



Illinois Tollway ABC Evaluation Example

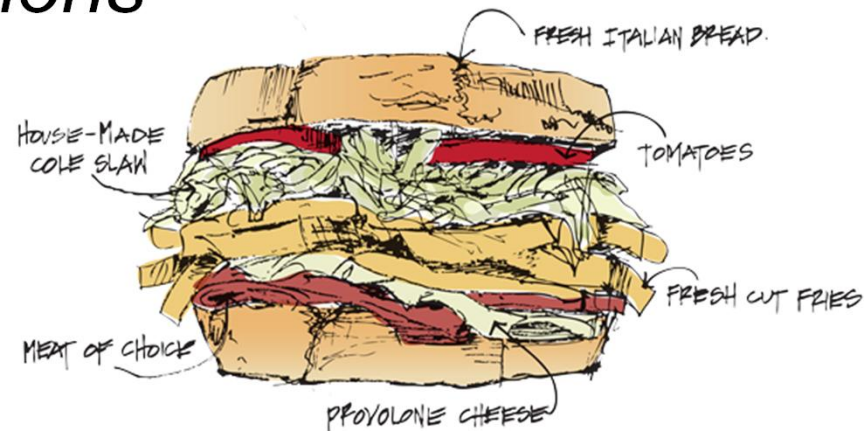
Fox River Bridge

Eric Ozimok

AECOM

Goals for Presentation

- *Explain the procedure to evaluate ABC*
- *Provide a more detailed review of the Tools*
- *Brief tutorial on how to use the Tools*
- *Describe major assumptions*
- *Answer any questions*
- *Finish before Lunch!*



I will try to avoid this:



And this:



And hopefully this:



Special Thank You

■ *Fox River Bridge Project Team*

■ DSE: Stanley Consultants Inc.

□ Scott Eshleman

■ CM: Chastain-Thomas Joint Venture

□ Keith Sargent

■ DCM: BV3 Joint Venture

■ CCM: OMEGA Associates



What is the Example?

■ Aid DSEs in evaluating a structure for ABC

- Step by step procedure
 - ABC DMT
 - ABC BLCC Tool
 - Summary and Conclusions

□ Explains logical steps

□ Provides assumptions used in the tools

APPENDIX A - ABC DMT and ABC BLCC TOOL EXAMPLE

ABC BLCC TOOL INPUT – INITIAL COST (IC)					
	Bridge Alt #1	Bridge Alt #2	Bridge Alt #3	Bridge Alt #4	Bridge Alt #5
Total Labor Duration	> 18 months	btwn 13 and 18 months	btwn 13 and 18 months	btwn 13 and 18 months	btwn 13 and 18 months
Deck	CIP	CIP	CIP	Precast	CIP
Super	Precast	Precast	Precast	Precast	Precast
Sub	CIP	CIP	Precast	Precast	CIP
Equipment	Typ CIP	Long Launch	PBES	PBES	Gantry Crane
Agency Costs	Normal	Extensive	Moderate	Extensive	Moderate
ROW	btwn 0.5 and 1.0 acres	btwn 0.5 and 1.0 acres	> 1.0 acre	> 1.0 acre	btwn 0.5 and 1.0 acres
Environmental Impacts	Maximum	Maximum	Medium	Medium	Medium

Duration: The conventional construction schedule (Bridge Alt #1) includes a 9 month pre-stage to construct the piers under the existing structure and a 19 month staged construction scheme for the superstructure. The total construction timeframe for labor costs would then be 28 months which is greater than the 18 month upper limit.

ABC technologies are assumed to speed up the construction timeframe but a 10 month reduction (to change the scoring for this variable) in construction timeframe is unrealistic. However, to realize a benefit in the BLCC Tool, the Total Labor scores for Bridge Alternatives that utilized ABC technologies (Bridge Alt #2, #3 #4 and #5) were adjusted down one level because a benefit would be realized.

Agency Costs: Based on the ABC BLCC Guidance, "Normal agency coordination" shall be defined for conventional construction (Bridge Alt #1). Construction projects that use methods that are less familiar to the agency and contracting community present a higher likelihood for more agency involvement and coordination; therefore, Longitudinal Launch (Bridge Alt #2) is scored as "Extensive agency coordination" since this is not typically done on Illinois Tollway projects. Precast Deck Panels (Bridge Alt #4) would

December 2016

A-9

Illinois Tollway

What is the Example?

■ *Aid DSEs in evaluating a structure for ABC*

- ❑ Completed Tools are included for reference
- ❑ Does **not** provide a final recommendation or cost comparison breakdown
- ❑ Example may be downloaded from the Illinois Tollway's website

APPENDIX A - ABC DMT and ABC BLCC TOOL EXAMPLE

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Super	Precast	Precast	Precast	Precast	Precast
Sub	CIP	CIP	Precast	Precast	CIP
Equipment	Typ CIP	Long Launch	PBES	PBES	Gantry Crane
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ROW	btwn 0.5 and 1.0 acres	btwn 0.5 and 1.0 acres	> 1.0 acre	> 1.0 acre	btwn 0.5 and 1.0 acres
Environmental Impacts	Maximum	Maximum	Medium	Medium	Medium

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December 2016

A-9

Illinois Tollway

Where to go to find Example?



Go Under
Doing Business

Where to go to find Example?

How Can We Help You?

BUSINESS OPPORTUNITIES

Construction Bidding/Letting

Goods and Services Solicitations

Job Order Contracting

Professional Services Bulletins

OTHER OPPORTUNITIES

Auctions

Blue Board Signage

Online Plan Room

Procurement Contacts

Tower and Fiber Leasing

RESOURCES

Construction/Engineering

Construction Permits

Diversity

Goods and Services

Manuals

Policies/Guidelines

State of Illinois Comptroller's Office Vendor
Payment Inquiry

**Select
Manuals**

Where to go to find Example?

Manuals

Bridges and Structures

Structure Design Manual (3/2016) (pdf - 5.6 MB) >

Bridge Superstructure Rating Form (03/2015) (xls - 66 KB) >

Geotechnical Manual (3/2016) (pdf - 318 KB) >

Structure Design Manual Appendix A - ABC Example (12/2016) >

ABC Bridge Life Cycle Comparison (BLCC) Tool (12/2016) >

Page 1 of 2 ▾

— 5 Items per page Showing 1 - 5 of 6 results.

← First

Previous

Next

Last →



**Download
Example**

Where to go to find Example?

Manuals

Bridges and Structures

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Structure Design Manual Appendix A - ABC Example (12/2016) >

ABC Bridge Life Cycle Comparison (BLCC) Tool (12/2016) >

Page 1 of 2 ▾

— 5 Items per

Showing 1 - 5 of 6 results.

← First

Previous

Next

Last →

**ABC BLCC
Tool**

Where to go to find Example?

Manuals

Bridges and Structures

[ABC Decision Matrix Tool \(DMT\) \(01/2017\)](#)

Page 2 of 2

— 5 Items per Page Showing 6 - 6 of 6 results.

← First

Previous

Next

Last →

Page 2

ABC
DMT

What structure did we use and why?

- *Jane Addams Memorial Tollway (I-90) over the Fox River dual structures*



What structure did we use and why?

- *ABC methods were considered during design*
- *ABC methods used to construct the bridges*



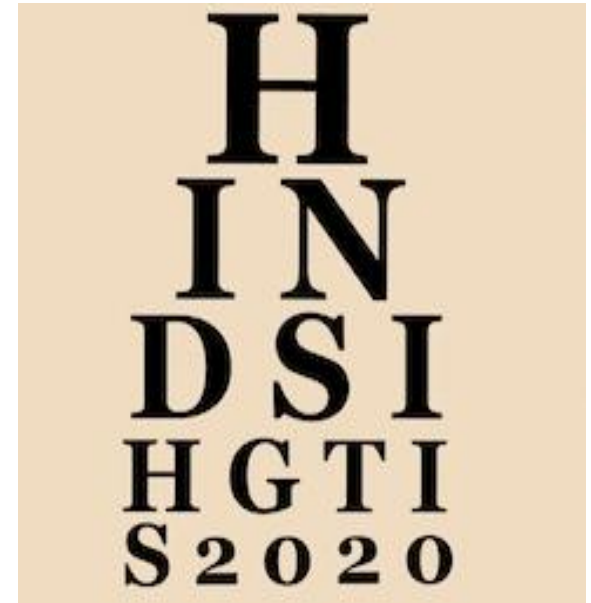
What structure did we use and why?

■ *Real Life Example*

- ❑ Run Through our Evaluation Process
- ❑ Method to Validate our tool

■ *Hind sight is always 20/20*

- ❑ Construction information used
- ❑ May not know all the details
- ❑ Must “think-thru” the process



How to Evaluate for ABC?



Two-Step Process

How to Evaluate for ABC?

***Pre-Concept
or
Master Plan***

How to Evaluate for ABC?

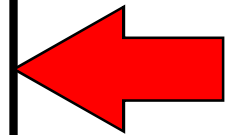
■ *Pre-Concept or Master Plan*

- ☐ Bridge Inspection
- ☐ Bridge Condition Report

■ *Determine Scope of Work*

- ☐ Bridge Rehabilitation, Culverts, Retaining Walls
 - No further ABC analysis required

- ☐ Bridge Replacement or Reconstruction
 - ABC DMT required



How to Evaluate for ABC?

