



Lifecycle Cost Analysis Current and Future

User Group Meeting September 2, 2020



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WHAT IS LIFECYCLE COST ANALYSIS

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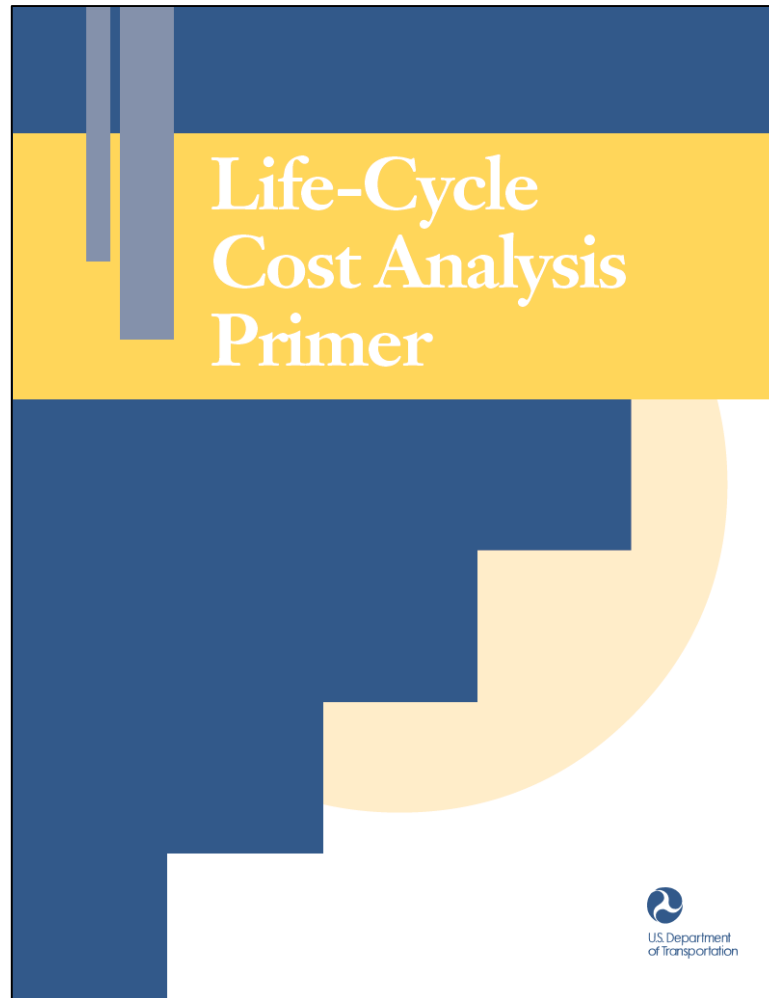
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August 2002, 25 pages in all.

LCCA is a cost-centric approach used to **select the most cost-effective alternative** that accomplishes a preselected project at a specific level of benefits that is assumed to be equal among project alternatives being considered.

<https://www.fhwa.dot.gov/infrastructure/asstmgmt/lcca.cfm>

WHAT IS LIFECYCLE COST ANALYSIS

Consider this example:

Comparing do nothing now vs doing a wearing surface now. Inflation 3%.

Year	Alternative	Cost	NPV Cost
1	(do nothing)		
21	Low Slump Overlay	\$ 32,637	\$ 18,070
36	Replace Bridge	\$ 381,848	\$ 135,703
	Agency Sum LCC		\$ 153,773
	Residual		\$ (134,988)
	Total LCC		\$ 18,785

Year	Alternative	Cost	NPV Cost
1	Wearing Surface	\$ 18,927	\$ 18,927
21	Low Slump Overlay	\$ 32,637	\$ 18,070
36	Low Slump Overlay	\$ 50,847	\$ 135,703
	Agency Sum LCC		\$ 55,068
	Residual		\$ (121,235)
	Total LCC		\$ (66,167)

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Agency Sum LCC			\$ 55,068
Residual			\$ (121,235)
Total LCC			\$ (66,167)

$$LCC = \sum Action Costs_{NPV} - Residual_{NPV}$$

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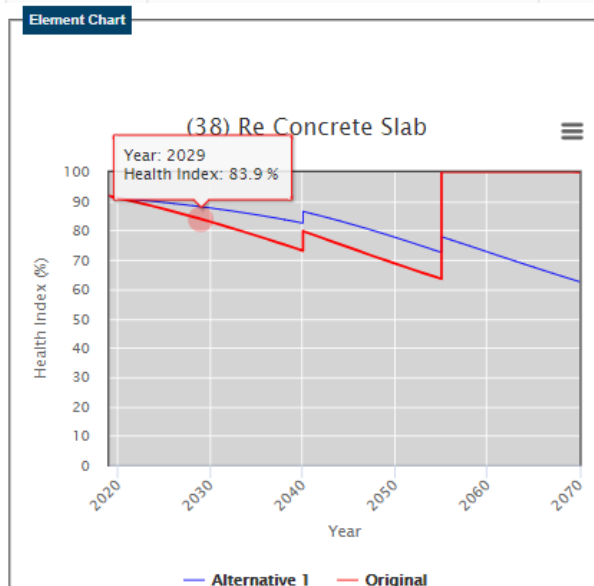
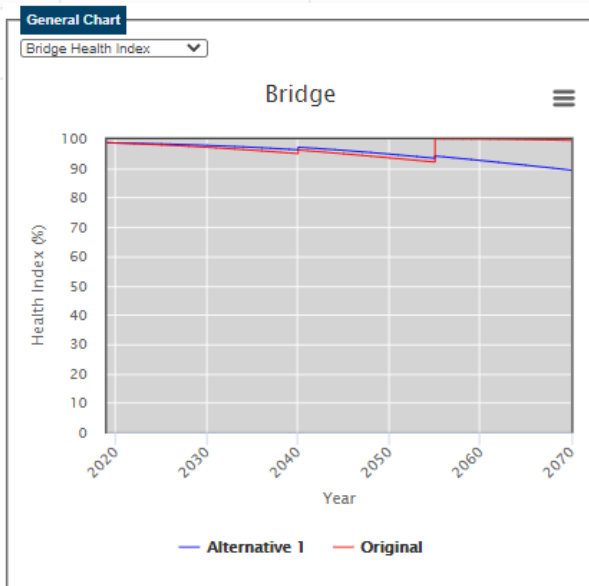
WHEN DO WE GET IT

Consider this example:

Comparing do nothing now vs doing a wearing surface now. Inflation 3%.

Year	Alternative	Cost	NPV Cost
1	(do nothing)		
21	Low Slump Overlay	\$ 32,637	\$ 18,070
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Agency Sum LCC			\$ 153,773
Residual			\$ (134,988)
Total LCC			

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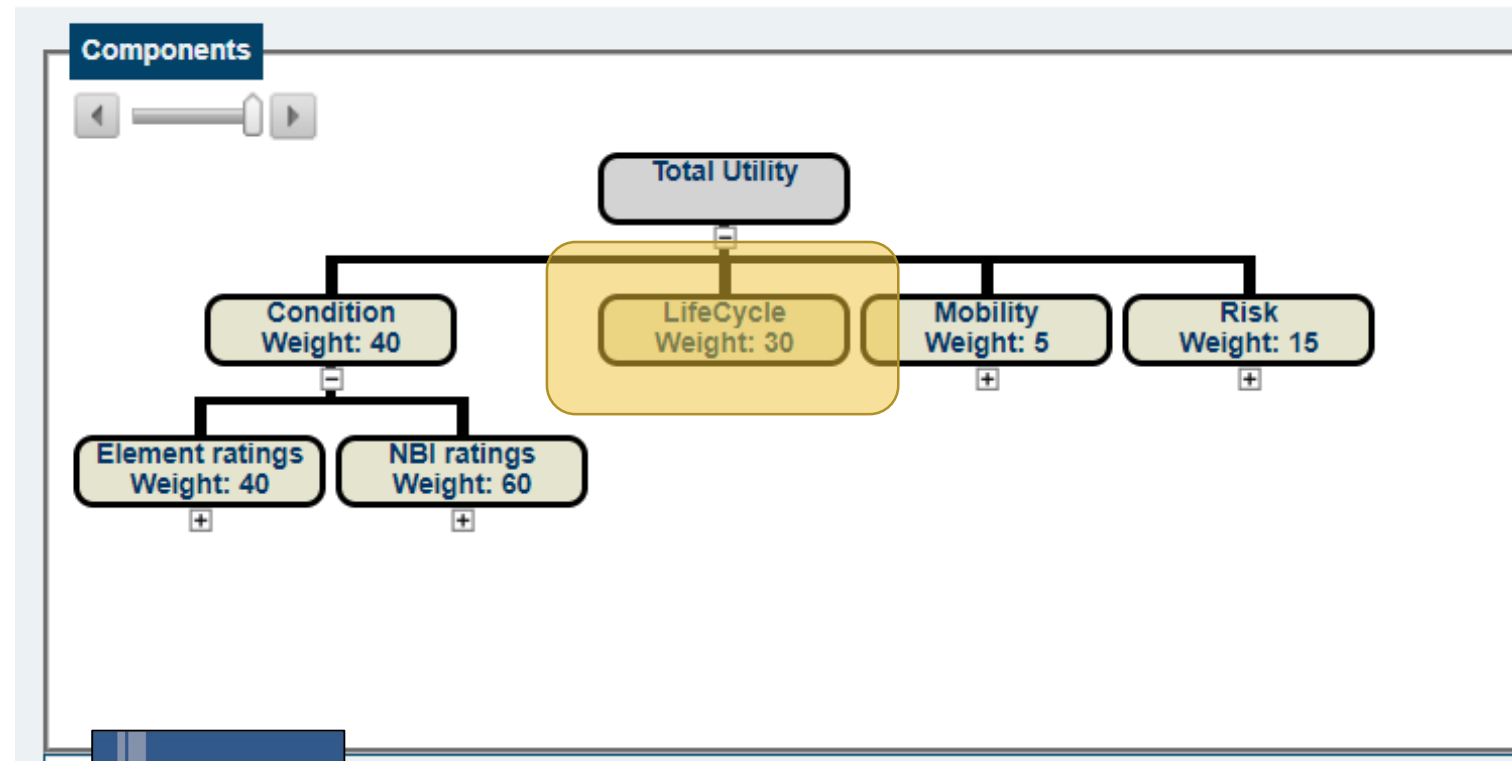
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Admin > Modeling Config > Utility



A Benefit Cost Analysis considers more than just cost or lifecycle cost.



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WHEN DO WE GET IT

Analysis > LCCA

Description

Route:	00000	Milepoint:	mi
District:	Michlet	County:	05 BON HOMME
Owner:	2 County Hwy Agency	Area:	901 - Unknown
Material:	2 Concrete Continuous	Resp:	2 County Hwy Agency
Boar:	U Unknown Boar	Design:	01 Slab

Current Scaled Performance

Condition:	87.28	Risk:	76.52
Lifecycle:	84.55	Mobility:	70

Sufficiency

Rating:	77.2	SDFD:	Not Deficient
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Conditions

Deck:	7 Good	Deck Index:	95.05
Superstr:	7 Good	Superstr Index:	87.04
Basal:	2 Good	Basal Index:	100.00
Culvert:	N/A (N/A)	Culvert Index:	
Channe:	6 Bank Slumping	Structure HI:	98.72

Recent Completed Work

Notes	Year	Cost (\$k)
No recently completed work found.		

