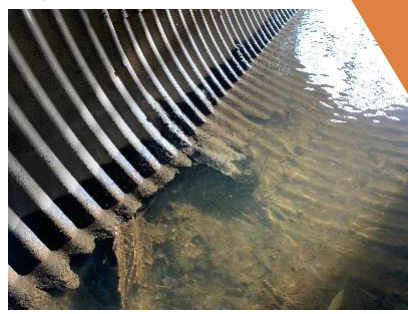
Washtenaw County (<20’ Inspection)

- Culvert reporting process
  - Any significant changes or safety concerns are handled with an email/call to the county
  - All posting changes were included in a summary spreadsheet that was sent to the county at the end of all the inspections

Facility	Feature	Structure Number	Township	Date	Culvert Rating	Current Posting	New Posting
N Parker Rd	Unnamed Creek	C0701006	Lima	9/1/2021	2	22/30/55	16/24/37
Warren Rd	Fleming Creek	C0901009	Ann Arbor	11/12/2021	3	23/35/42	20/NN/NN
Bemis Rd	Unnamed Creek	C1433002	Freedom	11/12/2021	3	-	29/44/52
Maple Rd	Unnamed Creek	C1812005	Saline	11/10/2021	4	-	36/55/65
Hartman Rd	Unnamed Creek	C1812006	Saline	11/10/2021	2	-	10/NN/NN

Washtenaw County (<20’ Inspection)

- Culvert naming convention – Example is C0115003
  - Structure number starts with C for culvert
  - Each township has a number assigned
    - For example – Salem Township is #1, Northfield Township is #2, Webster Township is #3, etc.
  - Next number is the Section # within the township
  - Last number is the # of the culvert within that section
  - Culvert is also noted by the Facility (road name) and Feature (drain/creek name if one is provided)
  - Latitude and longitude provided for each culvert



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Washtenaw County (<20’ Inspection)

- Culvert replacement process
  - Local route
    - 50/50 split in the cost to replace the culvert between the county and the township
    - As the culvert continues to deteriorate, the more likely the township is willing to replace the culvert
    - Some townships are quicker to fund replacements than others

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Washtenaw County (<20’ Inspection)

- Culvert replacement process
  - Primary route
    - County funds 100% of the replacement for primary route
    - Higher the average daily traffic (ADT) and the worse the condition of the culvert, the more likely the county is willing to replace the culvert

Bay County (<20’ Inspections)

- Inspection process:
  - Culverts and bridges included in the inspection list have a span that ranges from 10’ to 20’
  - Culverts and bridges are inspected at a frequency of 5 years maximum depending on their condition
    - Inspection frequency will increase as the condition of the culvert continues to decrease
    - A culvert or bridge in poor condition or worse, the inspection frequency will increase to 12 months or less if necessary

Bay County (<20’ Inspections)

- Culvert reporting process:
  - All comments and ratings are entered into a Microsoft Access template for each culvert or bridge and a PDF is created
    - Separate template created for a culvert and a bridge

Structure ID		Facility		Feature		Insp. Freq.
Arnolith20WFraser		Arnolith Rd		Squacoming Creek Branch 1		24
Location		**Latitude**	**Longitude**	**Length**	**Span/Dia**	**Rise**	**Shape**
20' west of Fraser		N43.5569	W84.0144'	70 ft	5 ft	5 ft	Circular
Year	**Year Recon.**	**Culvert Matl**	**Culvert Des.**	**Inspector**	**Agency/Consultants**	**Ins. Date**
		3	58	Joel Thorne	Great Lakes	12/21/2021
Approach						
1. Surface	5	Chipsealed HMA. Uneven and rutted over pipe.				
2. Headwalls	N	Riprap on ends.				
4. Shoulders	6	Gravel / grass shoulders.				
Culvert						
4. Joints	7	Lock joints. 90 degree bend inside. Section joints are wrapped. Speckled rust at some joints.				
5. Leakage	7	None noted.				
6. Pipe	7	CMP with 90 degree bend at south end.				
7. Slope	7	Steep and stable.				
9. Channel (SIA-61)	7	Improved county drain. Tall grass. Slow flow.				
8. Scour	7	Ends buried.				
10. Culvert Rating (SIA-62)	7	60" CMP. North 20' poly coated. Band at south. 2 taps.				