***Collect
Project
Specific Data***

Fox River Bridge Example

■ STEP 1A - Collect Project Specific Data



Roadway Data

- Average Daily Traffic 108,590
- Tangent Alignment

Fox River Bridge Example

■ **STEP 1A - Collect Project Specific Data**

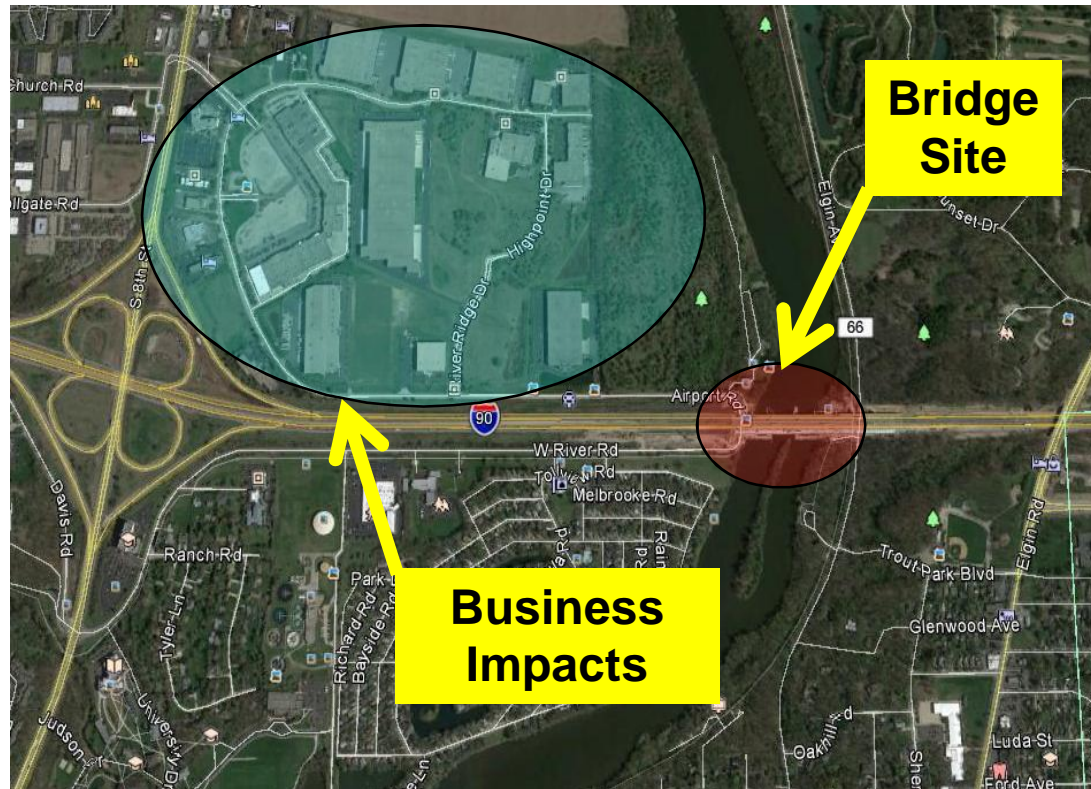


Waterway Data

- Fox River
- Navigable Waterway
- Does not carry commercial boat traffic

Fox River Bridge Example

■ STEP 1A - Collect Project Specific Data

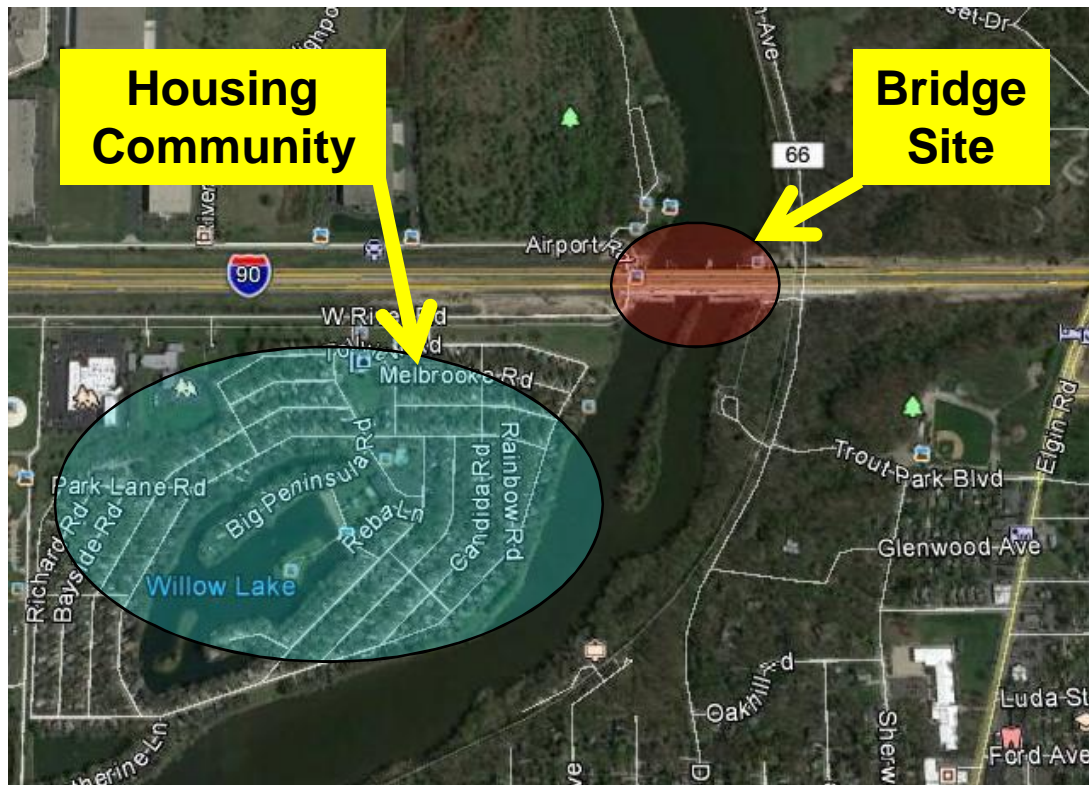


Economic Impacts

- Several businesses along Airport Road
- Access may be impacted during construction