LCCA Configuration

Discount Rate (%): Analysis Start Year: Short-Term Analysis Length (Years): Long-Term Analysis Length (Years):

Estimate User Life-Cycle Cost:

Utility

Utility Profile:

NBI Modeling

NBI Deterioration Method: NBI Converter Profile:

Cost Indexing

Inflation Estimation Method: Inflation Rate (%):

Run Analysis Analysis last run on 04/20/2023 9:56:30 AM on "Alternative 1"

Short-Term Work Items Existing For Selected Bridge:

Display System Recommendations Display Work Candidates Display Zero Cost Recommendations Display Zero Cost Work Candidates Alternative 1

Sel.	Short-Term Work Item	Action	Base Utility	Utility (Change)	Condition (Change)	Life-Cycle (Change)	Mobility (Change)	Risk (Change)	Cost	Benefit / Cost (\$k)	Cost (\$k) / Benefit	Target Year
<input type="checkbox"/>	Last Inspection		86.46	86.46 (0.00)	87.28 (0.00)	93.08 (0.00)	70.00 (0.00)	76.52 (0.00)	\$0			
<input type="checkbox"/>	System Generated	Replace Structure - Network	86.46	68.68 (-17.78)	100.00 (12.72)	22.79 (-70.29)	70.00 (0.00)	76.52 (0.00)	\$38,160	-0.529	-519	2020
<input type="checkbox"/>	System Generated	Bridge Rail Replacement	86.46	83.32 (-3.14)	89.23 (1.95)	87.07 (-6.01)	70.00 (0.00)	76.52 (0.00)	\$18,320	-0.699	-514	2020
<input type="checkbox"/>	System Generated	LSDC Overlay	86.46	81.14 (-5.32)	89.30 (2.02)	86.42 (-6.66)	70.00 (0.00)	76.52 (0.00)	\$18,070	-0.703	-514	2020
<input type="checkbox"/>	System Generated	Polymer Chip Seal Overlay	86.46	83.81 (-2.65)	87.36 (0.08)	91.02 (-2.06)	70.00 (0.00)	76.52 (0.00)	\$5,590	-1.161	-59	2020
<input type="checkbox"/>	System Generated	Asphalt Overlay	86.46	83.42 (-3.04)	87.36 (0.08)	89.86 (-3.22)	70.00 (0.00)	76.52 (0.00)	\$8,740	-1.119	-58	2020
<input type="checkbox"/>	System Generated	Abutment Repair	86.46	74.07 (-11.79)	87.28 (0.00)	57.71 (-35.37)	70.00 (0.00)	76.52 (0.00)	\$80,000	-1.228	-58	2020
<input type="checkbox"/>	System Generated	Bent Cap Repair	86.46	74.16 (-12.28)	87.28 (0.00)	56.23 (-36.85)	70.00 (0.00)	76.52 (0.00)	\$70,000	-1.228	-58	2020
<input type="checkbox"/>	System Generated	Scour Countermeasures	86.46	68.46 (-18.00)	87.28 (0.00)	37.81 (-35.27)	70.00 (0.00)	76.52 (0.00)	\$150,000	-1.12	-58	2020
<input type="checkbox"/>	System Generated	Replace Culvert	86.46	57.26 (-29.20)	89.23 (1.95)	2.88 (-90.20)	70.00 (0.00)	76.52 (0.00)	\$244,800	-1.193	-58	2020
<input type="checkbox"/>	System Generated	Modify Bridge Rail	86.46	87.27 (0.81)	89.23 (1.95)	92.92 (-0.16)	70.00 (0.00)	76.52 (0.00)	\$430	1.8431	\$1	2020
<input type="checkbox"/>	System Generated	Rehab Deck - Network	86.46	87.30 (0.84)	89.30 (2.02)	92.92 (-0.16)	70.00 (0.00)	76.52 (0.00)	\$440	1.0683	\$1	2020
<input type="checkbox"/>	System Generated	Replace Deck - Network	86.46	94.42 (7.96)	100.00 (12.72)	100.00 (6.92)	70.00 (0.00)	76.52 (0.00)	\$41,850	1.902	\$5	2020
<input type="checkbox"/>	System Generated	Place Wearing Surface - Network	86.46	83.77 (2.31)	87.28 (0.00)	100.00 (6.92)	70.00 (0.00)	76.52 (0.00)	\$18,920	1.22	\$8	2020
<input type="checkbox"/>	System Generated	Replace Bridge	86.46	93.66 (6.40)	100.00 (12.72)	94.66 (3.58)	70.00 (0.00)	91.83 (15.33)	\$135,700	0.693	\$14	2020
<input type="checkbox"/>	System Generated	Deck Replacement	86.46	94.42 (7.96)	100.00 (12.72)	100.00 (6.92)	70.00 (0.00)	76.52 (0.00)	\$124,820	0.64	\$16	2020

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LCCA Activity Profile

Selected LCCA policies

Bridge Policy: SD Replacement
 Culvert Policy: SD Culvert
 Deck Policy: SD Deck Policy
 Substructure Policy: SD Substructure
 Superstructure Policy: SD Superstructure

Index	Date	Year	Action Name	Orig. Cost	NPV Cost	Prior Action H.I.	After Action H.I.
1	2045	21	LSDC Overlay	\$15,437	\$10,076	94.87	94.21
2	2055	30	Replace Bridge	\$381,848	\$135,703	92.10	100.00
Residual:				\$134,988	\$134,988		
Agency Life-Cycle Cost:					\$153,773		
User Life-Cycle Cost:					\$0		
Total Life-Cycle Cost:					\$153,773		

Charts

General Chart

Bridge Health Index

Element Chart

Effects on Each Element

Element	Str. Unit	Env.	Quantity	Units	Starting Conditions	Effect	Ending Conditions
0101 Re Concrete Slab	0	Low(2)	701.00	sq ft			
0201 Re Conc Column	0	Low(2)	6.00	each			
0101 Re Conc Abutment	0	Low(2)	57.00	ft			
0201 Re Conc Pier Cap	0	Low(2)	41.00	ft			
0301 Other Bridge Rating	0	Mod(3)	68.00	ft			



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Current Bridge Information

Analysis > LCCA

Description	00000	Milepost	mi	Conditions	7 Good	Deck Index:	95.95
District	Michell	County	05 BON HOMME	Superstr:	7 Good	Superstr Index:	87.04
Owner	2 County Hwy Agency	Area	901 - Unknown	Basal:	2 Good	Basal Index:	100.00
Material	2 Concrete Continuous	Resp	2 County Hwy Agency	Culvert:	N/A (NBI)	Culvert Index:	
Route	U Unknown Road	Design	87 Slab	Channel:	4 Bank Slumping	Structure HI:	98.72

Current Scaled Performance

Condition:	87.28	Risk:	76.52
Lifecycle:	84.55	Mobility:	70

Sufficiency

Rating:	77.2	SDFD:	Not Deficient
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Recent Completed Work

Notes	Year	Cost (\$k)
No recently completed work found.		

Modeling Settings

LCCA Configuration

Discount Rate (%) Analysis Start Year (2020) Short-Term Analysis Length (Years) Long-Term Analysis Length (Years)

Estimate User Life-Cycle Cost

Utility

Utility Profile

NBI Modeling

NBI Deterioration Method (NBI Converter) NBI Converter Profile (NBI Default)

Cost Indexing

Inflation Estimation Method (Fixed Inflation Rate) Inflation Rate (%)

Run Analysis Analysis last run on 8/4/2023 9:56:30 AM on 'Alternative 1'

Run Analysis



Short Term Work

Short-Term Work Items Existing For Selected Bridge

Display System Recommendations Display Work Candidates Display Zero Cost Recommendations Display Zero Cost Work Candidates Alternative 1

Sel.	Short-Term Work Item	Action	Base Utility	Utility (Change)	Condition (Change)	LifeCycle (Change)	Mobility (Change)	Risk (Change)	Cost	Benefit / Cost (\$k)	Cost (\$k) / Benefit	Target Year
<input type="checkbox"/>	System Generated	Replace Structure - Network	86.46	68.68 (-17.78)	100.00 (12.72)	22.79 (-70.29)	70.00 (0.00)	76.52 (0.00)	\$138,180	-0529	-619	2020
<input type="checkbox"/>	System Generated	Bridge Rail Replacement	86.46	83.32 (-3.14)	89.33 (1.95)	87.07 (-8.01)	70.00 (0.00)	76.52 (0.00)	\$18,320	-0695	-614	2020
<input type="checkbox"/>	System Generated	LSDC Overlay	86.46	85.14 (-1.32)	89.30 (2.02)	86.42 (-6.66)	70.00 (0.00)	76.52 (0.00)	\$18,070	-073	-614	2020
<input type="checkbox"/>	System Generated	Polymer Chip Seal Overlay	86.46	83.81 (-0.65)	87.36 (0.06)	91.02 (-2.06)	70.00 (0.00)	76.52 (0.00)	\$5,590	-1161	-69	2020
<input type="checkbox"/>	System Generated	Asphalt Overlay	86.46	85.42 (-1.04)	87.36 (0.06)	89.86 (-3.22)	70.00 (0.00)	76.52 (0.00)	\$8,740	-119	-69	2020
<input type="checkbox"/>	System Generated	Abutment Repair	86.46	74.07 (-11.79)	87.28 (0.00)	57.71 (-35.37)	70.00 (0.00)	76.52 (0.00)	\$80,000	-1228	-68	2020
<input type="checkbox"/>	System Generated	Bank Cap Repair	86.46	74.16 (-12.28)	87.28 (0.00)	56.23 (-36.85)	70.00 (0.00)	76.52 (0.00)	\$100,000	-1228	-68	2020
<input type="checkbox"/>	System Generated	Scour Countermeasures	86.46	86.46 (-18.00)	87.28 (0.00)	37.81 (-32.27)	70.00 (0.00)	76.52 (0.00)	\$150,000	-132	-68	2020
<input type="checkbox"/>	System Generated	Replace Culvert	86.46	57.26 (-29.20)	89.23 (1.95)	2.88 (-90.20)	70.00 (0.00)	76.52 (0.00)	\$244,800	-1193	-68	2020
<input type="checkbox"/>	System Generated	Modify Bridge Rail	86.46	87.27 (0.81)	89.23 (1.95)	92.92 (-0.16)	70.00 (0.00)	76.52 (0.00)	\$430	1,8431	\$1	2020
<input type="checkbox"/>	System Generated	Rehab Deck - Network	86.46	87.30 (0.84)	89.30 (2.02)	92.92 (-0.16)	70.00 (0.00)	76.52 (0.00)	\$440	1,0083	\$1	2020
<input type="checkbox"/>	System Generated	Replace Deck - Network	86.46	94.42 (7.96)	100.00 (12.72)	100.00 (0.00)	70.00 (0.00)	76.52 (0.00)	\$41,850	1,902	\$5	2020
<input type="checkbox"/>	System Generated	Place Wearing Surface - Network	86.46	88.77 (2.31)	87.28 (0.00)	100.00 (0.00)	70.00 (0.00)	76.52 (0.00)	\$18,920	122	\$8	2020
<input type="checkbox"/>	System Generated	Replace Bridge	86.46	93.68 (6.40)	100.00 (12.72)	96.46 (0.50)	70.00 (0.00)	91.83 (11.33)	\$135,700	2691	\$14	2020
<input type="checkbox"/>	System Generated	Deck Replacement	86.46	94.42 (7.96)	100.00 (12.72)	100.00 (0.00)	70.00 (0.00)	76.52 (0.00)	\$124,320	254	\$16	2020

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Long Term Work

LCCA Activity Profile

Selected LCCA policies

Bridge Policy: SD Replacement

Culvert Policy: SD Culvert

Deck Policy: SD Deck Policy

Substructure Policy: SD Substructure

Superstructure Policy: SD Superstructure

Index	Date	Year	Action Name	Orig. Cost	NPV Cost	Prior Action H.I.	After Action H.I.
1	2045	23	LSDC Overlay	\$12,437	\$10,076	94.87	95.21
2	2055	30	Replace Bridge	\$381,849	\$150,703	92.10	100.00
Residual:				\$134,968			
Agency Life-Cycle Cost:					\$153,773		
User Life-Cycle Cost:					\$0		
Total Life-Cycle Cost:					\$18,793		

Results

Charts

General Chart

Bridge Health Index

Element Chart

Effects on Each Element

Element	Str. Unit	Env.	Quantity	Units	Starting Conditions	Effect	Ending Conditions
0101 Re Concrete Slab	0	Low(2)	701.00	sq ft			
0105 Re Conc Column	0	Low(2)	6.00	each			
0115 Re Conc Abutment	0	Low(2)	57.00	ft			
0120 Re Conc Pier	0	Low(2)	41.00	ft			
0130 Cap	0	Mod(3)	68.00	ft			
Other Bridge Rating							

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WHEN DO WE GET IT

Analysis > LCCA

Description			
Route:	00000	Milepoint:	mi
District:	Mitchell	County:	05 BON HOMME
Owner:	2 County Hwy Agency	Area:	901 - Unknown
Material:	2 Concrete Continuous	Resp:	2 County Hwy Agency
Scour:	U Unknown Scour	Design:	01 Slab

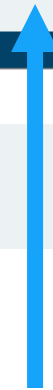
Conditions			
Deck:	7 Good	Deck Index:	95.05
Superstr:	7 Good	Superstr Index:	97.04
Substr:	7 Good	Substr Index:	100.00
Culvert:	N N/A (NBI)	Culvert Index:	
Channel:	6 Bank Slumping	Structure HI:	98.72

Current Scaled Performance			
Condition:	87.28	Risk:	76.52
Lifecycle:	84.55	Mobility:	70

Range: 5 years

Recent Completed Work	Notes	Year
No recently completed work found.		

Sufficiency			
Rating:	77.2	SD/FO:	Not Deficient



Current Conditions



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Analysis > LCCA

Description			
Route:	00000	Milepoint:	mi
District:	Mitchell	County:	05 BON HOMME
Owner:	2 County Hwy Agency	Area:	901 - Unknown
Material:	2 Concrete Continuous	Resp:	2 County Hwy Agency
Scour:	U Unknown Scour	Design:	01 Slab

Conditions			
Deck:	7 Good	Deck Index:	95.05
Superstr:	7 Good	Superstr Index:	97.04
Substr:	7 Good	Substr Index:	100.00
Culvert:	N N/A (NBI)	Culvert Index:	
Channel:	6 Bank Slumping	Structure HI:	98.72

Current Scaled Performance			
Condition:	87.28	Risk:	76.52
Lifecycle:	84.55	Mobility:	70

Range: 5 years

Recent Completed Work	Notes	Year
No recently completed work found.		