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Bay County (<20’ Inspections)

- Culvert reporting process
  - All typical photos and additional deterioration photos are entered into a photo log template that was created by GLEG and a PDF is created
  - After all the inspection reports and photo logs are created, the PDFs are compiled together and given to the county

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Bay County (<20’ Inspections)

- Culvert/bridge naming convention
  - Structure number is created based on the Facility (road name) and the distance from the nearest intersection
    - Example – Amelith10WKraenlein and Bowker30SSchoof
  - Culvert/bridge is also noted by the Facility (road name) and Feature (drain/creek name if one is provided)
  - Latitude and longitude provided for each culvert/bridge

Bay County (<20’ Inspections)

- Culvert and bridge replacement process
  - Primary routes are prioritized for replacement – County does not want any posted less than 20’ culverts/bridges if possible
  - Replacement on primary route will be prioritized by average daily traffic (ADT) and condition of the culvert/bridge

Bay County (<20’ Inspections)

- Culvert and bridge replacement process
  - Replacement on local route is secondary to the primary routes
  - Replacement on local route will be moved up the priority list as the condition continues to decrease or if the culvert/bridge is closed to all traffic
  - County is replacing two culverts/bridges this year with their own forces

Road Commission for Oakland County

- County has roughly 290 culverts with <20’ span
- Inventory mainly consists of concrete and steel
- Breakdown of culvert condition
  - 77% of inventory in fair or greater (5 or greater)
  - 15% of inventory in poor (4)
  - 8% of inventory in serious or worse (3 or less)
- Roughly 9% of the culverts are weight restricted

Oakland County (<20’ Inspections)

- Inspection process:
  - RCOC has inspected culverts since the 1990’s
  - Originally used an Excel spreadsheet to manage inspections
  - Around 2017, with the assistance of MDOT, started adding structures to MiBRIDGE
  - Since 2017, RCOC periodically finds “new” culverts, and these have been added to MiBRIDGE
  - Currently, MDOT limits structures in MiBRIDGE to a minimum span length of 10 ft.
  - Inspections are grouped by Township

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Oakland County (<20’ Inspections)

- Culvert reporting process:
  - MiBRIDGE is now used to manage RCOC’s culvert inspections
  - Inspection frequencies vary from 48 months down to 6 months, depending on condition

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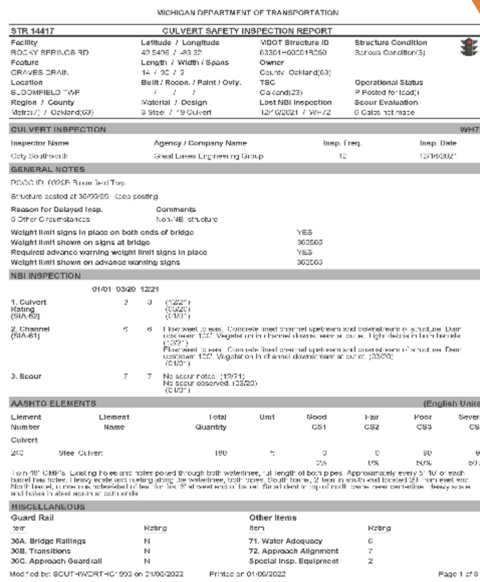
Oakland County (<20' Inspections)

- Culvert naming convention – Example is 0102B
  - "01" is for the township number within Oakland County, i.e. 01 – Addison Twp; 03 – Bloomfield Twp; 20 – Southfield Twp; etc.
  - "02" is for the number of culverts within the Township.
  - "B" signifies a Non-NBI structure within Oakland County
  - County developed this naming convention and uses it for their non-NBI structures, as well as their NBI structures. NBI structures have an "A".