Fox River Bridge Example

■ STEP 1A - Collect Project Specific Data

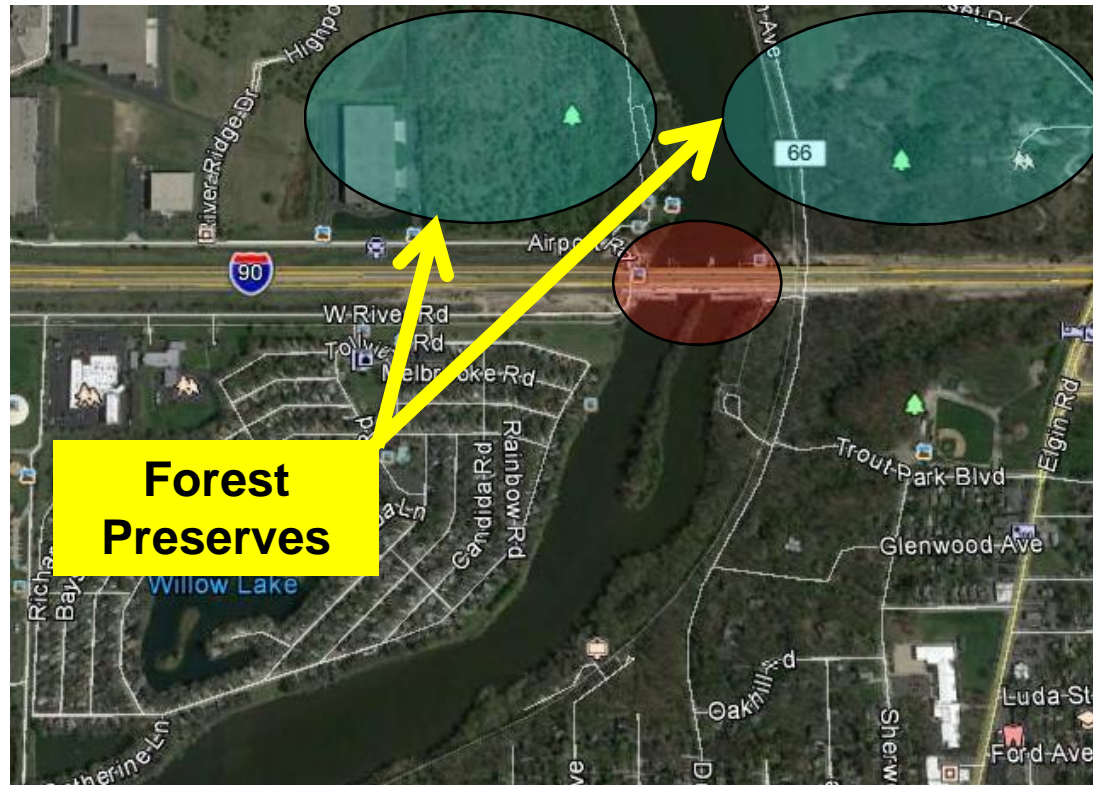


Environmental

- Noise Impacts
- Forest Preserve
- Nature Preserve
- Forested Fen

Fox River Bridge Example

■ STEP 1A - Collect Project Specific Data

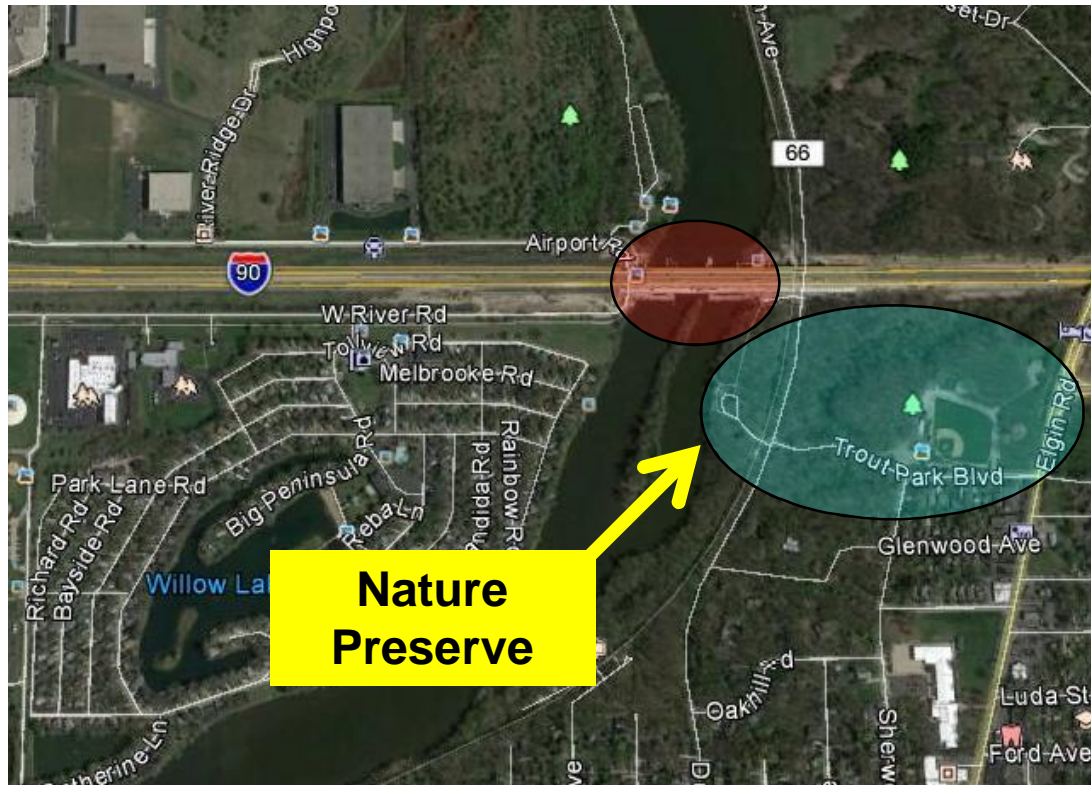


Environmental

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Fox River Bridge Example

■ STEP 1A - Collect Project Specific Data

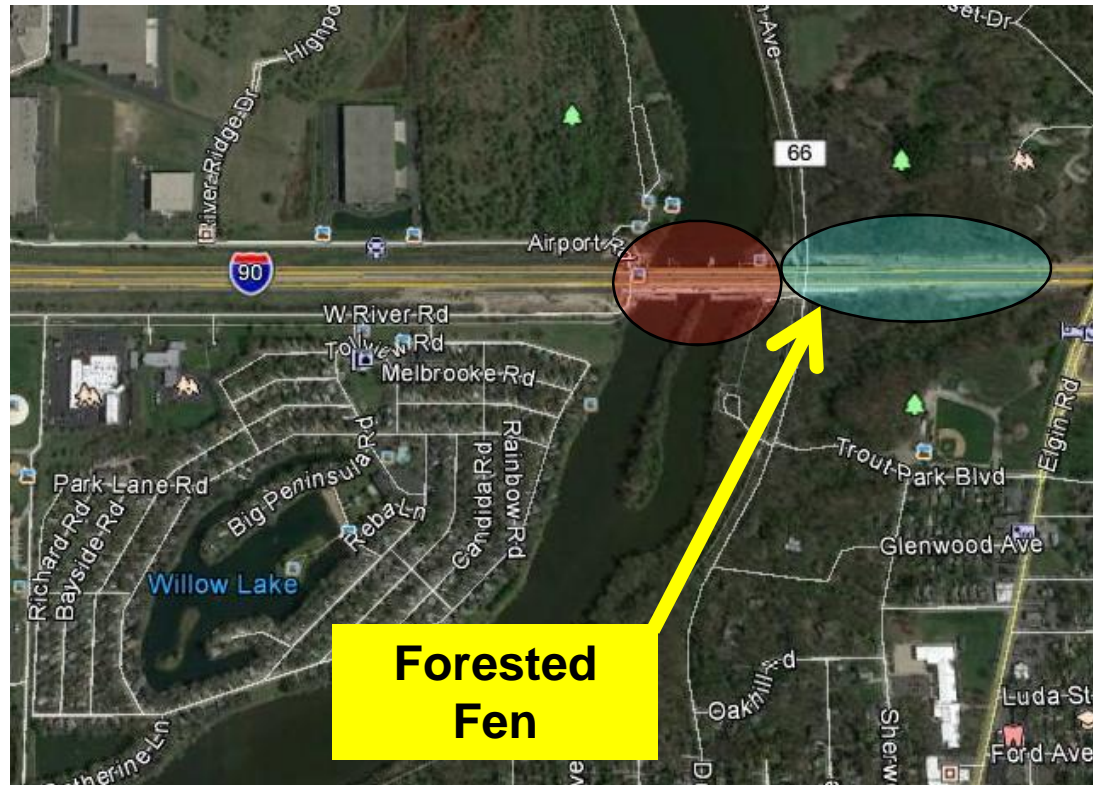


Environmental

- Noise Impacts
- Forest Preserve
- Nature Preserve
- Forested Fen

Fox River Bridge Example

■ STEP 1A - Collect Project Specific Data



Environmental

- Noise Impacts
- Forest Preserve
- Nature Preserve
- Forested Fen

Forested Fen



Fox River Bridge Example

■ **STEP 1A - Collect Project Specific Data**



Environmental

- **Spawning of River Redhorse Fish**
- Waterway opening limitations

Fox River Bridge Example

■ **STEP 1A - Collect Project Specific Data**



Environmental

- Spawning of River Redhorse Fish
- Waterway opening limitations

Fox River Bridge Example

■ STEP 1A - Collect Project Specific Data



Right-of-Way

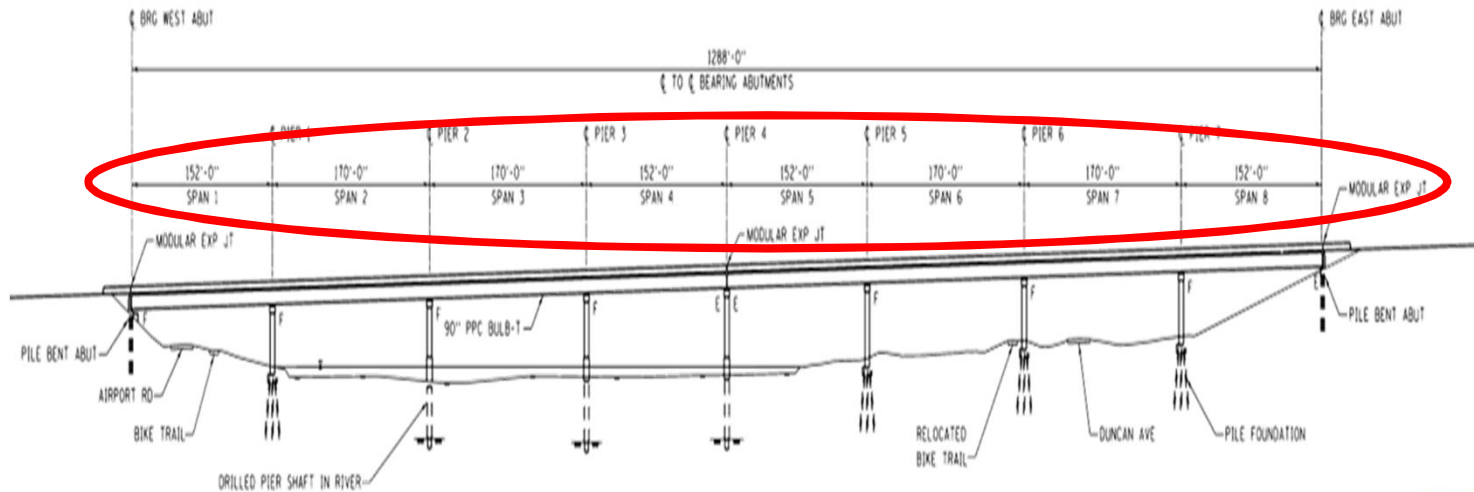
- ~~Right-of-Way for widening road~~
- Temporary Easement
- ROW for staging area and haul road

Fox River Bridge Example

■ STEP 1A - Collect Project Specific Data

• Proposed Structure/ Span Arrangement

- 8 span
- 8" CIP deck
- No skew
- 90" PPC Bulb T-Beams
- Multi-column bents on drilled shafts
- Stub abutments on multi-row steel piles



ELEVATION

Fox River Bridge Example

■ STEP 1A - Collect Project Specific Data

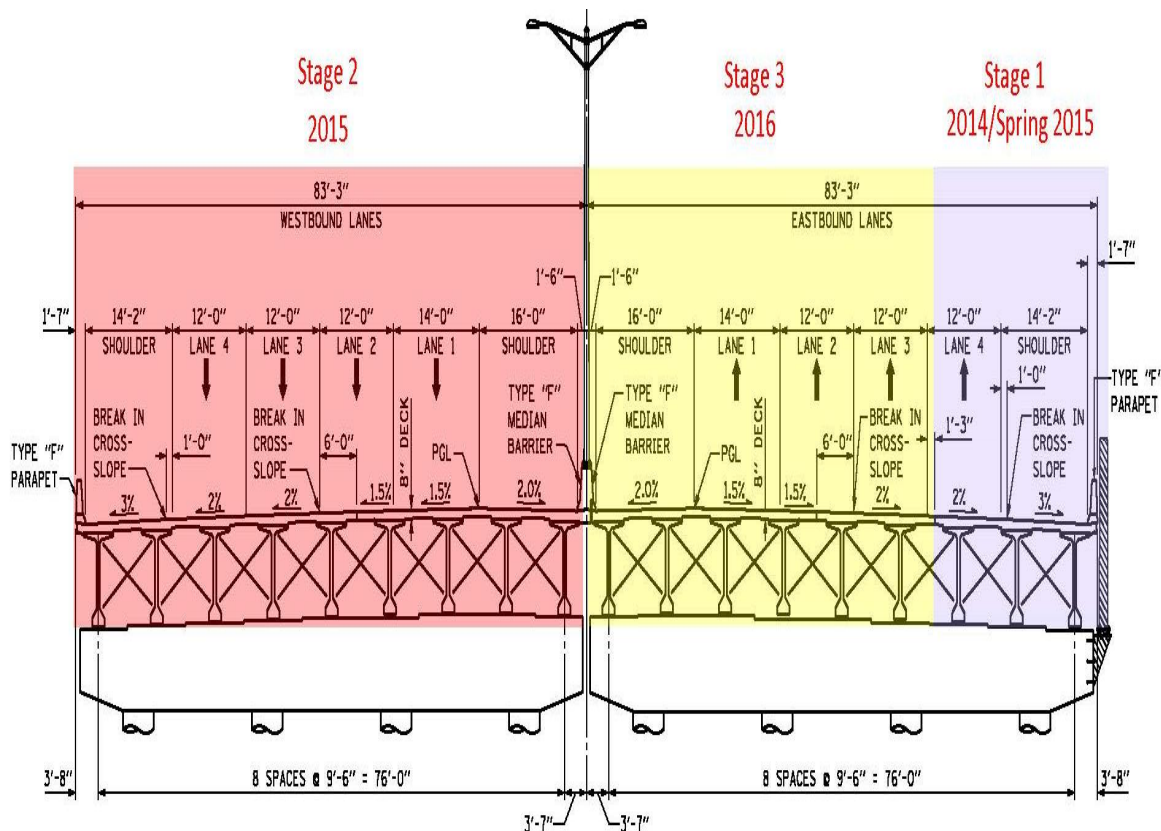


Staging

- **Pre-Stage to build piers under existing structure**
- **Conventional 3 stage Construction Scheme**

Fox River Bridge Example

STEP 1A - Collect Project Specific Data



Staging

- Pre-Stage to build piers under existing structure
- **Conventional 3 stage Construction Scheme**

How to Evaluate for ABC?