Sufficiency			
Rating:	77.2	SD/FO:	Not Deficient

LCCA Configuration

Discount Rate (%): Analysis Start Year: Short-Term Analysis Length (Years): Long-Term Analysis Length (Years):

Estimate User Life-Cycle Cost:

Utility

Utility Profile:

NBI Modeling

NBI Deterioration Method: NBI Converter Profile:

Cost Indexing

Inflation Estimation Method: Inflation Rate (%):

[Run Analysis](#) Analysis last run on 8/4/2020 9:56:30 AM on "Alternative 1".

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Analysis > LCCA

Description

Route:	00000	Milepoint:	mi
District:	Mitchell	County:	05 BON HOM
Owner:	2 County Hwy Agency	Area:	901 - Unknov
Material:	2 Concrete Continuous	Resp:	2 County Hw
Scour:	U Unknown Scour	Design:	01 Slab

Current Scaled Performance

Condition:	87.28	Risk:	76.52
Lifecycle:	84.55	Mobility:	70

Sufficiency

Rating:	77.2	SD/FO:	Not Deficient
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LCCA Configuration

Discount Rate (%): Analysis Start Year: Short-Term Analysis Length (Years): Long-Term Analysis Length (Years):

Estimate User Life-Cycle Cost:

Utility

Utility Profile:

NBI Modeling

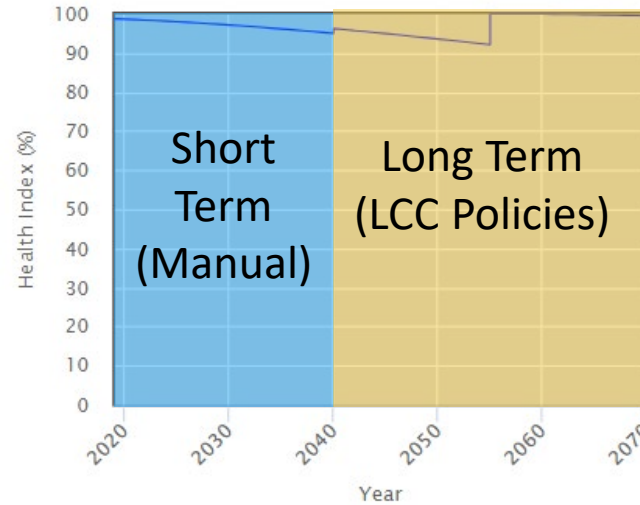
NBI Deterioration Method: NBI Converter Profile:

Cost Indexing

Inflation Estimation Method: Inflation Rate (%):

[Run Analysis](#) Analysis last run on 8/4/2020 9:56:30 AM on "Alternative 1".

Bridge



Deck Index:	95.05
Superstr Index:	97.04
Substr Index:	100.00
Culvert Index:	
Structure HI:	98.72

Notes	Year
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WHEN DO WE GET IT

NBI Deterioration Method: NBI Converter NBI Converter Profile: BrM Default

Cost Indexing --

Inflation Estimation Method: Fixed Inflation Rate Inflation Rate (%): 3

Short Term Work Selection

Run Analysis Analysis last run on 8/4/2020 9:56:30 AM on "Alternative 1".

Short-Term Work Items Existing For Selected Bridge --



Display System Recommendations Display Work Candidates Display Zero Cost Recommendations Display Zero Cost Work Candidates Alternative 1 [New Alternative](#)

Sel.	Short-Term Work Item	Action	Base Utility	Utility (Change)	Condition (Change)	LifeCycle (Change)	Mobility (Change)	Risk (Change)	Cost	Benefit / Cost (\$k)	Cost (\$k) / Benefit ▲	Target Year
	Last inspection		86.46	86.46 (0.00)	87.28 (0.00)	93.08 (0.00)	70.00 (0.00)	76.52 (0.00)	\$0			1
<input type="checkbox"/>	System Generated	Replace Structure - Network	86.46	68.68 (-17.78)	100.00 (12.72)	22.79 (-70.29)	70.00 (0.00)	76.52 (0.00)	\$336,192	-0.529	-\$19	2020
<input type="checkbox"/>	System Generated	Bridge Rail Replacement	86.46	85.32 (-1.14)	89.23 (1.95)	87.07 (-6.01)	70.00 (0.00)	76.52 (0.00)	\$16,320	-0.699	-\$14	2020
<input type="checkbox"/>	System Generated	LSDC Overlay	86.46	85.14 (-1.32)	89.30 (2.02)	86.42 (-6.66)	70.00 (0.00)	76.52 (0.00)	\$18,070	-0.73	-\$14	2020
<input type="checkbox"/>	System Generated	Polymer Chip Seal Overlay	86.46	85.81 (-0.65)	87.36 (0.08)	91.02 (-2.06)	70.00 (0.00)	76.52 (0.00)	\$5,598	-1.161	-\$9	2020
<input type="checkbox"/>	System Generated	Asphalt Overlay	86.46	85.42 (-1.04)	87.36 (0.08)	89.86 (-3.22)	70.00 (0.00)	76.52 (0.00)	\$8,741	-1.19	-\$8	2020
<input type="checkbox"/>	System Generated	Abutment Repair	86.46	74.67 (-11.79)	87.28 (0.00)	57.71 (-35.37)	70.00 (0.00)	76.52 (0.00)	\$96,000	-1.228	-\$8	2020
<input type="checkbox"/>	System Generated	Bent Cap Repair	86.46	74.18 (-12.28)	87.28 (0.00)	56.23 (-36.85)	70.00 (0.00)	76.52 (0.00)	\$100,000	-1.228	-\$8	2020
<input type="checkbox"/>	System Generated	Scour Countermeasures	86.46	68.46 (-18.00)	87.28 (0.00)	37.81 (-55.27)	70.00 (0.00)	79.07 (2.55)	\$150,000	-1.2	-\$8	2020
<input type="checkbox"/>	System Generated	Replace Culvert	86.46	57.26 (-29.20)	89.23 (1.95)	2.88 (-90.20)	70.00 (0.00)	76.52 (0.00)	\$244,800	-1.193	-\$8	2020
<input type="checkbox"/>	System Generated	Modify Bridge Rail	86.46	87.27 (0.81)	89.23 (1.95)	92.92 (-0.16)	70.00 (0.00)	76.52 (0.00)	\$439	1.8431	\$1	2020
<input type="checkbox"/>	System Generated	Rehab Deck - Network	86.46	87.30 (0.84)	89.30 (2.02)	92.92 (-0.16)	70.00 (0.00)	76.52 (0.00)	\$440	1.9083	\$1	2020
<input type="checkbox"/>	System Generated	Replace Deck - Network	86.46	94.42 (7.96)	100.00 (12.72)	100.00 (6.92)	70.00 (0.00)	76.52 (0.00)	\$41,850	.1902	\$5	2020
<input type="checkbox"/>	System Generated	Place Wearing Surface - Network	86.46	88.77 (2.31)	87.28 (0.00)	100.00 (6.92)	70.00 (0.00)	76.52 (0.00)	\$18,927	.122	\$8	2020
<input type="checkbox"/>	System Generated	Replace Bridge	86.46	95.86 (9.40)	100.00 (12.72)	96.66 (3.58)	70.00 (0.00)	91.85 (15.33)	\$135,703	.0693	\$14	2020
<input type="checkbox"/>	System Generated	Deck Replacement	86.46	94.42 (7.96)	100.00 (12.72)	100.00 (6.92)	70.00 (0.00)	76.52 (0.00)	\$124,321	.064	\$16	2020

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LCCA Activity Profile --

Selected LCCA policies
Bridge Policy: SD Replacement

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<input type="checkbox"/>	System Generated	Rehab Deck - Network	86.46	87.30 (0.84)	89.30 (2.02)	92.92 (-0.16)	70.00 (0.00)	76.52 (0.00)	\$440	1.9083	\$1	2020
<input type="checkbox"/>	System Generated	Replace Deck - Network	86.46	94.42 (7.96)	100.00 (12.72)	100.00 (6.92)	70.00 (0.00)	76.52 (0.00)	\$41,850	.1902	\$5	2020
<input type="checkbox"/>	System Generated	Place Wearing Surface - Network	86.46	88.77 (2.31)	87.28 (0.00)	100.00 (6.92)	70.00 (0.00)	76.52 (0.00)	\$18,927	.122	\$8	2020
<input type="checkbox"/>	System Generated	Replace Bridge	86.46	95.86 (9.40)	100.00 (12.72)	96.66 (3.58)	70.00 (0.00)	91.85 (15.33)	\$135,703	.0693	\$14	2020
<input type="checkbox"/>	System Generated	Deck Replacement	86.46	94.42 (7.96)	100.00 (12.72)	100.00 (6.92)	70.00 (0.00)	76.52 (0.00)	\$124,321	.064	\$16	2020

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LCCA Activity Profile

Selected LCCA policies
 Bridge Policy: SD Replacement
 Culvert Policy: SD Culvert
 Deck Policy: SD Deck Policy
 Substructure Policy: SD Substructure
 Superstructure Policy: SD Superstructure

Long Term Work (From LifeCycle Policies)

Index	Date	Year	Action Name	Orig. Cost	NPV Cost	Prior Action H.I.	After Action H.I.
1	2040	21	LSDC Overlay	\$32,637	\$18,070	94.97	96.21
2	2055	36	Replace Bridge	\$381,848	\$135,703	92.10	100.00
Residual:				\$134,988	\$134,988		
Agency Life-Cycle Cost:					\$153,773		
User Life-Cycle Cost:					\$0		
Total Life-Cycle Cost:					\$18,785		

Charts

General Chart

Bridge Health Index

Element Chart

Effects on Each Element

Year: 2020

Element	Str. Unit	Env.	Quantity	Units	Starting Conditions	Effect	Ending Conditions
(38) Re Concrete Slab	0	Low(2)	701.00	sq.ft	<div style="width: 100%; height: 10px; background-color: green;"></div>	<div style="width: 100%; height: 10px; background-color: green;"></div>	<div style="width: 100%; height: 10px; background-color: green;"></div>
(205) Re Conc Column	0	Low(2)	6.00	each	<div style="width: 100%; height: 10px; background-color: green;"></div>	<div style="width: 100%; height: 10px; background-color: green;"></div>	<div style="width: 100%; height: 10px; background-color: green;"></div>
(215) Re Conc Abutment	0	Low(2)	57.00	ft	<div style="width: 100%; height: 10px; background-color: green;"></div>	<div style="width: 100%; height: 10px; background-color: green;"></div>	<div style="width: 100%; height: 10px; background-color: green;"></div>
(234) Re Conc Pier Cap	0	Low(2)	41.00	ft	<div style="width: 100%; height: 10px; background-color: green;"></div>	<div style="width: 100%; height: 10px; background-color: green;"></div>	<div style="width: 100%; height: 10px; background-color: green;"></div>



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<input type="checkbox"/> System Generated	Deck Replacement	86.46	94.42 (7.96)	100.00 (12.72)	100.00 (6.92)	70.00 (0.00)	76.52 (0.00)	\$124.3
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Add to New Project

LCCA Activity Profile

Selected LCCA policies

Bridge Policy: SD Replacement
 Culvert Policy: SD Culvert
 Deck Policy: SD Deck Policy
 Substructure Policy: SD Substructure
 Superstructure Policy: SD Superstructure

Index	Date	Year	Action Name	Orig. Cost	NPV Cost	Prior Action H.I.
1	2040	21	LSDC Overlay	\$32,637	\$18,070	94.97
2	2055	36	Replace Bridge	\$381,848	\$135,703	92.10
Residual:				\$134,988	\$134,988	
Agency Life-Cycle Cost:					\$153,773	
User Life-Cycle Cost:					\$0	
Total Life-Cycle Cost:					\$18,785	

Charts

General Chart

Bridge Health Index

Element Chart

Effects on Each Element

Year: 2020

Element	Str. Unit	Env.	Quantity	Units
(38) Re Concrete Slab	0	Low(2)	701.00	sq.ft
(205) Re Conc Column	0	Low(2)	6.00	each



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WHEN DO WE GET IT

<input type="checkbox"/> System Generated	Deck Replacement	86.46	94.42 (7.96)	100.00 (12.72)	100.00 (6.92)	70.00 (0.00)	76.52 (0.00)	\$124.3
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Add to New Project