MICHIGAN DEPARTMENT OF TRANSPORTATION

STR 14417 — CULVERT SAFETY INSPECTION REPORT

Facility	Latitude / Longitude	MDOT Structure ID	Structure Condition
ROCKY SPRINGS RD	42.5408 / -83.32	63301H00001B060	Serious Condition(3)
Feature	Length / Width / Spans	Owner	
GRAVES DRAIN	14 / 90 / 2	County: Oakland(63)	
Location	Built / Recon. / Paint / Ovly.	TSC	Operational Status
BLOOMFIELD TWP	/ / /	Oakland(23)	P Posted for load(1)
Region / County	Material / Design	Last NBI Inspection	Scour Evaluation
Metro(7) / Oakland(63)	3 Steel / 19 Culvert	12/16/2021 / WH72	6 Calcs not made

CULVERT INSPECTION — WH72

Inspector Name	Agency / Company Name	Insp. Freq.	Insp. Date
Coty Southworth	Great Lakes Engineering Group	12	12/16/2021

GENERAL NOTES

RCOC ID: 0325B Bloomfield Twp

Structure posted at 36/55/55. Keep posting.

Reason for Delayed Insp.	Comments
6 Other Circumstances	Non-NBI structure

Weight limit signs in place on both ends of bridge	YES
Weight limit shown on signs at bridge	365565
Required advance warning weight limit signs in place	YES
Weight limit shown on advance warning signs	365565

NBI INSPECTION

	01/01	03/20	12/21	
1. Culvert Rating (SIA-62)		3	3	(12/21) (03/20) (01/01)
2. Channel (SIA-61)		6	6	[illegible] (12/21) Flow west to east. Concrete lined channel upstream and downstream of structure. Dam upstream 100'. Vegetation in channel downstream at outlet. (03/20) (01/01)
3. Scour		7	7	No scour noted. (12/21) No scour observed. (03/20) (01/01)

AASHTO ELEMENTS — (English Units)

Element Number	Element Name	Total Quantity	Unit	Good CS1	Fair CS2	Poor CS3	Severe CS4
Culvert							
240	Steel Culvert	180	ft	0	0	90	90
				0%	0%	50%	50%

[illegible]

MISCELLANEOUS

Guard Rail Item	Rating	Other Items Item	Rating
36A. Bridge Railings	N	71. Water Adequacy	6
36B. Transitions	N	72. Approach Alignment	7
36C. Approach Guardrail	N	Special Insp. Equipment	2

Modified by: SOUTHWORTHC1993 on 01/06/2022 Printed on 01/06/2022 Page 1 of 8

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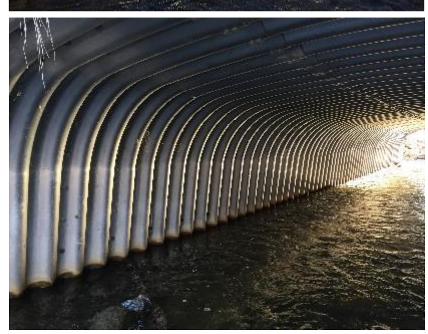
Oakland County (<20' Inspections)

- Culvert replacement process
  - Around 6 to 8 years ago, County began to budget specifically for culvert replacements
  - Currently, culvert replacements are programmed up to 5 years in advance
  - County currently budgets approximately $5 million per year for culvert replacements



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Oakland County (<20’ Inspections)

- Culvert replacement process
  - Local route
    - 50/50 split in the cost to replace the culvert between the county and the township.
    - EXCEPTION to this rule is Dead-End Roads. RCOC funds 100% of a culvert replacement on a Dead-End Road (Oakland County has many lakes, and subsequently many Dead-End Roads with large culverts.)

Oakland County (<20’ Inspections)

- Primary route
  - County funds 100% of the replacement for primary route
  - Higher the average daily traffic (ADT) and the worse the condition of the culvert, the more likely the county is willing to replace the culvert

Difficulties of Inspecting Small Culverts

- Conditions vary from one inspection to the next
  - Following two pictures are from previous inspection
    - High water during inspection, minimal amount of deterioration visible


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Difficulties of Inspecting Small Culverts

- Conditions vary from one inspection to the next
  - Following two pictures are from current inspection
    - Low water during inspection, numerous holes and buckled portions of the walls
    - Resulted in significant reduction in load posting


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Working to Catch This…

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Before This Happens…

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The Project is Finished
Questions & Answers
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