***Complete
ABC DMT***

How to Evaluate for ABC?

■ **STEP 1B - Complete ABC DMT**

■ *ABC Decision Matrix Tool*

- ❑ Use collected data to fill out tool
- ❑ Dual Structures only one ABC DMT
- ❑ Determines if the site and bridge are a good candidate for ABC

THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
ACCELERATED BRIDGE CONSTRUCTION (ABC) - DECISION MATRIX TOOL (DMT)

Prepared By: XX Prepared On: xxx/xx/xxxx
Checked By: XX Checked On: xxx/xx/xxxx
Bridge No.: XXXXX Mile Post: xx.xx
Location: XXXXX

ABC Rating Procedure December 2016

Note to User: Refer to Structure Design Manual Article 27.5.1 for general guidance on using this tool.

Average Daily Traffic (Combined over and under)	0	No traffic during construction
	1	Less than 20,000
	2	20,000 to 50,000
	3	50,001 to 100,000
	4	100,001 to 150,000
	5	More than 150,000
Traffic Impact (Based on Severity Index)	0	Least severe traffic impact
	1	More severe traffic impact than 0
	2	More severe traffic impact than 1
	3	More severe traffic impact than 2
	4	More severe traffic impact than 3
	5	Most severe traffic impact
Maintenance of Traffic	0	No impact
	1	Short duration with simple MOT
	2	Short duration with multiple staging
	3	Normal duration
	4	Long duration with simple MOT
	5	Long duration with multiple staging
Economic Impact	0	Low business impact
	3	Medium business impact
	5	High business impact
Bridge Classification	0	Typical bridge
	3	Essential bridge
	5	Critical bridge
Railroad/Waterway Impact	0	No railroad or minor railroad spur or no waterway
	3	One mainline railroad track or waterway
	5	Multiple mainline railroad tracks or waterway with commercial traffic
Environmental Impact	0	No impact
	1	Minimum impact
	3	Medium impact
	5	Maximum impact
Economy of Scale (Total number of spans)	0	1 span
	1	2 or 3 spans
	3	4 or 5 spans
	5	More than 5 spans
Use of Typical Details	0	Complex or unsymmetrical geometry
	3	Some complexity
	5	Simple, symmetrical geometry
Accessibility	0	Unfavorable site with no ROW available
	3	Favorable site with some ROW available
	5	Favorable site with plenty of ROW available

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10 Input Variables

- ☐ Average Daily Traffic
- ☐ Traffic Impact
- ☐ Maintenance of Traffic
- ☐ Economic Impact
- ☐ Bridge Classification
- ☐ Railroad/Waterway Impact
- ☐ Environmental Impact
- ☐ Economy of Scale
- ☐ Use of Typical Details
- ☐ Accessibility

THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
ACCELERATED BRIDGE CONSTRUCTION (ABC) - DECISION MATRIX TOOL (DMT)

Prepared By: XX Prepared On: XXXX/XXXX
Checked By: XX Checked On: XXXX/XXXX
Bridge No.: XXXXX Mile Post: XX.XX
Location: XXXXX

ABC Rating Procedure December 2016

Note to User: Refer to Structure Design Manual Article 27.3.1 for general guidance on using this tool.

Average Daily Traffic (Combined over and under)	<input type="text"/>	0 No traffic during construction 1 Less than 20,000 2 20,000 to 50,000 3 50,001 to 100,000 4 100,001 to 150,000 5 More than 150,000
Traffic Impact (Based on Severity Index)	<input type="text"/>	0 Least severe traffic impact 1 More severe traffic impact than 0 2 More severe traffic impact than 1 3 More severe traffic impact than 2 4 More severe traffic impact than 3 5 Most severe traffic impact
Maintenance of Traffic	<input type="text"/>	0 No impact 1 Short duration with simple MOT 2 Short duration with multiple staging 3 Normal duration 4 Long duration with simple MOT 5 Long duration with multiple staging
Economic Impact	<input type="text"/>	0 Low business impact 3 Medium business impact 5 High business impact
Bridge Classification	<input type="text"/>	0 Typical bridge 3 Essential bridge 5 Critical bridge
Railroad/Waterway Impact	<input type="text"/>	0 No railroad or minor railroad spur or no waterway 3 One mainline railroad track or waterway 5 Multiple mainline railroad tracks or waterway with commercial traffic
Environmental Impact	<input type="text"/>	0 No impact 1 Minimum impact 3 Medium impact 5 Maximum impact
Economy of Scale (Total number of spans)	<input type="text"/>	0 1 span 1 2 or 3 spans 3 4 or 5 spans 5 More than 5 spans
Use of Typical Details	<input type="text"/>	0 Complex or unsymmetrical geometry 3 Some complexity 5 Simple, symmetrical geometry
Accessibility	<input type="text"/>	0 Unfavorable site with no ROW available 3 Favorable site with some ROW available 5 Favorable site with plenty of ROW available

Page 1 of 2

ABC Decision Matrix Tool (DMT)

THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY ACCELERATED BRIDGE CONSTRUCTION (ABC) - DECISION MATRIX TOOL (DMT)

Prepared By	XX	Prepared On	xx/xx/xxxx
Checked By	XX	Checked On	xx/xx/xxxx
Bridge No.	XXXXX	Mile Post	xx.xx
Location	xxxxxx		



ABC Rating Procedure January 2017

Note to User: Refer to Structure Design Manual Article 27.3.1 for general guidance on using this tool.

Average Daily Traffic (Combined over and under)	<input type="text"/>	0	No traffic during construction
		1	Less than 20,000
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Traffic Impact (Based on Severity Index)	<input type="text"/>	0	Least severe traffic impact
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		4	More severe traffic impact than 3
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Maintenance of Traffic	<input type="text"/>	0	No impact
		1	Short duration with simple MOU
		2	Short duration with multiple MOU
		3	Normal duration
		4	Long duration with simple staging
		5	Long duration with multiple staging
Economic Impact	<input type="text"/>	0	No economic impact
		3	Low business impact
		5	High business impact
Bridge Classification	<input type="text"/>	0	Typical bridge
		3	Essential bridge
		5	Critical bridge

DMT Guidance Tab

Provides description and instructions for each variable

SDM 27.3.1

provides additional guidance on how to use tool

ABC Decision Matrix Tool (DMT)

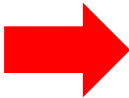
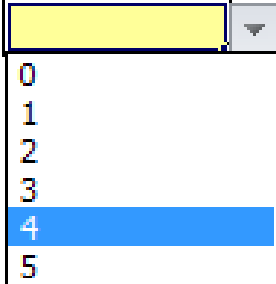
- *Jane Addams Memorial Tollway (I-90) over the Fox River dual structures*



ABC Decision Matrix Tool (DMT)

■ *Average Daily Traffic*

- Accounts for volume of traffic crossing the bridge site
- Include total over and under for all structure
- Dual structures = no need to use directional split
- Higher ADT values support the use of ABC

Average Daily Traffic (Combined over and under)			0	No traffic during construction
		1	1	Less than 20,000
		2	2	20,000 to 50,000
		3	3	50,001 to 100,000
		4	4	100,001 to 150,000
		5	5	More than 150,000

Fox River ADT = 108,590

ABC Decision Matrix Tool (DMT)

■ *Traffic Impact*

- Accounts for possibility of service disruptions from lane closures during construction
- Illinois Tollway Lane Closure Guide was tabulated
- Higher Severity Index scores support the use of ABC

Traffic Impact

(Based on Severity Index)

0
1
2
3
4
5

- | | |
|---|-----------------------------------|
| 0 | Least severe traffic impact |
| 1 | More severe traffic impact than 0 |
| 2 | More severe traffic impact than 1 |
| 3 | More severe traffic impact than 2 |
| 4 | More severe traffic impact than 3 |
| 5 | Most severe traffic impact |

ABC Decision Matrix Tool (DMT)

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Bridge No.	XXXXX	Mile Post	xx.xx
Location	xxxxxx		



ABC Rating Procedure January 2017

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**Use Severity Index Tab
to determine Score**

DMT DMT Guidance Decision Flow Chart **Severity Index**

ABC Decision Matrix Tool (DMT)

	A	B	C	D	E	F
1	Interstate	Direction	Segment	MP_From	MP_To	Severity_Weekday
2	88	E	US 30 West Terminus to IL 26 Ramps	44.2	54.4	3.0
3	88	E	IL 26 Ramps to IL 251	54.4	76.1	3.0
4		E	IL 251 to Interstate 39	76.1	78.5	3.0
5		E	Interstate 39 to Annie Glidden Rd	78.5	91.4	3.0
6		E	Annie Glidden Rd to DeKalb Oasis	91.4	93.3	3.0
7		E	DeKalb Oasis to Peace Rd	93.3	94.0	3.0
8		E	Peace Rd to Illinois 47	94.0	109.3	4.0
9		E	Illinois 47 to Illinois 56	109.3	113.8	4.0
10		E	Illinois 56 to Orchard Rd	113.8	114.4	2.0
11		E	Orchard Rd to Illinois 31 Ramps	114.4	116.8	2.0