LCCA Activity Profile

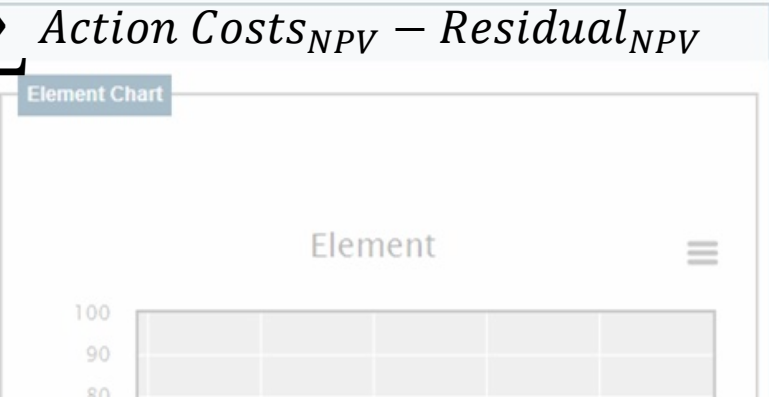
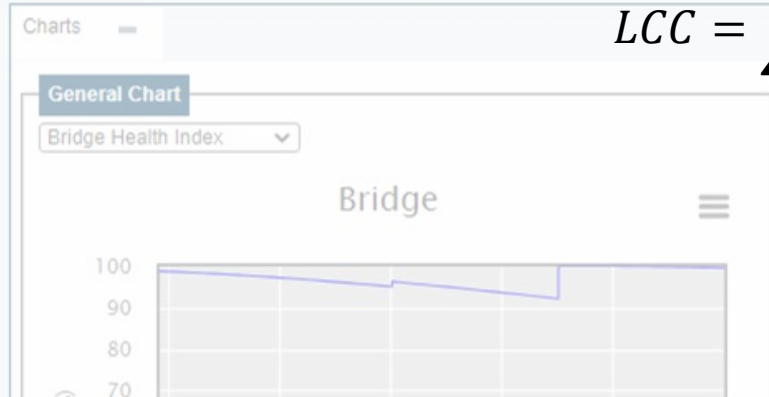
Selected LCCA policies
 Bridge Policy: SD Replacement
 Culvert Policy: SD Culvert
 Deck Policy: SD Deck Policy
 Substructure Policy: SD Substructure
 Superstructure Policy: SD Superstructure

Total LifeCycle Cost

Index	Date	Year	Action Name	Orig. Cost	NPV Cost	Prior Action H.I.
1	2040	21	LSDC Overlay	\$32,637	\$18,070	94.97
2	2055	36	Replace Bridge	\$381,848	\$135,703	92.10
Residual:				\$134,988	\$134,988	
Agency Life-Cycle Cost:					\$153,773	
User Life-Cycle Cost:					\$0	
Total Life-Cycle Cost:					\$18,785	



$$LCC = \sum Action Costs_{NPV} - Residual_{NPV}$$



Effects on Each Element

Year: 2020

Element	Str. Unit	Env.	Quantity	Units
(38) Re Concrete Slab	0	Low(2)	701.00	sq.ft
(205) Re Conc Column	0	Low(2)	6.00	each

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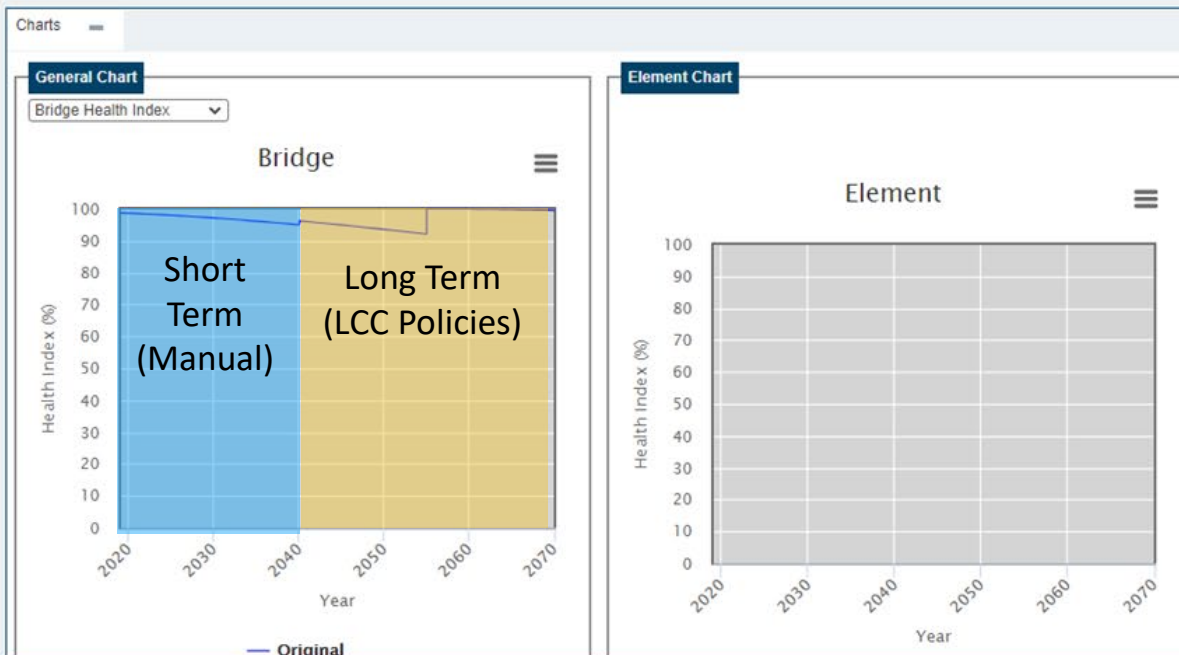
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WHEN DO WE GET IT

LCCA Activity Profile

Selected LCCA policies
 Bridge Policy: SD Replacement
 Culvert Policy: SD Culvert
 Deck Policy: SD Deck Policy
 Substructure Policy: SD Substructure
 Superstructure Policy: SD Superstructure

Index	Date	Year	Action Name	Orig. Cost	NPV Cost	Prior Action H.I.	After Action H.I.
1	2040	21	LSDC Overlay	\$32,637	\$18,070	94.97	96.21
2	2055	36	Replace Bridge	\$381,848	\$135,703	92.10	100.00
Residual:				\$134,988	\$134,988		
Agency Life-Cycle Cost:					\$153,773		
User Life-Cycle Cost:					\$0		
Total Life-Cycle Cost:					\$18,785		



Effects on Each Element

Year: 2020

Element	Str. Unit	Env.	Quantity	Units	Starting Conditions	Effect	Ending Conditions
(38) Re Concrete Slab	0	Low(2)	701.00	sq.ft			
(205) Re Conc Column	0	Low(2)	6.00	each			
(215) Re Conc Abutment	0	Low(2)	57.00	ft			
(234) Re Conc Pier Cap	0	Low(2)	41.00	ft			
(333) Other Bridge Railing	0	Mod.(3)	68.00	ft			



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Conditions			
Deck:	7 Good	Deck Index:	95.05
Superstr:	7 Good	Superstr Index:	97.04
Substr:	7 Good	Substr Index:	100.00
Culvert:	N N/A (NBI)	Culvert Index:	
Channel:	6 Bank Slumping	Structure HI:	98.72

Range: 5 years

Recent Completed Work	Notes	Year	Cost (\$k)
No recently completed work found.			

Consider 3 Alternatives:

- Do Nothing
- Place Wearing Surface
- Replace Deck

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WHEN DO WE GET IT

Short-Term Work Items Existing For Selected Bridge

Display System Recommendations
 Display Work Candidates
 Display Zero Cost Recommendations
 Display Zero Cost Work Candidates
 Alternative 1 [New Alternative](#)

Sel.	Short-Term Work Item	Action	Base Utility	Utility (Change)	Condition (Change)	LifeCycle (Change)	Mobility (Change)	Risk (Change)	Cost	Benefit / Cost (\$k)	Cost (\$k) / Benefit ▲	Target Year
Selected Short-Term Work Items			86.46	88.77 (2.31)	87.28 (0.00)	100.00 (6.92)	70.00 (0.00)	76.52 (0.00)	\$18,927	.122	\$8	1
<input type="checkbox"/>	System Generated	Replace Structure - Network	86.46	68.68 (-17.78)	100.00 (12.72)	22.79 (-70.29)	70.00 (0.00)	76.52 (0.00)	\$336,192	-.0529	-\$19	2020
<input type="checkbox"/>	System Generated	Bridge Rail Replacement	86.46	85.32 (-1.14)	89.23 (1.95)	87.07 (-6.01)	70.00 (0.00)	76.52 (0.00)	\$16,320	-.0699	-\$14	2020
<input type="checkbox"/>	System Generated	LSDC Overlay	86.46	85.14 (-1.32)	89.30 (2.02)	86.42 (-6.66)	70.00 (0.00)	76.52 (0.00)	\$18,070	-.073	-\$14	2020
<input type="checkbox"/>	System Generated	Polymer Chip Seal Overlay	86.46	85.81 (-0.65)	87.36 (0.08)	91.02 (-2.06)	70.00 (0.00)	76.52 (0.00)	\$5,598	-.1161	-\$9	2020
<input type="checkbox"/>	System Generated	Asphalt Overlay	86.46	85.42 (-1.04)	87.36 (0.08)	89.86 (-3.22)	70.00 (0.00)	76.52 (0.00)	\$8,741	-.119	-\$8	2020
<input type="checkbox"/>	System Generated	Abutment Repair	86.46	74.67 (-11.79)	87.28 (0.00)	57.71 (-35.37)	70.00 (0.00)	76.52 (0.00)	\$96,000	-.1228	-\$8	2020
<input type="checkbox"/>	System Generated	Bent Cap Repair	86.46	74.18 (-12.28)	87.28 (0.00)	56.23 (-36.85)	70.00 (0.00)	76.52 (0.00)	\$100,000	-.1228	-\$8	2020
<input type="checkbox"/>	System Generated	Scour Countermeasures	86.46	68.46 (-18.00)	87.28 (0.00)	37.81 (-55.27)	70.00 (0.00)	79.07 (2.55)	\$150,000	-.12	-\$8	2020
<input type="checkbox"/>	System Generated	Replace Culvert	86.46	57.26 (-29.20)	89.23 (1.95)	2.88 (-90.20)	70.00 (0.00)	76.52 (0.00)	\$244,800	-.1193	-\$8	2020
<input type="checkbox"/>	System Generated	Modify Bridge Rail	86.46	87.27 (0.81)	89.23 (1.95)	92.92 (-0.16)	70.00 (0.00)	76.52 (0.00)	\$439	1.8431	\$1	2020
<input type="checkbox"/>	System Generated	Rehab Deck - Network	86.46	87.30 (0.84)	89.30 (2.02)	92.92 (-0.16)	70.00 (0.00)	76.52 (0.00)	\$440	1.9083	\$1	2020
<input type="checkbox"/>	System Generated	Replace Deck - Network	86.46	94.42 (7.96)	100.00 (12.72)	100.00 (6.92)	70.00 (0.00)	76.52 (0.00)	\$41,850	.1902	\$5	2020
<input checked="" type="checkbox"/>	System Generated	Place Wearing Surface - Network	86.46	88.77 (2.31)	87.28 (0.00)	100.00 (6.92)	70.00 (0.00)	76.52 (0.00)	\$18,927	.122	\$8	2020
<input type="checkbox"/>	System Generated	Replace Bridge	86.46	95.86 (9.40)	100.00 (12.72)	96.66 (3.58)	70.00 (0.00)	91.85 (15.33)	\$135,703	.0693	\$14	2020
<input type="checkbox"/>	System Generated	Deck Replacement	86.46	94.42 (7.96)	100.00 (12.72)	100.00 (6.92)	70.00 (0.00)	76.52 (0.00)	\$124,321	.064	\$16	2020

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Short-Term Work Items Existing For Selected Bridge

Display System Recommendations
 Display Work Candidates
 Display Zero Cost Recommendations
 Display Zero Cost Work Candidates
 Alternative 2
 [New Alternative](#)
[Delete Profile](#)