**Sort by
Interstate**



**Sort by
Direction**



**Sort by
Milepost**

ABC Decision Matrix Tool (DMT)

D	E	F	G	H
MP_From ▾	MP_To ▾	Severity_Weekday ▾	Severity_Weekend ▾	Severity_Weekly ▾
44.2	54.4	3.0	3.0	3.0
54.4	76.1	3.0	3.0	3.0
76.1	78.5	3.0	3.0	3.0
78.5	91.4	3.0	3.0	3.0
91.4	93.3	3.0	3.0	3.0
93.3	94.0	3.0	3.0	3.0
94.0	109.3	4.0	4.0	4.0
109.3	113.8	4.0	4.0	4.0
113.8	114.4	2.0	2.0	2.0
114.4	116.8	2.0	2.0	2.0
116.8	119.2	3.0	2.0	3.0
119.2	121.4	3.0	2.0	3.0
121.4	123.3	4.0	3.0	3.0
123.3	125.2	2.0	1.0	2.0
125.2	127.4	2.0	1.0	2.0

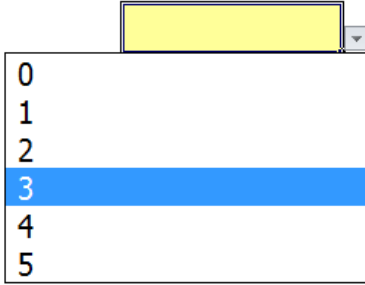


**Use Weekly
Severity**

ABC Decision Matrix Tool (DMT)

■ *Traffic Impact*

- Accounts for possibility of service disruptions from lane closures during construction
- Illinois Tollway Lane Closure Guide was tabulated
- **Higher Severity Index scores support the use of ABC**

Traffic Impact (Based on Severity Index)		0 Least severe traffic impact
		1 More severe traffic impact than 0
		2 More severe traffic impact than 1
		3 More severe traffic impact than 2
		4 More severe traffic impact than 3
		5 Most severe traffic impact

Fox River Severity Index = 3

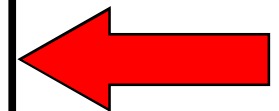
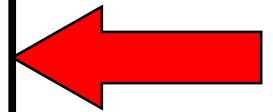
ABC Decision Matrix Tool (DMT)

■ *Maintenance of Traffic*

- Accounts for safety of workers and travelers
- Accounts for amount of time and cost of staging
- Longer Duration and higher cost staging support ABC

■ *Definitions*

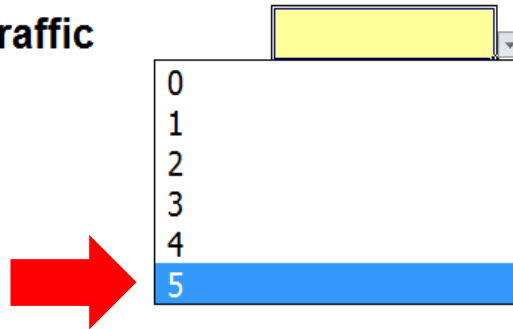
- Short Duration = 3 months or less
 - Normal Duration = between 3 and 9 months
 - Long Duration = greater than 9 months
-
- Simple MOT = 2 stages or less
 - Multiple Staging = more than 2 stages



ABC Decision Matrix Tool (DMT)

■ *Maintenance of Traffic*


Maintenance of Traffic



- | | |
|---|--------------------------------------|
| 0 | No impact |
| 1 | Short duration with simple MOT |
| 2 | Short duration with multiple staging |
| 3 | Normal duration |
| 4 | Long duration with simple MOT |
| 5 | Long duration with multiple staging |

■ *Fox River*


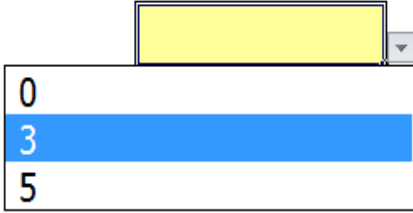
- Only include staging duration that affects MOT
 - ☐ Pre-Stage for Pier Construction = don't include

- 3 Stage Construction > 2 stages
 - 19 months > 9 months
- 

ABC Decision Matrix Tool (DMT)

■ *Economic Impact*

- Accounts for Negative Impact on local businesses
- Accounts for limited access for customers/employees
- Score is subjective
- Higher Business Impacts will support the use of ABC

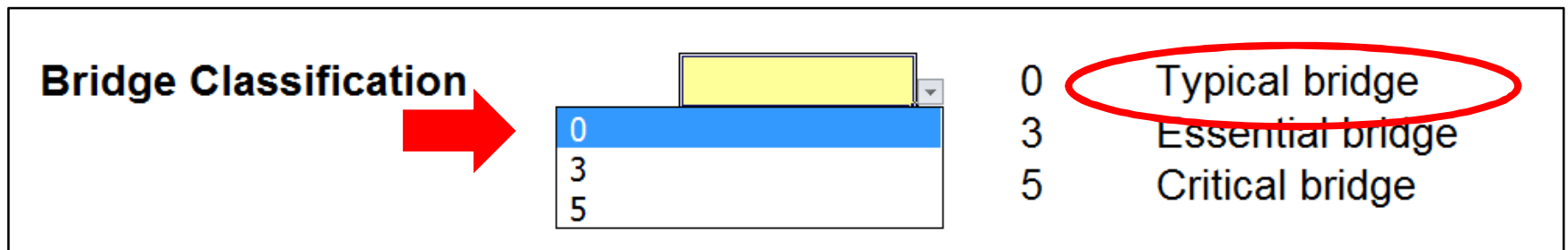
Economic Impact			0	Low business impact
			3	Medium business impact
			5	High business impact

Impact to business along Airport Road
Assume Medium Impact

ABC Decision Matrix Tool (DMT)

■ *Bridge Classification*

- Accounts for impacts to bridges along evacuation/military routes or that provide access for emergency vehicles
- Scores based on operational classifications in AASHTO Articles 1.3.5 and 3.10.5
- Essential or Critical will support the use of ABC

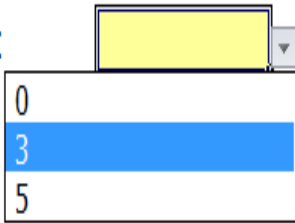


Operational Class = Typical

ABC Decision Matrix Tool (DMT)

■ *Railroad/Waterway Impact*

- Accounts for impacts to railroad or waterway traffic
- Accounts for impacts due to construction activities in waterways
- Structures that affect multiple mainline tracks or waterways with commercial traffic will support use of ABC

Railroad/Waterway Impact		0	No railroad or minor railroad spur or no waterway
		3	One mainline railroad track or waterway
		5	Multiple mainline railroad tracks or waterway with commercial traffic

Crosses one waterway

Does NOT carry commercial boat traffic

ABC Decision Matrix Tool (DMT)

■ *Environmental Impact*

- Accounts for impacts to the environment during construction
- Impacts to streams, lakes, endangered species, contaminated soils, wetlands, noise impacts, air impacts, natural resources etc.
- Score is subjective
- Structures with significant environmental impacts will support the use of ABC

ABC Decision Matrix Tool (DMT)

■ *Environmental Impact - Fox River*

- Noise impacts
- Nature Preserve
- Construction limitations in Fox River
- Forest Preserves
- Spawning fish
- Highly Sensitive forested fen (plant)

Environmental Impact

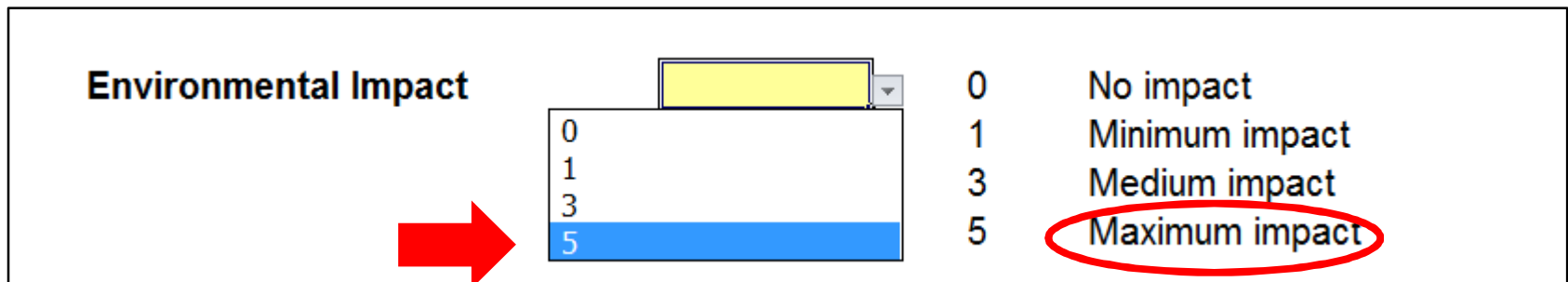
0 1 3 5

0 No impact

1 Minimum impact

3 Medium impact

5 Maximum impact

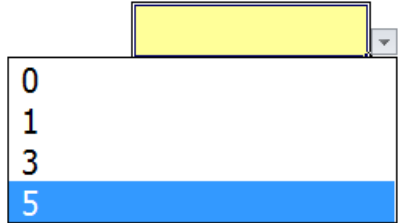


Maximum Environmental Impact

ABC Decision Matrix Tool (DMT)

■ *Economy of Scale*

- Accounts for potential cost savings by use of repetitive elements and operations.
- Structures with high potential for economies of scale will support ABC

Economy of Scale (Total number of spans)		0	1 span
		1	2 or 3 spans
		3	4 or 5 spans
		5	More than 5 spans

Proposed Structure = 8 span

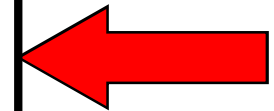
ABC Decision Matrix Tool (DMT)

■ *Use of Typical Details*

- Accounts for level of simplicity of details
- More symmetric/ simpler geometry can use standard details
- Structures that can utilize typical details will support ABC

■ *Definitions*

- Simple Geometry
 - ☐ Straight alignment
 - ☐ Parallel substructure elements
 - ☐ Bridge skews 10 degrees or less



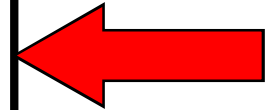
ABC Decision Matrix Tool (DMT)

■ *Use of Typical Details*

■ *Definitions*

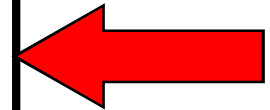
■ Some Complexity

- ☐ Varying deck width
- ☐ Curved structures
- ☐ Bridge Skews 11 to 29 degrees



■ Complex Geometry

- ☐ Unique framing plan
- ☐ Substructure not parallel
- ☐ Bridge Skews 30 degrees or greater



ABC Decision Matrix Tool (DMT)

■ *Use of Typical Details*

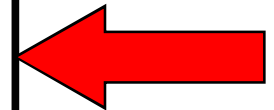
Use of Typical Details



- | | |
|---|-----------------------------------|
| 0 | Complex or unsymmetrical geometry |
| 3 | Some complexity |
| 5 | Simple, symmetrical geometry |

■ *Fox River*

- | | |
|-------------------------|-------------------------|
| ■ No curvature | ■ Substructure parallel |
| ■ No varying deck width | ■ No Skew |
| ■ Tangent alignment | |



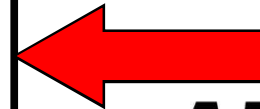
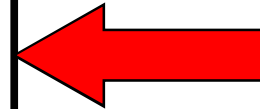
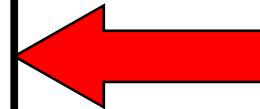
ABC Decision Matrix Tool (DMT)

■ *Accessibility*

- Accounts for area available to the Contractor to accommodate PBES near the construction site.
- Structures with high levels of accessibility will support the use of ABC.

■ *Definitions*

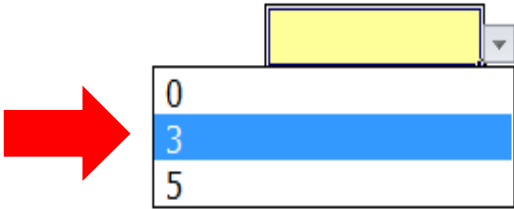
- | |
|--|
| ■ Plenty of ROW |
| □ Near interchanges or large infield areas |
| ■ Some ROW |
| □ Available area along approaches |
| ■ No ROW |
| □ Near railroad or waterways |



ABC Decision Matrix Tool (DMT)

■ *Accessibility*

Accessibility



0	Unfavorable site with no ROW available
3	Favorable site with some ROW available
5	Favorable site with plenty of ROW available

■ *Fox River*

- Open areas along the approaches available for laydown areas and fabrication

ABC Decision Matrix Tool (DMT)

ABC RATING SCORE: VARIABLES AND WEIGHTS					
Variable	Score	Weight Factor	Adjusted Score	Maximum Score	Adjusted Score
Average Daily Traffic	4	10	40	5	50
Traffic Impact	3	15	45	5	75
Maintenance of Traffic	5	10	50	5	50
Economic Impact	3	5	15	5	25
Bridge Classification	0	3	0	5	15
Railroad/Waterway Impact	3	5	15	5	25
Environmental Impact	5	3	15	5	15
Economy of Scale	5	3	15	5	15
Use of Typical Details	5	3	15	5	15
Accessibility	3	5	15	5	25
Total Score			225	Max. Score	310

ABC Rating Score: 73

Input Score
Summary

ABC Decision Matrix Tool (DMT)

ABC RATING SCORE: VARIABLES AND WEIGHTS					
Variable	Score	Weight Factor	Adjusted Score	Maximum Score	Adjusted Score
Average Daily Traffic	4	10	40	5	50
Traffic Impact	3	15	45	5	75
Maintenance of Traffic	5	10	50	5	50
Economic Impact	3	5	15	5	25
Bridge Classification	0	3	0	5	15
Railroad/Waterway Impact	3	5	15	5	25
Environmental Impact	5	3	15	5	15
Economy of Scale	3	3	15	5	15
Use of Typical Details	3	3	15	5	15
Accessibility	3	5	15	5	25
Total Score			225	Max. Score	310

Scores are weighted

ABC Rating Score: 73

ABC Decision Matrix Tool (DMT)

ABC RATING SCORE: VARIABLES AND WEIGHTS					
Variable	Score	Weight Factor	Adjusted Score	Maximum Score	Adjusted Score
Average Daily Traffic	4	10	40	5	50
Traffic Impact	3	15	45	5	75
Maintenance of Traffic	5	10	50	5	50
Economic Impact	3	5	15	5	25
Bridge Classification	0	3	0	5	15
Railroad/Waterway Impact	3	5	15	5	25
Environmental Impact	5	3	15	5	15
Economy of Scale	5	3	15	5	15
Use of Typical Details	5	3	15	5	15
Accessibility	3	5	15	5	25
	Total Score		225	Max. Score	310

Use to enter
Decision Flow
Chart

ABC Rating Score: 73

ABC Decision Matrix Tool (DMT)

THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY ACCELERATED BRIDGE CONSTRUCTION (ABC) - DECISION MATRIX TOOL (DMT)

Prepared By	XX	Prepared On	xx/xx/xxxx
Checked By	XX	Checked On	xx/xx/xxxx
Bridge No.	XXXXX	Mile Post	xx.xx
Location	xxxxxx		



ABC Rating Procedure

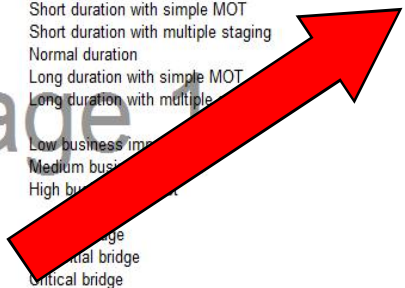
January 2017

Note to User: Refer to Structure Design Manual Article 27.3.1 for general guidance on using this tool.

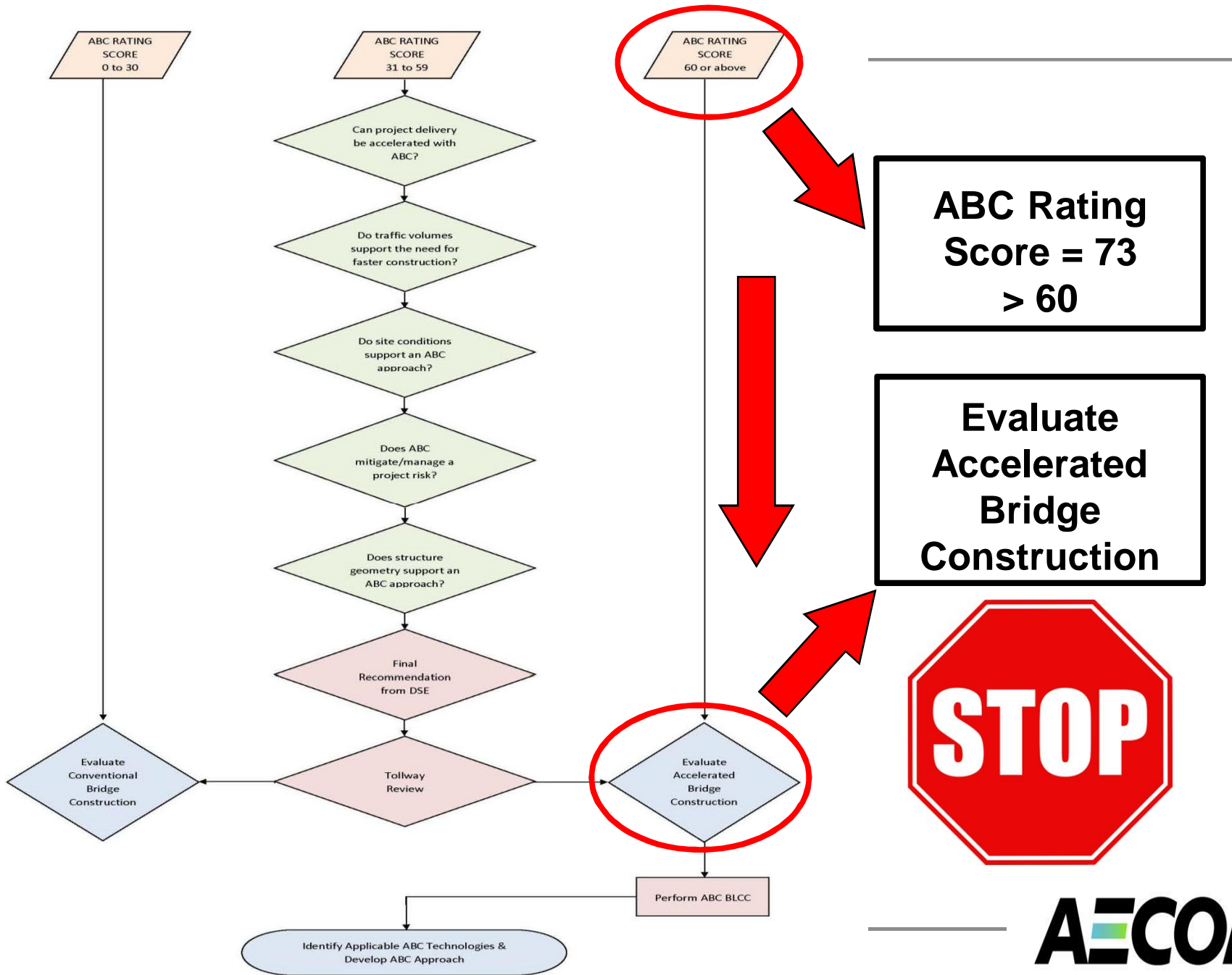
Average Daily Traffic (Combined over and under)	<input type="text"/>	0 No traffic during construction 1 Less than 20,000 2 20,000 to 50,000 3 50,001 to 100,000 4 100,001 to 150,000 5 More than 150,000
Traffic Impact (Based on Severity Index)	<input type="text"/>	0 Least severe traffic impact 1 More severe traffic impact than 0 2 More severe traffic impact than 1 3 More severe traffic impact than 2 4 More severe traffic impact than 3 5 Most severe traffic impact
Maintenance of Traffic	<input type="text"/>	0 No impact 1 Short duration with simple MOT 2 Short duration with multiple staging 3 Normal duration 4 Long duration with simple MOT 5 Long duration with multiple
Economic Impact	<input type="text"/>	0 Low business impact 3 Medium business impact 5 High business impact
Bridge Classification	<input type="text"/>	0 Minor bridge 3 Major bridge 5 Critical bridge