Sel.	Short-Term Work Item	Action	Base Utility	Utility (Change)	Condition (Change)	LifeCycle (Change)	Mobility (Change)	Risk (Change)	Cost	Benefit / Cost (\$k)	Cost (\$k) / Benefit ▲	Target Year
Selected Short-Term Work Items			86.46	94.42 (7.96)	100.00 (12.72)	100.00 (6.92)	70.00 (0.00)	76.52 (0.00)	\$124,321	.064	\$16	1
<input type="checkbox"/>	System Generated	Replace Structure - Network	86.46	68.68 (-17.78)	100.00 (12.72)	22.79 (-70.29)	70.00 (0.00)	76.52 (0.00)	\$336,192	-0.529	-\$19	2020
<input type="checkbox"/>	System Generated	Bridge Rail Replacement	86.46	85.32 (-1.14)	89.23 (1.95)	87.07 (-6.01)	70.00 (0.00)	76.52 (0.00)	\$16,320	-0.699	-\$14	2020
<input type="checkbox"/>	System Generated	LSDC Overlay	86.46	85.14 (-1.32)	89.30 (2.02)	86.42 (-6.66)	70.00 (0.00)	76.52 (0.00)	\$70	-0.73	-\$14	2020
<input type="checkbox"/>	System Generated	Polymer Chip Seal Overlay	86.46	85.81 (-0.65)	87.36 (0.08)	91.02 (-2.06)	70.00 (0.00)	76.52 (0.00)	\$598	-1.161	-\$9	2020
<input type="checkbox"/>	System Generated	Asphalt Overlay	86.46	85.42 (-1.04)	87.36 (0.08)	89.86 (-3.22)	70.00 (0.00)	76.52 (0.00)	\$8,741	-1.19	-\$8	2020
<input type="checkbox"/>	System Generated	Abutment Repair	86.46	74.67 (-11.79)	87.28 (0.00)	57.71 (-35.37)	70.00 (0.00)	76.52 (0.00)	\$96,000	-1.228	-\$8	2020
<input type="checkbox"/>	System Generated	Bent Cap Repair	86.46	74.18 (-12.28)	87.28 (0.00)	56.23 (-36.85)	70.00 (0.00)	76.52 (0.00)	\$100,000	-1.228	-\$8	2020
<input type="checkbox"/>	System Generated	Scour Countermeasures	86.46	68.46 (-18.00)	87.28 (0.00)	37.81 (-55.27)	70.00 (0.00)	79.07 (2.55)	\$150,000	-1.2	-\$8	2020
<input type="checkbox"/>	System Generated	Replace Culvert	86.46	57.26 (-29.20)	89.23 (1.95)	2.88 (-90.20)	70.00 (0.00)	76.52 (0.00)	\$244,800	-1.193	-\$8	2020
<input type="checkbox"/>	System Generated	Modify Bridge Rail	86.46	87.27 (0.81)	89.23 (1.95)	92.92 (-0.16)	70.00 (0.00)	76.52 (0.00)	\$439	1.8431	\$1	2020
<input type="checkbox"/>	System Generated	Rehab Deck - Network	86.46	87.30 (0.84)	89.30 (2.02)	92.92 (-0.16)	70.00 (0.00)	76.52 (0.00)	\$440	1.9083	\$1	2020
<input type="checkbox"/>	System Generated	Replace Deck - Network	86.46	94.42 (7.96)	100.00 (12.72)	100.00 (6.92)	70.00 (0.00)	76.52 (0.00)	\$41,850	.1902	\$5	2020
<input type="checkbox"/>	System Generated	Place Wearing Surface - Network	86.46	88.77 (2.31)	87.28 (0.00)	100.00 (6.92)	70.00 (0.00)	76.52 (0.00)	\$18,927	.122	\$8	2020
<input type="checkbox"/>	System Generated	Replace Bridge	86.46	95.86 (9.40)	100.00 (12.72)	96.66 (3.58)	70.00 (0.00)	91.85 (15.33)	\$135,703	.0693	\$14	2020
<input checked="" type="checkbox"/>	System Generated	Deck Replacement	86.46	94.42 (7.96)	100.00 (12.72)	100.00 (6.92)	70.00 (0.00)	76.52 (0.00)	\$124,321	.064	\$16	2020

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You can add different alternatives



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Year	Alternative	Cost	NPV Cost	Year	Alternative	Cost	NPV Cost	Year	Alternative	Cost	NPV Cost
1	(do nothing)			1	Wearing Surface	\$ 18,927	\$ 18,927	1	Deck Replacement	\$ 124,321	\$ 124,321
21	Low Slump Overlay	\$ 32,637	\$ 18,070	21	Low Slump Overlay	\$ 32,637	\$ 18,070	21	(do nothing)		
36	Replace Bridge	\$ 381,848	\$ 135,703	36	Low Slump Overlay	\$ 50,847	\$ 135,703	36	(do nothing)		
Agency Sum LCC			\$ 153,773	Agency Sum LCC			\$ 55,068	Agency Sum LCC			\$ 124,321
Residual			\$ (134,988)	Residual			\$ (121,235)	Residual			\$ (126,451)
Total LCC			\$ 18,785	Total LCC			\$ (66,167)	Total LCC			\$ (2,130)

LCCAActivity Profile

Selected LCCA policies
 Bridge Policy: SD Replacement
 Culvert Policy: SD Culvert
 Deck Policy: SD Deck Policy
 Substructure Policy: SD Substructure
 Superstructure Policy: SD Superstructure

Index	Date	Year	Action Name	Orig. Cost	NPV Cost	Prior Action H.I.	After Action H.I.
1	2020	1	Place Wearing Surface - Network	\$18,927	\$18,927	98.61	98.61
2	2040	21	LSDC Overlay	\$32,637	\$18,070	96.28	97.16
3	2055	36	LSDC Overlay	\$50,847	\$18,070	93.39	94.16
Residual:				\$121,235	\$121,235		
Agency Life-Cycle Cost:					\$55,068		
User Life-Cycle Cost:					\$0		
Total Life-Cycle Cost:					(\$66,167)		

COMPARE ALTERNATIVES

WHAT IS LCCA

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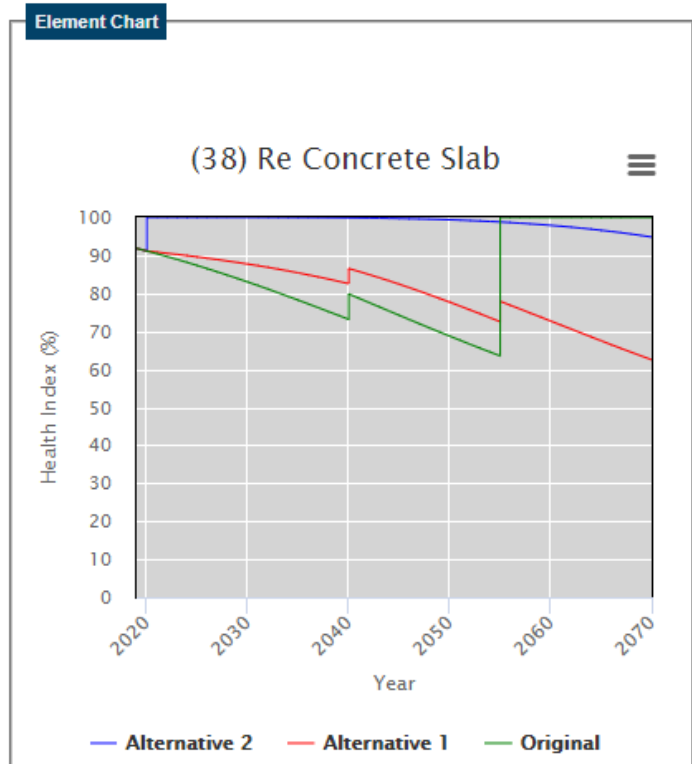
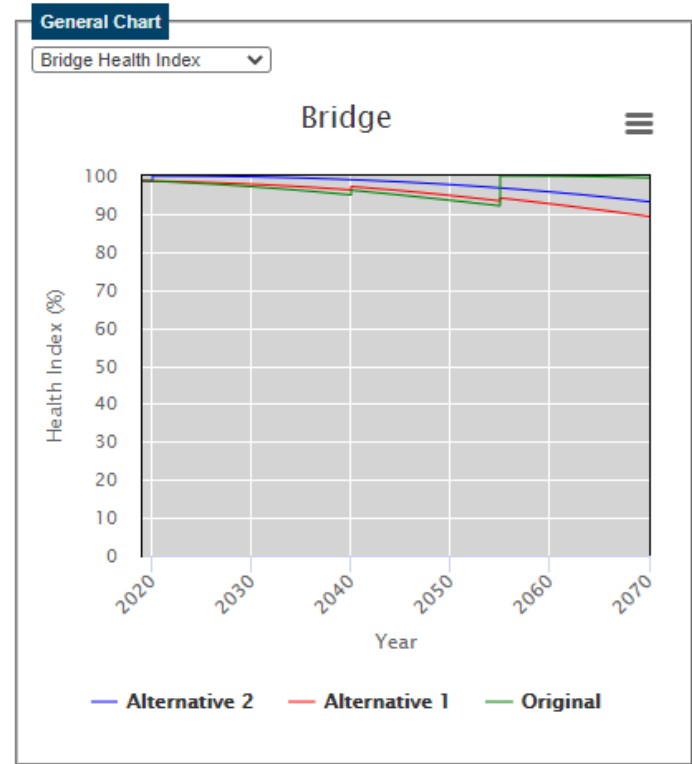
COMPARE ALTERNATIVES

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WHEN DO WE GET IT

Year	Alternative	Cost	NPV Cost	Year	Alternative	Cost	NPV Cost	Year	Alternative	Cost	NPV Cost
1	(do nothing)			1	Wearing Surface	\$ 18,927	\$ 18,927	1	Deck Replacement	\$ 124,321	\$ 124,321
21	Low Slump Overlay	\$ 32,637	\$ 18,070	21	Low Slump Overlay	\$ 32,637	\$ 18,070	21	(do nothing)		
36	Replace Bridge	\$ 381,848	\$ 135,703	36	Low Slump Overlay	\$ 50,847	\$ 135,703	36	(do nothing)		
Agency Sum LCC			\$ 153,773	Agency Sum LCC			\$ 55,068	Agency Sum LCC			\$ 124,321
Residual			\$ (134,988)	Residual			\$ (121,235)	Residual			\$ (126,451)
Total LCC			\$ 18,785	Total LCC			\$ (66,167)	Total LCC			\$ (2,130)



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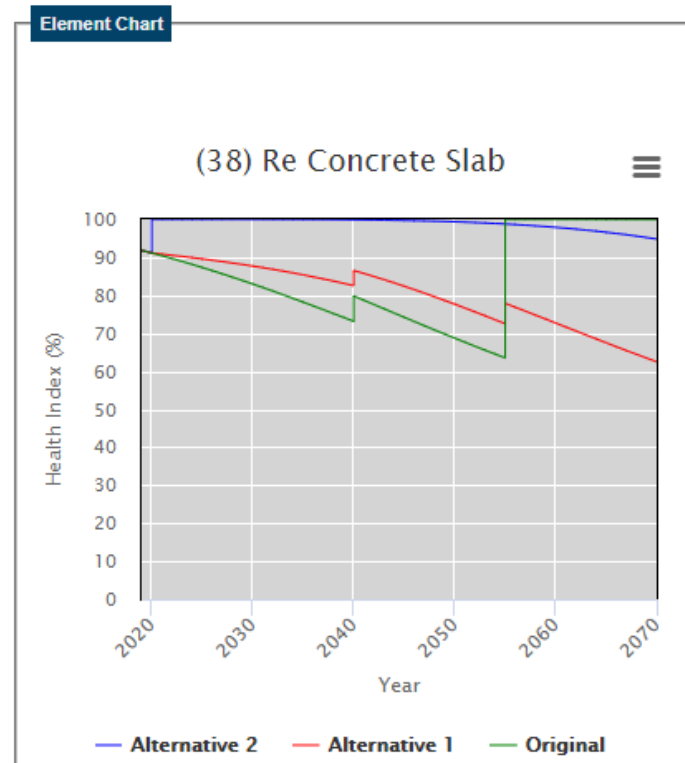
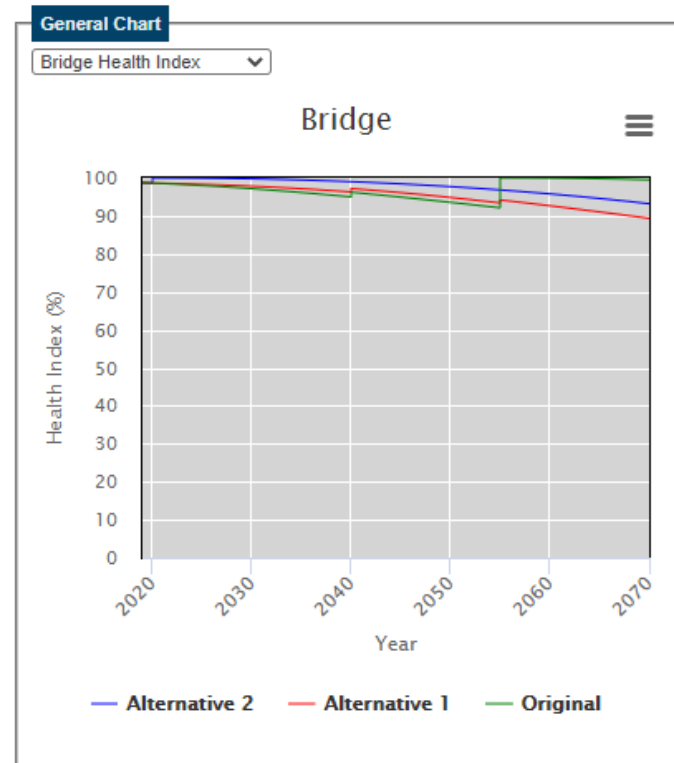
UPCOMING PAGES

WHEN DO WE GET IT

Year	Alternative	Cost	NPV Cost	Year	Alternative	Cost	NPV Cost	Year	Alternative	Cost	NPV Cost
1	(do nothing)			1	Wearing Surface	\$ 18,927	\$ 18,927	1	Deck Replacement	\$	\$
21	Low Slump Overlay	\$ 32,637	\$ 18,070	21	Low Slump Overlay	\$ 32,637	\$ 18,070			124,321	124,321
36	Replace Bridge	\$ 381,848	\$ 135,703	36	Low Slump Overlay	\$ 50,847	\$ 135,703	21	(do nothing)		
	Agency Sum LCC		\$ 153,773		Agency Sum LCC		\$ 55,068	36	(do nothing)		
	Residual		\$ (134,988)		Residual		\$ (121,235)		Agency Sum LCC		\$ 124,321
	Total LCC		\$ 18,785		Total LCC		\$ (66,167)		Residual		\$ (126,451)
									Total LCC		\$ (12,100)

Short Term:
User selected and defined alternatives.