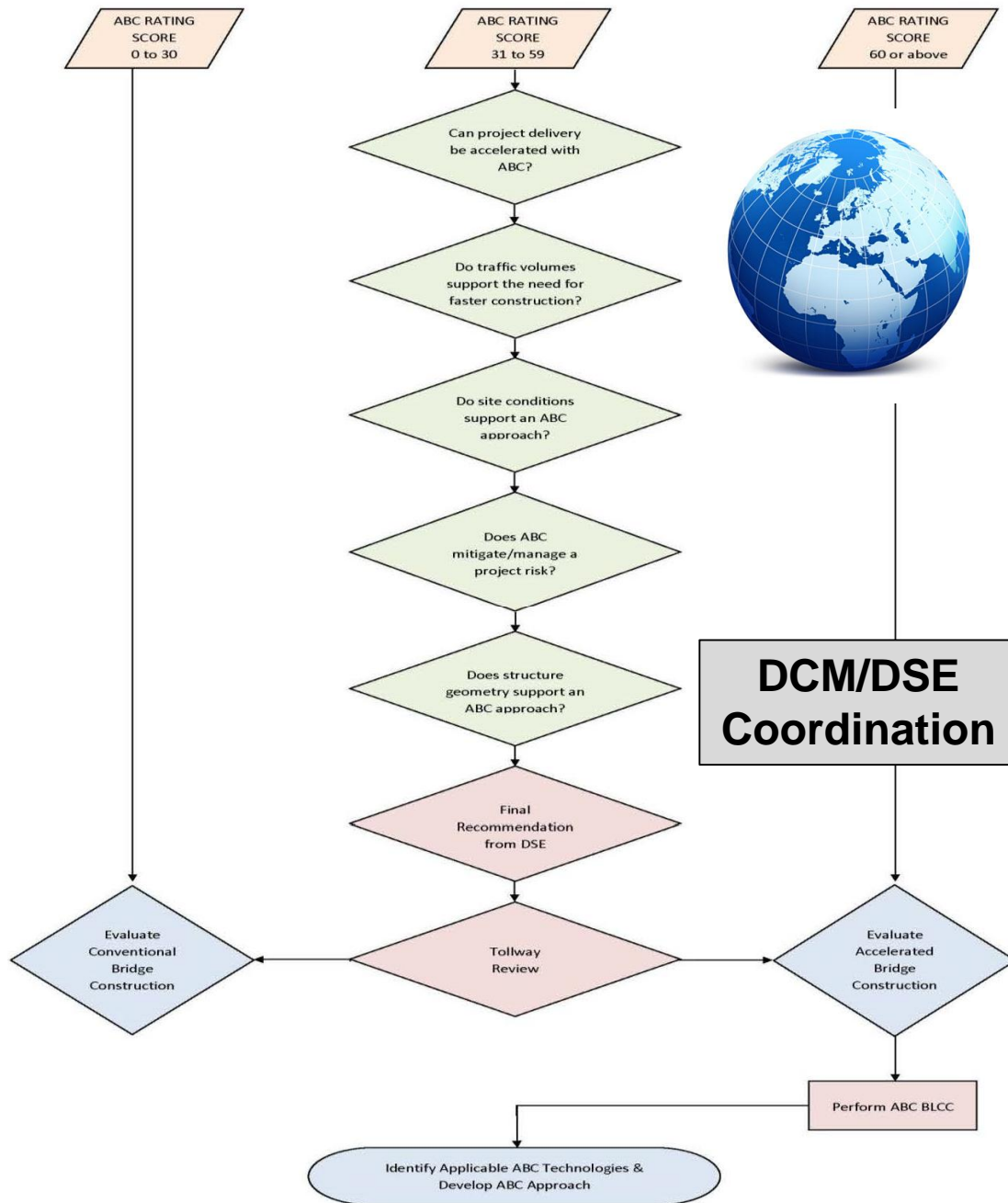
Decision Flow Chart Tab

Helps guide recommendation
based on ABC Rating Score



DMT DMT Guidance **Decision Flow Chart** Severity Index





- Take a step back
- Evaluate structure from a Global project perspective
- Does use of ABC really provide a benefit to the project will all project specific information considered
- If project contains multiple structures within a corridor – take into consideration overall project delivery and MOT



ABC Decision Matrix Tool (DMT)

■ *Provide Final Recommendation*

- Include in Master Plan Study
- If no Master Plan => Technical Memo

■ *Items to include*

- ☑ Completed ABC DMT
- ☑ Supporting Material
- ☑ Justification

■ *Normal Tollway Review Process*

■ *Disposition of Comments*

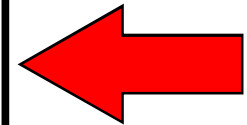
ABC Decision Matrix Tool (DMT)

■ *Justification – Fox River Bridge*

- Not a corridor and no additional structure work

■ High Scores Support that use of ABC

- ☐ High ADT
- ☐ Long MOT with Multiple Stages
- ☐ High Environmental Impact
- ☐ High Potential for Economy of Scale
- ☐ Simple Geometry
- ☐ Some ROW available

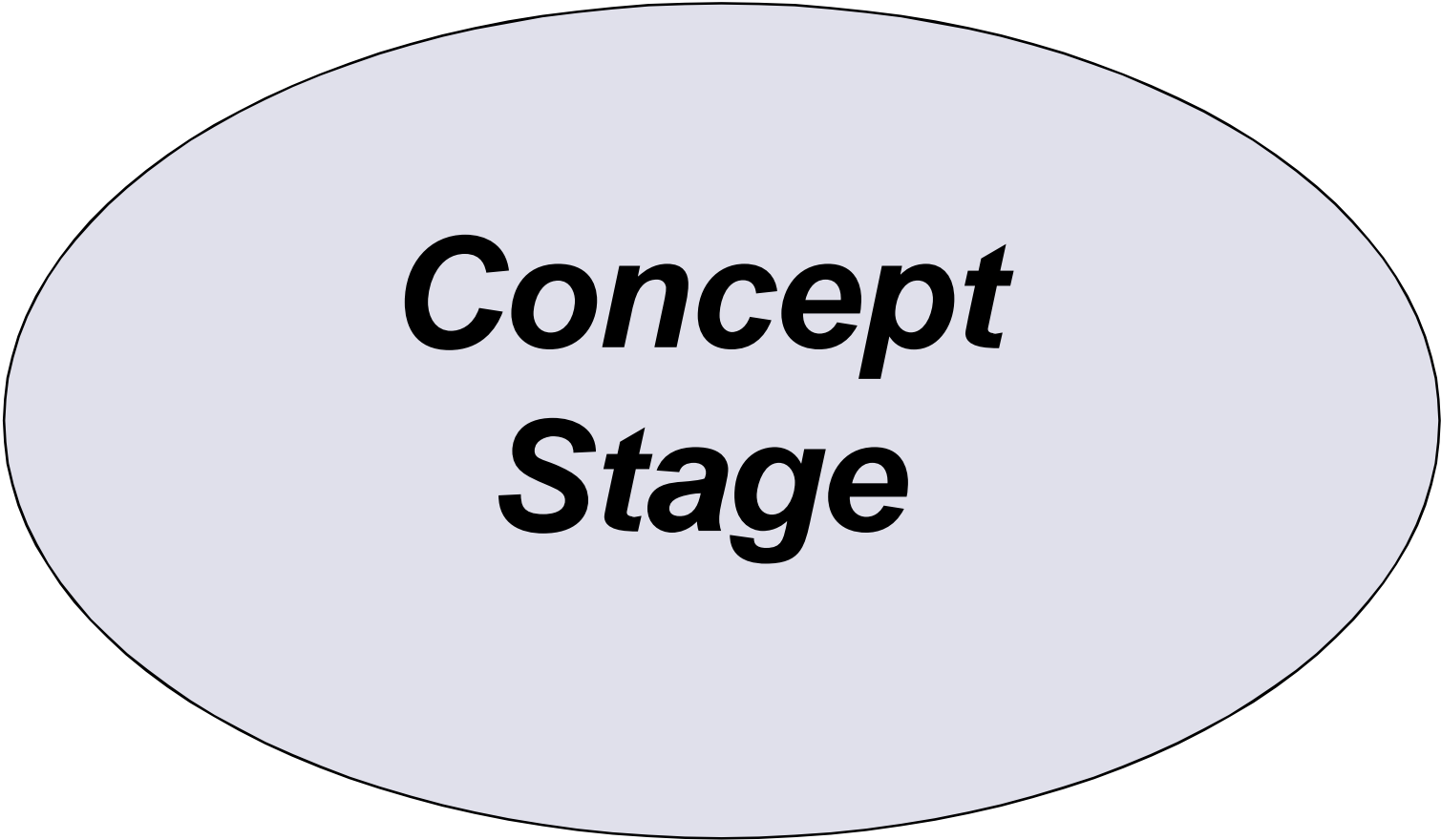


Evaluate Accelerated Bridge Construction

Everyone still with me?



How to Evaluate for ABC?



***Concept
Stage***

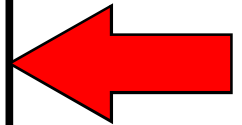
How to Evaluate for ABC?

■ **STEP 2 - Complete ABC BLCC Tool**

■ *Recommendation from Previous Step*

- ☐ Evaluate Conventional Construction
 - No further ABC analysis required

- ☐ Evaluate Accelerated Bridge Construction
 - ABC BLCC Tool required



How to Evaluate for ABC?