Long Term:
Consequences driven by the Lifecycle Cost Policies



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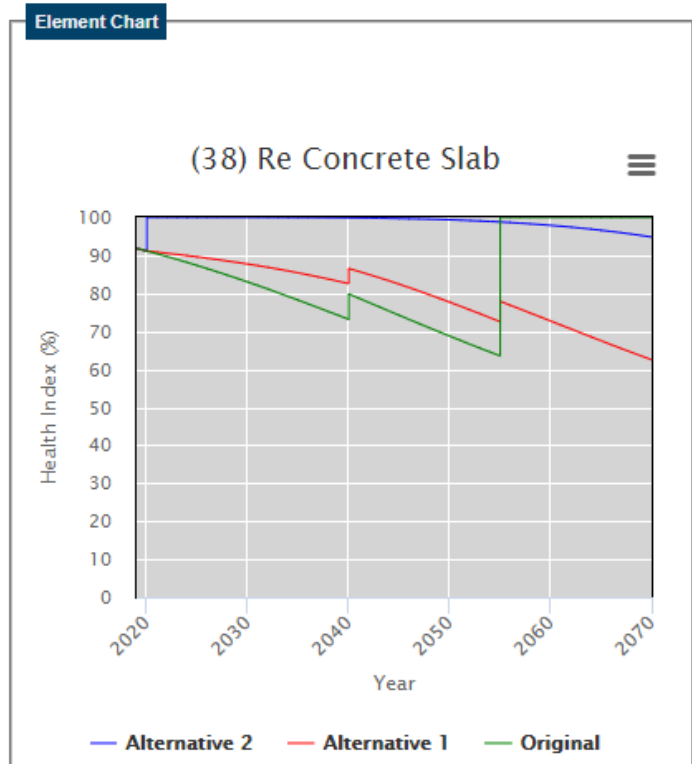
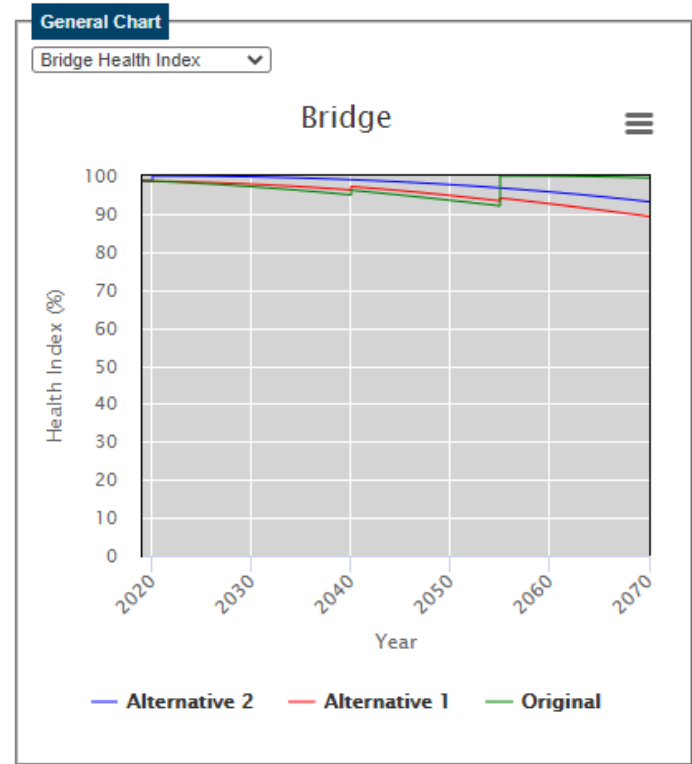
WHEN DO WE GET IT

Year	Alternative	Cost	NPV Cost
1	(do nothing)		
21	Low Slump Overlay	\$ 32,637	\$ 18,070
36	Replace Bridge	\$ 381,848	\$ 135,703
Agency Sum LCC			\$ 153,773
Residual			\$ (134,988)
Total LCC			\$ 18,785

Year	Alternative	Cost	NPV Cost
1	Wearing Surface	\$ 18,927	\$ 18,927
21	Low Slump Overlay	\$ 32,637	\$ 18,070
36	Low Slump Overlay	\$ 50,847	\$ 135,703
Agency Sum LCC			\$ 55,068
Residual			\$ (121,235)
Total LCC			\$ (66,167)

Year	Alternative	Cost	NPV Cost
1	Deck Replacement	\$ 124,321	\$ 124,321
21	(do nothing)		
36	(do nothing)		
Agency Sum LCC			\$ 124,321
Residual			\$ (126,451)
Total LCC			\$ (2,130)

Best Alternative: **Wearing Surface**
 Ok Alternative: **Deck Replace**
 Least Alternative: **Do Nothing**



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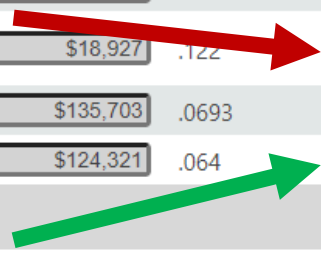
ADJUST LCC POLICIES

UPCOMING PAGES

WHEN DO WE GET IT

Sel.	Short-Term Work Item	Action	Base Utility	Utility (Change)	Condition (Change)	LifeCycle (Change)	Cost	Benefit / Cost (\$k)	Cost (\$k) / Benefit ▲	Target Year
	Last inspection		86.46	86.46 (0.00)	87.28 (0.00)	93.08 ((\$0		1
<input type="checkbox"/>	System Generated	Replace Structure - Network	86.46	68.68 (-17.78)	100.00 (12.72)	22.79 (-70.29)	\$336,192	-.0529	-\$19	2020
<input type="checkbox"/>	System Generated	Bridge Rail Replacement	86.46	85.32 (-1.14)	89.23 (1.95)	87.07 (-6.01)	\$16,320	-.0699	-\$14	2020
<input type="checkbox"/>	System Generated	LSDC Overlay	86.46	85.14 (-1.32)	89.30 (2.02)	86.42 (-6.66)	\$18,070	-.073	-\$14	2020
<input type="checkbox"/>	System Generated	Polymer Chip Seal Overlay	86.46	85.81 (-0.65)	87.36 (0.08)	91.02 (-2.06)	\$5,598	-.1161	-\$9	2020
<input type="checkbox"/>	System Generated	Asphalt Overlay	86.46	85.42 (-1.04)	87.36 (0.08)	89.86 (-3.22)	\$8,741	-.119	-\$8	2020
<input type="checkbox"/>	System Generated	Abutment Repair	86.46	74.67 (-11.79)	87.28 (0.00)	57.71 (-35.37)	\$96,000	-.1228	-\$8	2020
<input type="checkbox"/>	System Generated	Bent Cap Repair	86.46	74.18 (-12.28)	87.28 (0.00)	56.23 (-36.85)	\$100,000	-.1228	-\$8	2020
<input type="checkbox"/>	System Generated	Scour Countermeasures	86.46	68.46 (-18.00)	87.28 (0.00)	37.81 (-55.27)	\$150,000	-.12	-\$8	2020
<input type="checkbox"/>	System Generated	Replace Culvert	86.46	57.26 (-29.20)	89.23 (1.95)	2.88 (-90.20)	\$244,800	-.1193	-\$8	2020
<input type="checkbox"/>	System Generated	Modify Bridge Rail	86.46	87.27 (0.81)	89.23 (1.95)	92.92 (-0.16)	\$439	1.8431	\$1	2020
<input type="checkbox"/>	System Generated	Rehab Deck - Network	86.46	87.30 (0.84)	89.30 (2.02)	92.92 (-0.16)	\$440	1.9083	\$1	2020
<input type="checkbox"/>	System Generated	Replace Deck - Network	86.46	94.42 (7.96)	100.00 (12.72)	100.00 (6.92)	\$41,850	.1902	\$5	2020
<input type="checkbox"/>	System Generated	Place Wearing Surface - Network	86.46	88.77 (2.31)	87.28 (0.00)	100.00 (6.92)	\$18,927	.122	\$8	2020
<input type="checkbox"/>	System Generated	Replace Bridge	86.46	95.86 (9.40)	100.00 (12.72)	96.66 (3.58)	\$135,703	.0693	\$14	2020
<input type="checkbox"/>	System Generated	Deck Replacement	86.46	94.42 (7.96)	100.00 (12.72)	100.00 (6.92)	\$124,321	.064	\$16	2020

Add to New Project





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<input type="checkbox"/> System Generated	Deck Replacement	86.46	94.42 (7.96)	100.00 (12.72)	100.00 (6.92)	70.00 (0.00)	76.52 (0.00)	\$124.3
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Page size: 50

Add to New Project

LCCA Activity Profile

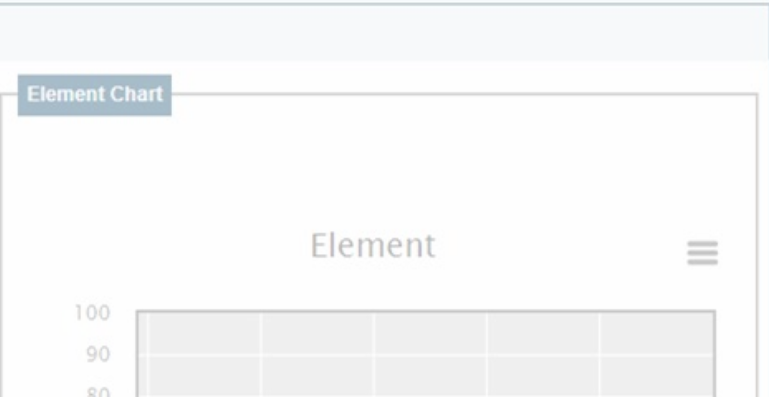
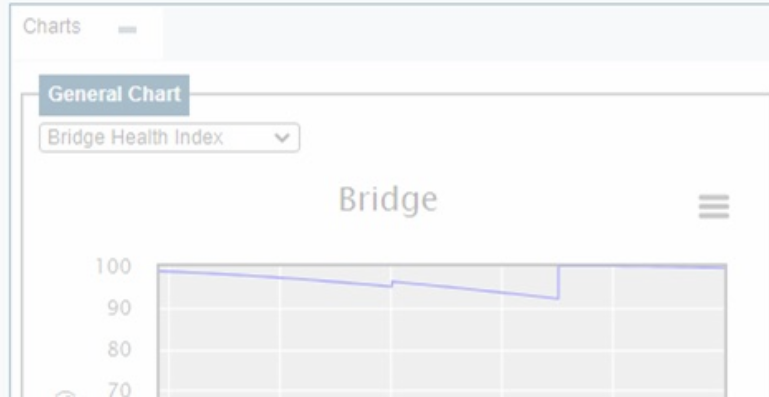
Selected LCCA policies

Bridge Policy: SD Replacement
 Culvert Policy: SD Culvert
 Deck Policy: SD Deck Policy
 Substructure Policy: SD Substructure
 Superstructure Policy: SD Superstructure



Which policies have been assigned to this bridge

Index	Date	Year	Action Name	Orig. Cost	NPV Cost	Prior Action H.I.
1	2040	21	LSDC Overlay	\$32,637	\$18,070	94.97
2	2055	36	Replace Bridge	\$381,848	\$135,703	92.10
Residual:				\$134,988	\$134,988	
Agency Life-Cycle Cost:					\$153,773	
User Life-Cycle Cost:					\$0	
Total Life-Cycle Cost:					\$18,785	



Effects on Each Element

Year: 2020

Element	Str. Unit	Env.	Quantity	Units
(38) Re Concrete Slab	0	Low(2)	701.00	sq.ft
(205) Re Conc Column	0	Low(2)	6.00	each

ADJUST LCC POLICIES

Admin > Modeling Config > Preservation and Replacement Policy

Policy Editor

Policy: Default Structure Overall Create New Copy >>

Policy Details

Name:

Inactive:

Description:

Notes:

User Cost Calculation:

User Cost Formula String:

Policy Rules

Name	Condition	Action
Structure Replacement	(Bridge Health Index Must Be Less Than Number Value 40 OR (Health Index of Category 'Superstructure' Must Be Less Than Number Value 50 AND Health Index of Category 'Substructure' Must Be Less Than Number Value 50))	Replace Structure - Network ✕

Add Rule

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ADJUST LCC POLICIES

Admin > Modeling Config > LCCA Policy Rules

Rule Editor

Policy: Rule: [Create New](#)

Rule Details

Name: Resulting Action:

Summary

(Bridge Health Index Must Be Less Than Number Value 40 OR (Health Index of Category 'Superstructure' Must Be Less Than Number Value 50 AND Health Index of Category 'Substructure' Must Be Less Than Number Value 50))

Rule Builder

[Add Condition](#) [Add Group](#)

Type: Type:
Bridge Health Index Must Be Number Value [Remove Condition](#)

Group

[Add Condition](#) [Add Group](#) [Remove Group](#)

Type: Type:
Field Must Be Number Value [Remove Condition](#)

Type: Type:
Field Must Be Number Value [Remove Condition](#)

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Admin > Modeling Config > LCCA Policy Rules

Rule Editor
 Policy: Default Structure Overall Rule: Structure Replacement [Create New](#)

Rule Details
 Name: Structure Replacement Resulting Action: Replace Structure - Network [Inactive]

Summary
 (Bridge Health Index Must Be Less Than Number Value 40 OR (Health Index of Category 'Superstructure' Must Be Less Than Number Value 50 AND Health Index of Category 'Substructure' Must Be Less Than Number Value 50))

Rule Builder
[Add Condition](#) [Add Group](#)

Type: Bridge Health Index Must Be Less Than Number Value 40 [Remove Condition](#)

OR

Group
[Add Condition](#) [Add Group](#) [Remove Group](#)

Type: Category Health Index Must Be Less Than Number Value 50 [Remove Condition](#)

AND

Type: Material Health Index Must Be Less Than Number Value 50 [Remove Condition](#)

- Is Null
- Bridge Health Index
- Element Health Index
- Category Health Index**
- Material Health Index
- Type Health Index
- NBI Component Rating
- Repeat (in years)
- Element Condition State



ADJUST LCC POLICIES

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WHEN DO WE GET IT

Admin > Modeling Config > LCCA Assign Policies

Bridge List				Bridge Policy	Default Culvert Policy	Default Deck Policy	Default Substructure Policy	Default Superstructure Policy
<input type="checkbox"/>	Bridge ID	District	County	No Policy Selected	No Policy Selected	No Policy Selected	No Policy Selected	No Policy Selected
<input type="checkbox"/>	02033280	Mitchell	02 AURORA	No Policy Selected	Assign To Selected Assign To All	Assign To Selected Assign To All	Assign To Selected Assign To All	Assign To Selected Assign To All
<input type="checkbox"/>	03254180	Aberdeen	03 BEADLE	Default Culvert policy	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	03258060	Aberdeen	03 BEADLE	Default Deck Policy	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	03259010	Aberdeen	03 BEADLE	Default Structure Overall	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	03265240	Aberdeen	03 BEADLE	Default Substructure Policy	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	03268030	Aberdeen	03 BEADLE	Default Superstructure Policy	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	03270149	Aberdeen	03 BEADLE	SD Culvert	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	03271040	Aberdeen	03 BEADLE	SD Deck Policy	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	03275090	Aberdeen	03 BEADLE	SD Replacement	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	03281262	Aberdeen	03 BEADLE	SD Substructure	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	03281270	Aberdeen	03 BEADLE	SD Superstructure	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	05125130	Mitchell	05 BON HOMME	SD Replacement	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	05126225	Mitchell	05 BON HOMME	SD Replacement	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	05129228	Mitchell	05 BON HOMME	SD Replacement	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	05130053	Mitchell	05 BON HOMME	SD Replacement	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	05130120	Mitchell	05 BON HOMME	SD Replacement	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	05131060	Mitchell	05 BON HOMME	SD Replacement	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	05131070	Mitchell	05 BON HOMME	SD Replacement	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	05132190	Mitchell	05 BON HOMME	SD Replacement	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	05133203	Mitchell	05 BON HOMME	SD Replacement	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	05136100	Mitchell	05 BON HOMME	SD Replacement	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	05137090	Mitchell	05 BON HOMME	SD Replacement	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	05138080	Mitchell	05 BON HOMME	SD Replacement	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	05138210	Mitchell	05 BON HOMME	SD Replacement	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure
<input type="checkbox"/>	05140087	Mitchell	05 BON HOMME	SD Replacement	SD Culvert	SD Deck Policy	SD Substructure	SD Superstructure



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So what's in the new module?

- Introduction of Lifecycle Plans
- Breakdown division between short term and long term
- Introduce user cost
- Integrate with Network Optimization

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WHEN DO WE GET IT

Analysis > LCCA Plans

Bridge: 001701 Name: Governor Sprague Facility Carried (007): US 1A BSTN NCK RD

Create/Edit Plan

+ Name: 2020 Manual Plan Set as Current Plan
 + Start Year: 2020 + Analysis Length: 30 Years
 + Inflation Estimation Method: Fixed Inflation Rate + Inflation %: 3
 + Utility Weight Profile: Default + Residual Value Calculation: HI Approximation
 Estimate Functional User Cost
 + Condition Based On Inspection: 2018-10-05 (VAIS)

Notes: Generated by User, Pontis on 08/04/2020

Search

Locked	Year #	Year	Action(s)	Action(s) Added As	Agency Cost			Functional + Action User Cost			Total Cost			Utility		
					2020 \$	Inflated \$	2020 \$	2020 \$	Inflated \$	2020 \$	2020 \$	Inflated \$	2020 \$	Start	End	
<input type="checkbox"/>	1	2020	Do Nothing													
<input type="checkbox"/>	2	2021	Do Nothing													
<input type="checkbox"/>	3	2022	Do Nothing													
<input type="checkbox"/>	4	2023	Do Nothing													
<input type="checkbox"/>	5	2024	Do Nothing													
<input type="checkbox"/>	6	2025	Do Nothing													
<input type="checkbox"/>	7	2026	Do Nothing													
<input type="checkbox"/>	8	2027	Do Nothing													
<input type="checkbox"/>	9	2028	Do Nothing													
<input type="checkbox"/>	10	2029	Do Nothing													
31 years until next replacement					Residual Value (Final HI = 85.55%) \$		(1.00)									
Life Cycle Costs					Agency Life Cycle Cost			User Life Cycle Cost			Total Life Cycle Cost					
					\$1.00			\$1.00			\$1.00					

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31 items in 4 pages

Results

Optimization

A plan consists of the actions and the years



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Analysis > LCCA Plans

Bridge: 001701 Name: Governor Sprague Facility Carried (007): US 1A BSTN NCK RD

Create/Edit Plan

Name: 2020 Manual Plan Set as Current Plan

Start Year: 2020 Analysis Length: 30 Years

Inflation Estimation Method: Fixed Inflation Rate Inflation %: 3

Utility Weight Profile: Default Residual Value Calculation: HI Approximation

Estimate Functional User Cost

Condition Based On Inspection: 2018-10-05 (VAIS)

Notes: Generated by User, Pontis on 08/04/2020

Search

Locked	Year #	Year	Action(s)	Action(s) Added As	Agency Cost			Functional + Action User Cost			Total Cost			Utility		
					2020 \$	Inflated \$	2020 \$	2020 \$	Inflated \$	2020 \$	2020 \$	Inflated \$	2020 \$	Start	End	
<input type="checkbox"/>	1	2020	Do Nothing													
<input type="checkbox"/>	2	2021	Do Nothing													
<input type="checkbox"/>	3	2022	Do Nothing													
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<input type="checkbox"/>	5	2024	Do Nothing													
<input type="checkbox"/>	6	2025	Do Nothing													
<input type="checkbox"/>	7	2026	Do Nothing													
<input type="checkbox"/>	8	2027	Do Nothing													
<input type="checkbox"/>	9	2028	Do Nothing													
<input type="checkbox"/>	10	2029	Do Nothing													
31 years until next replacement					Residual Value (Final HI = 85.55%) \$		(1.00)									
Life Cycle Costs					Agency Life Cycle Cost			User Life Cycle Cost			Total Life Cycle Cost					
					\$1.00			\$1.00			\$1.00					

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No Short Term
and Long Term



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Estimate Functional User Cost

Condition Based On Inspection: 2018-10-05 (VAIS)

Notes: Generated by User, Pontis on 08/04/2020

Search

Locked	Year #	Year	Action(s)	Action(s) Added As	Agency Cost		Functional + Action User Cost					
					2020 \$	Inflated \$	2020 \$	2020 \$	Inflated \$	2020 \$	2020 \$	
<input type="checkbox"/>	1	2020	Do Nothing									
<input type="checkbox"/>	2	2021	Do Nothing									
<input type="checkbox"/>	3	2022	Do Nothing									
<input type="checkbox"/>	4	2023	Do Nothing									
<input type="checkbox"/>	5	2024	Do Nothing									
<input type="checkbox"/>	6	2025	Do Nothing									
<input type="checkbox"/>	7	2026	Do Nothing									
<input type="checkbox"/>	8	2027	Do Nothing									
<input type="checkbox"/>	9	2028	Do Nothing									
<input type="checkbox"/>	10	2029	Do Nothing									
				31 years until next replacement	Residual Value (Final HI = 85.55%) \$	(1.00)						
Life Cycle Costs						Agency Life Cycle Cost	\$1.00	User Life Cycle Cost	\$1.00			

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$$LCC = \sum Action Costs_{NPV} - Residual_{NPV}$$



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Search

Locked	Year #	Year	Action(s)	Action(s) Added As	Agency Cost		Functional + Action User Cost					
					2020 \$	Inflated \$	2020 \$	2020 \$	Inflated \$	2020 \$	2020 \$	
<input type="checkbox"/>	1	2020	Do Nothing									
<input type="checkbox"/>	2	2021	Do Nothing									
<input type="checkbox"/>	3	2022	Do Nothing									
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<input type="checkbox"/>	8	2027	Do Nothing									
<input type="checkbox"/>	9	2028	Do Nothing									
<input type="checkbox"/>	10	2029	Do Nothing									
				31 years until next replacement	Residual Value (Final HI = 85.55%) \$	(1.00)						
Life Cycle Costs							Agency Life Cycle Cost	\$1.00	User Life Cycle Cost		\$1.00	

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$$LCC = \sum Action Costs_{NPV} + \sum User Costs_{NPV} - Residual_{NPV}$$



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Estimate Functional User Cost

Condition Based On Inspection: 2018-10-05 (VAIS)

Notes: Generated by User, Pontis on 08/04/2020

Search

Locked	Year #	Year	Action(s)	Action(s) Added As	Agency Cost		Functional + Action User Cost						
					2020 \$	Inflated \$	2020 \$	2020 \$	Inflated \$	2020 \$	2020 \$		
<input type="checkbox"/>	1	2020	Do Nothing										
<input type="checkbox"/>	2	2021	Do Nothing										
<input type="checkbox"/>	3	2022	Do Nothing										
<input type="checkbox"/>	4	2023	Do Nothing										
<input type="checkbox"/>	5	2024	Do Nothing										
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<input type="checkbox"/>	8	2027	Do Nothing										
<input type="checkbox"/>	9	2028	Do Nothing										
<input type="checkbox"/>	10	2029	Do Nothing										
31 years until next replacement					Residual Value (Final HI = 85.55%) \$		(1.00)						
Life Cycle Costs							Agency Life Cycle Cost		\$1.00		User Life Cycle Cost		\$1.00

Example User Costs:

- Functional Cost: The cost to the state population of the bridge being too small for the traffic demands.
- Action Cost: The cost to the state population to close half of the lanes for phased construction.

Results

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$$LCC = \sum Action Costs_{NPV} + \sum User Costs_{NPV} - Residual_{NPV}$$



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Estimate Functional User Cost

Condition Based On Inspection: 2018-10-05 (VAIS)

Notes: Generated by User, Pontis on 08/04/2020

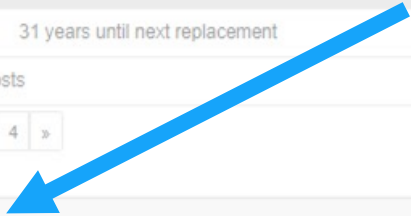
Search

Locked	Year #	Year	Action(s)	Action(s) Added As	Agency Cost		Functional + Action User Cost					
					2020 \$	Inflated \$	2020 \$	2020 \$	Inflated \$	2020 \$	2020 \$	
<input type="checkbox"/>	1	2020	Do Nothing									
<input type="checkbox"/>	2	2021	Do Nothing									
<input type="checkbox"/>	3	2022	Do Nothing									
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<input type="checkbox"/>	7	2026	Do Nothing									
<input type="checkbox"/>	8	2027	Do Nothing									
<input type="checkbox"/>	9	2028	Do Nothing									
<input type="checkbox"/>	10	2029	Do Nothing									
31 years until next replacement					Residual Value (Final HI = 85.55%) \$	(1.00)						
Life Cycle Costs							Agency Life Cycle Cost	\$1.00	User Life Cycle Cost		\$1.00	

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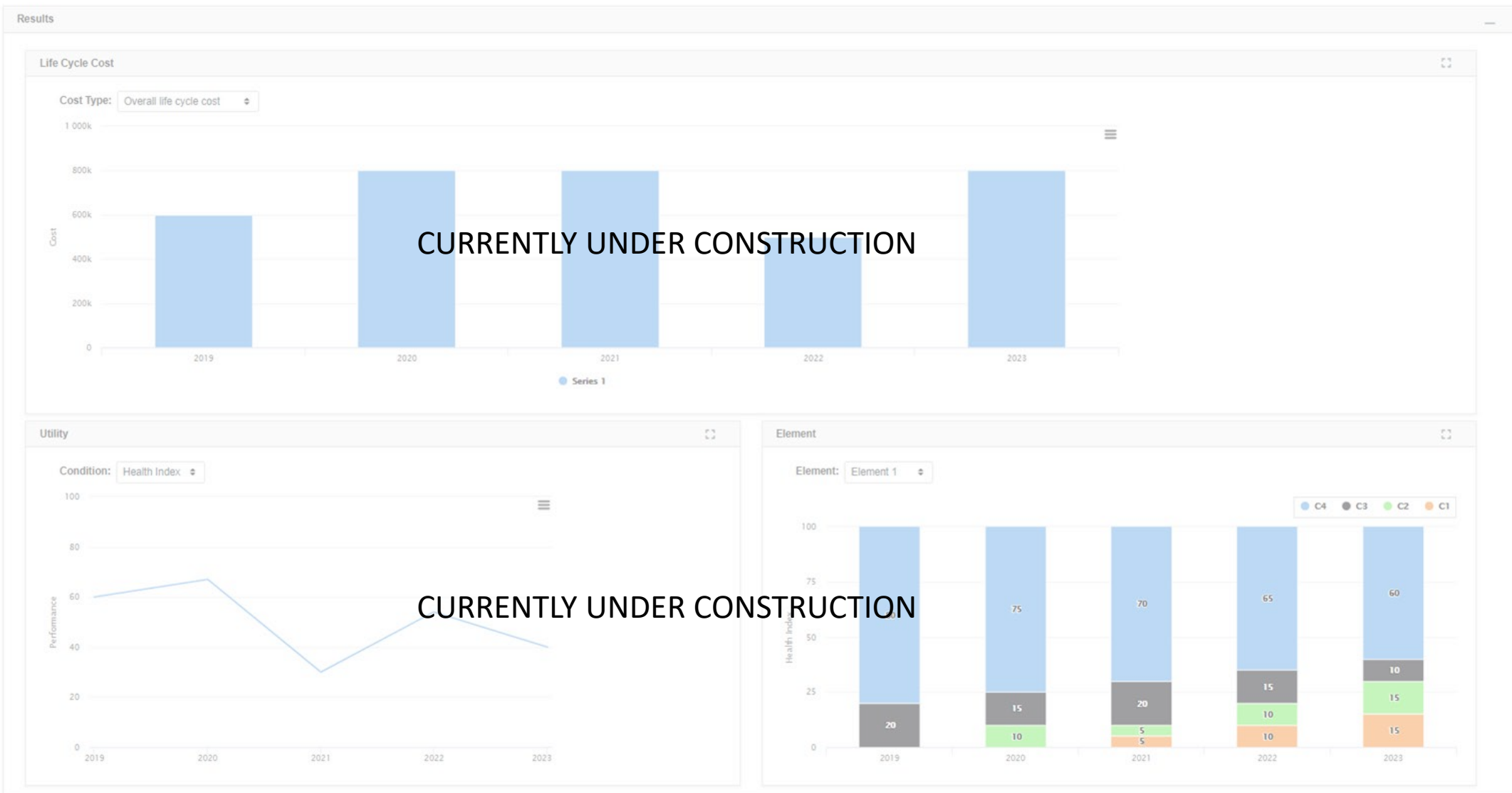
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COMPARE ALTERNATIVES

ADJUST LCC POLICIES

UPCOMING PAGES

WHEN DO WE GET IT



THE UPCOMING PAGES

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WHEN DO WE GET IT

	3	2022	Moveable Barrier (add/remove) Deck Patching	Actions		
	4	2023	Do Nothing			
	5	2024	Do Nothing			
	6	2025	Do Nothing			
	7	2026	Do Nothing			
	8	2027	Do Nothing			
	9	2028	Do Nothing			
	10	2029	Do Nothing			
31 years until next replacement		Residual Value (Final HI = 85.55%) \$		(1.00)		
Life Cycle Costs			Agency Life Cycle Cost	\$1.00	User Life Cycle Cost	\$1.00
			Total Life Cycle Cost		\$1.00	

31 items in 4 pages

Running an optimization on a single bridge in the LCCA module is like a goal-seek for the best LCC.

Results

Optimization

Optimizer Database Connection: Sample DB Name

Download Optimization Log:

• Optimization Start Year:

• NBI Deterioration Method:

Minimum Deferment: Years

Include User Costs in Optimization:

• Save Optimization As:

• NBI Converter Profile:

• New Plan Name:

Assign Network Policies

Available Network Policies

- Network Policy 1
- Network Policy 2
- Network Policy 3
- Network Policy 4
- Network Policy 5
- Network Policy 6

Selected Network Policies

Assign LCCA Policies

Available LCCA Policies

- LCCA Policy 1
- LCCA Policy 2
- LCCA Policy 3
- LCCA Policy 4
- LCCA Policy 5
- LCCA Policy 6

Selected LCCA Policies

Estimated Effort: LOW



THE UPCOMING PAGES

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WHEN DO WE GET IT

Analysis > LCCA Plans

Bridge: 002401 Name: Moons Cut Facility Carried (007): RI 33 PROVIDENCE ST

Export Search Create New Plan Create Plan from Scenario

Current	Sel.	Name	Start Year	End Year	Agency LCC	User LCC	Total LCC	Updated By	Updated On	Notes
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2010 Master Plan	2010	2040				Pontis User	8/4/2020	Generated by User, Pontis on 08/04/2020
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2020 Proposed Deck Replacement	2020	2050				Pontis User	8/4/2020	Generated by User, Pontis on 08/04/2020

2 items in 1 page

Freeze Current Version of Plan to Program Scenarios

Available Scenarios

- Scenario 1
- Scenario 2
- Scenario 3
- Scenario 4
- Scenario 5
- Scenario 6

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Frozen to Scenarios

Save

Graphs to compare plans against each other.

Compare Plans

Performance

Performance Measure: Utility

Utility	Series 1 Performance	Series 2 Performance
9999	70	70
10000	78	78
10001	85	85
10002	85	85
10003	30	30

Timing

Year	2010 Master Plan	2020 Proposed Deck Replacement
2019	Action 1 (+1)	Action 1 (+1)
2020	Action 1 (+1)	Action 1 (+1)
2021	Action 1 (+1)	Action 1 (+1)
2022	Action 1 (+1)	Action 1 (+1)
2023	Action 1 (+1)	Action 1 (+1)



THE UPCOMING PAGES

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Analysis > LCCA Plans

Bridge: 002401 Name: **Moons Cut** Facility Carried (007): **RI 33 PROVIDENCE ST**

Export Search + Create New Plan + Create Plan from Scenario

Current	Sel.	Name	Start Year	End Year	Agency LCC	User LCC	Total LCC	Updated By	Updated On	Notes	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2010 Master Plan	2010	2040				Pontis User	8/4/2020	Generated by User, Pontis on 08/04/2020	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2020 Proposed Deck Replacement	2020	2050				Pontis User	8/4/2020	Generated by User, Pontis on 08/04/2020	

« 1 » 2 items in 1 page

Freeze Current Version of Plan to Program Scenario

Create Plan from Scenario

* Program: Program 1

* Scenario: Scenario 2

Create Cancel

Save

Compare Plans

Performance Timing

You can import from a network optimization scenario



THE UPCOMING PAGES

Analysis > LCCA Plans

Bridge: 002401 Name: **Moons Cut** Facility Carried (007): **RI 33 PROVIDNCE ST**

Export Search + Create New Plan + Create Plan from Scenario

Current	Sel.	Name	Start Year	End Year	Agency LCC	User LCC	Total LCC	Updated By	Updated On	Notes
<input checked="" type="checkbox"/>		2010 Master Plan	2010	2040				Pontis User	8/4/2020	Generated by User, Pontis on 08/04/2020
<input checked="" type="checkbox"/>		2020 Proposed Deck Replacement	2020	2050				Pontis User	8/4/2020	Generated by User, Pontis on 08/04/2020

« 1 » 2 items in 1 page

And you can freeze entire plans to a scenario.

Freeze Current Version of Plan to Program Scenarios

Available Scenarios

- Scenario 2
- Scenario 3
- Scenario 4
- Scenario 5
- Scenario 6

Frozen to Scenarios

- Scenario 1

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Save

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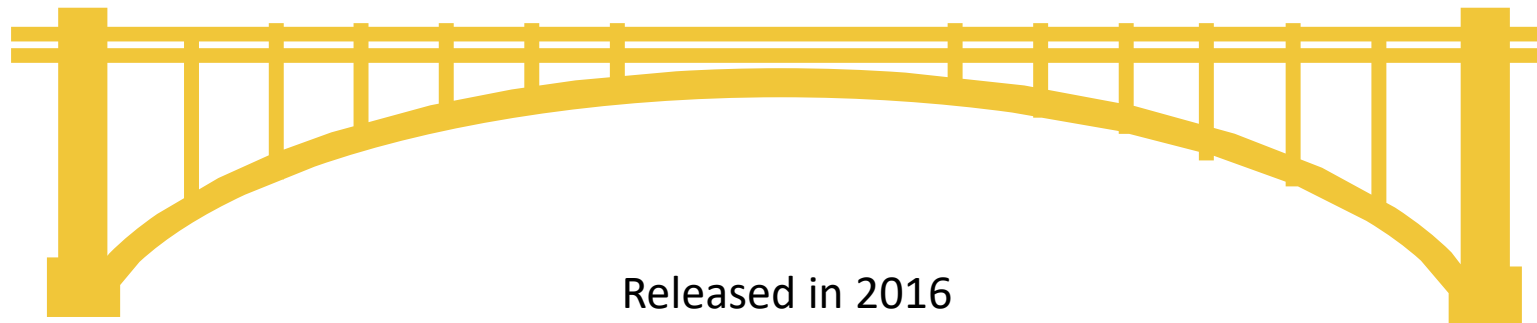
UPCOMING PAGES

WHEN DO WE GET
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WHEN DO WE GET IT?

WHEN DO WE GET IT?

The existing LCCA Page, with LCC Cost Calculations, you already have. It was released with BrM 5.2.3 in 2016.



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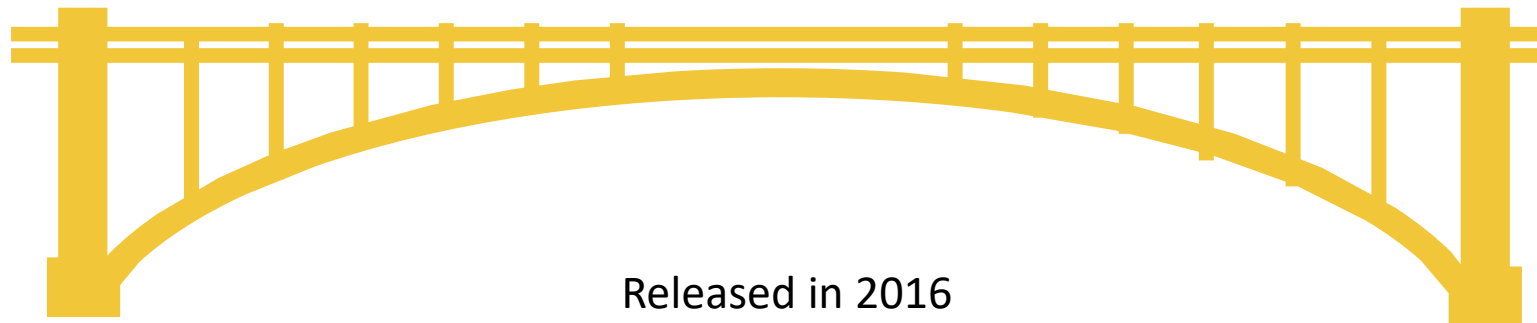
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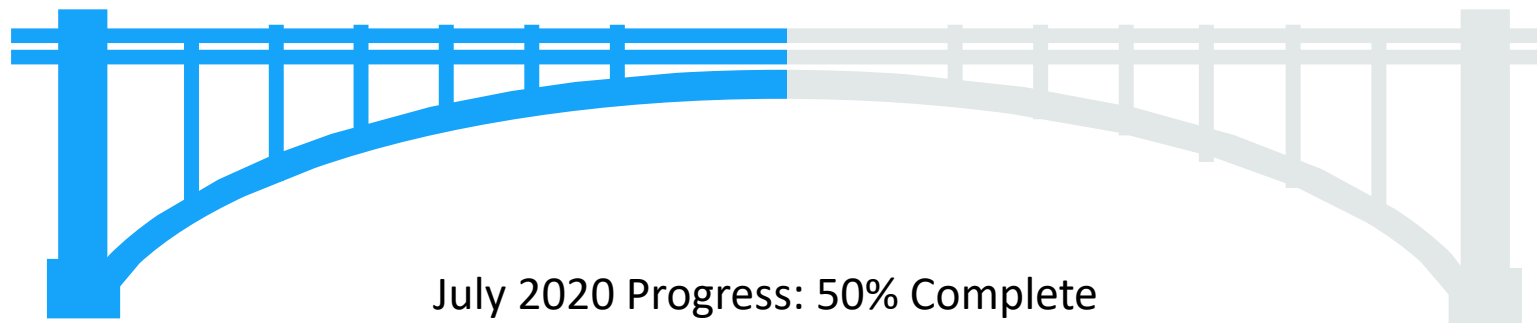
WHEN DO WE GET
IT

The existing LCCA Page, with LCC Cost Calculations, you already have. It was released with BrM 5.2.3 in 2016.



Released in 2016

The new LCCA page is being developed on a parallel track to BrM 6.4 (since we knew it would take a while). That with bring LCC Plans and Single Bridge Optimization.



July 2020 Progress: 50% Complete

CONTACT



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