■ **STEP 2 - Complete ABC BLCC Tool**

■ *ABC BLCC Tool*

- Helps compare and eliminate potential ABC technologies based on economic efficiency
- DSE identifies applicable ABC Technologies to compare

THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
ACCELERATED BRIDGE CONSTRUCTION (ABC) - BRIDGE LIFE CYCLE COMPARISON (BLCC) TOOL

Prepared By: XXX
Checked By: XXX
Bridge No.: XXXXX
Location: XXXXX
ABC BLCC Tool

Prepared On: XX/XX/XXXX
Checked On: XX/XX/XXXX
Mile Post: XX.XX
December 2010

Note to User: Refer to Structure Design Manual Article 27.3.2 for general guidance on using this tool.

INDIVIDUAL ABC BLCC RATING SCORE INPUT

INITIAL COSTS (\$)

Total Labor (On-Site and Off-Site)	1	Estimated construction time >= 18 months
	2	13 months <= Estimated construction time < 18 months
	3	8 months <= Estimated construction time < 13 months
	4	3 months <= Estimated construction time < 8 months
	5	Estimated construction time < 3 months
Deck Material	1	Deck type is cast-in-place concrete
	2	Deck type is precast concrete panels
Superstructure Material	1	Superstructure type is cast-in-place concrete
	2	Superstructure type is precast concrete or steel
Substructure Material	1	Substructure type is cast-in-place concrete
	2	Substructure type is precast concrete
Equipment	1	Self-Propelled Modular Transport equipment required
	2	Bridge Slab-in equipment required
	3	Spreadery Crane Based equipment required
	4	Premanufactured Bridge Element system or Longitudinal Launch required
	5	Typical cast-in-place conventional construction equipment required
Agency Costs	1	Extensive agency coordination
	2	Moderate agency coordination
	3	Normal agency coordination
Right-of-Way	1	Required R.O.W. acquisition > 1 acre
	2	0.5 acres < Required R.O.W. acquisition <= 1 acre
	3	0.25 acres < Required R.O.W. acquisition <= 0.5 acres
	4	0 acres < Required R.O.W. acquisition <= 0.25 acres
	5	Required R.O.W. acquisition < 0 acres
Environmental Impact Costs	1	Maximum impact
	2	Medium impact
	3	Minimum impact
	4	No impact

Page 1 of 4

How to Evaluate for ABC?

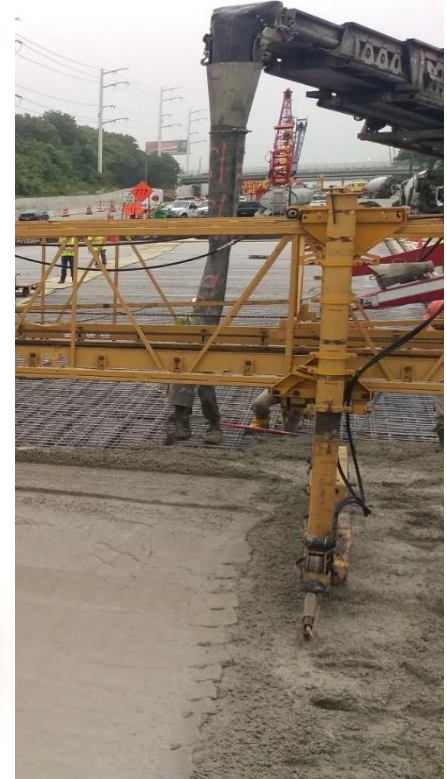
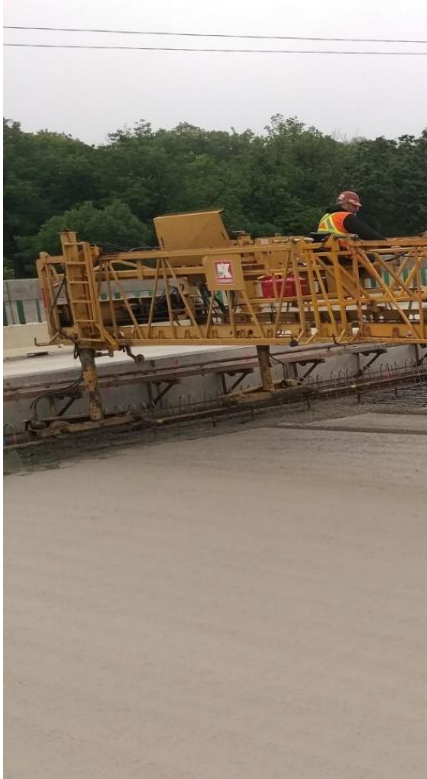
***Determine
Bridge
Alternatives***

How to Evaluate for ABC?

- **Determine Applicable ABC Technologies**
- *ABC Technologies = Bridge Alternatives*
 - Individual or combination of ABC Technologies
 - No upper limit on number of bridge alternatives
 - Based on engineering judgment

Structures with IGA = must coordinate allowable technologies with Local Agencies

How to Evaluate for ABC?



**MUST ALWAYS INCLUDE CONVENTIONAL
CONSTRUCTION BRIDGE ALTERNATIVE**

How to Evaluate for ABC?

- **Determine Applicable ABC Technologies**



How to Evaluate for ABC?

■ *Section 27.0 Accelerated Bridge Construction*

☐ 27.4 ABC Technologies

- ☐ 27.4.1 Prefabricated Bridge Elements and Systems
- ☐ 27.4.2 ABC Materials
- ☐ 27.4.3 ABC Connections

☐ 27.4.4 Installation Methods

- ☐ 27.4.4.1 Lateral Sliding
- ☐ 27.4.4.2 SPMT
- ☐ 27.4.4.3 Longitudinal Launches
- ☐ 27.4.4.4 Crane Based Projects

27.6 ABC References

Key References
Publications
Websites

How to Evaluate for ABC?

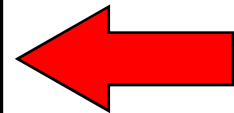
- *Jane Addams Memorial Tollway (I-90) over the Fox River dual structures*



How to Evaluate for ABC?

■ *Fox River Bridge Alternatives*

- ☐ High Potential for Economy of Scale
- ☐ Simple Geometry
- ☐ Potential Use of Repetitive Details
- ☐ Available Staging Areas
- ☐ Piers built in waterway = impacts



Consider Prefabricated Bridge Elements
and Systems

How to Evaluate for ABC?



Precast Deck Panels

How to Evaluate for ABC?

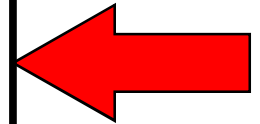


Precast Substructure Units

How to Evaluate for ABC?

■ *Fox River Bridge Alternatives*

- ❑ Over waterway and valley
- ❑ Top down construction to help avoid environmental impacts
 - Fox River
 - Forest Preserves
 - Nature Preserves
 - Forested Fen



Consider Bridge Installation Methods

How to Evaluate for ABC?

■ *Fox River Bridge Alternatives*

■ Lateral Slide-in

- ☐ Tall Temporary Piers in Waterway
- ☐ Extended Construction in River



■ SPMT

- ☐ Requires structure raise over 30 feet



How to Evaluate for ABC?



Longitudinal Launching

How to Evaluate for ABC?



Crane Based – Gantry Crane

ABC BLCC TOOL – BRIDGE ALTERNATIVES

	Bridge Alt #1	Bridge Alt #2	Bridge Alt #3	Bridge Alt #4	Bridge Alt #5
Construction Type	Conventional	ABC	ABC	ABC	ABC
Deck	CIP	CIP	CIP	Precast	CIP
Super	Precast	Precast	Precast	Precast	Precast
Sub	CIP	CIP	PBES	PBES	CIP
Method	Conventional	Long Launch	Conventional	Conventional	Crane Based

How to Evaluate for ABC?

■ *Fox River Bridge Alternatives*

■ Unlimited number of Alternatives

- ☐ For ease of use = limited example to 5
- ☐ Could have other combinations of ABC Technologies

■ Only precast superstructure was considered

- ☐ Steel could be considered as well

■ Complete jurisdiction of Tollway

- ☐ No coordination with local agency required

How to Evaluate for ABC?

***Complete
ABC BLCC
Tool***

How to Evaluate for ABC?

■ **STEP 2 - Complete ABC BLCC Tool**

■ *Bridge Life Cycle Comparison Tool*

- Does not capture actual Life Cycle Costs
- Used to compare and eliminate ABC technologies
- Input Data for multiple variables in 3 Major Categories

THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
ACCELERATED BRIDGE CONSTRUCTION (ABC) - BRIDGE LIFE CYCLE COMPARISON (BLCC) TOOL

Prepared By: JCE
Checked By: JCE
Bridge No.: XXXXX
Location: XXXXX
Prepared On: XXX/XXX/XX
Checked On: XXX/XXX/XX
Mile Post: XX.XX
ABC BLCC Tool: XXXXX
December 2010

Notes to User: Refer to Structure Design Manual Article 27.3.2 for general guidance on using this tool.

INDIVIDUAL ABC BLCC RATING SCORE INPUT

INITIAL COSTS (\$)	
Total Labor (On-Site and Off-Site)	1. Estimated construction time >= 18 months 2. 13 months <= Estimated construction time < 18 months 3. 8 months <= Estimated construction time < 13 months 4. 3 months <= Estimated construction time < 8 months 5. Estimated construction time < 3 months
Deck Material	1. Deck type is cast-in-place concrete 2. Deck type is precast concrete panels
Superstructure Material	1. Superstructure type is cast-in-place concrete 2. Superstructure type is precast concrete or steel
Substructure Material	1. Substructure type is cast-in-place concrete 2. Substructure type is precast concrete
Equipment	1. Self-Propelled Modular Transport equipment required 2. Bridge Slab in equipment required 3. Specialty Crane Based equipment required 4. Prefabricated Bridge Element System or Longitudinal Launch required 5. Typical cast-in-place concrete/steel construction equipment required
Agency Costs	1. Extensive agency coordination 2. Moderate agency coordination 3. Normal agency coordination
Right-of-Way	1. Required R.O.W. acquisition < 1 acre 2. 0.5 acres <= Required R.O.W. acquisition <= 1 acre 3. 0.25 acres <= Required R.O.W. acquisition <= 0.5 acres 4. 0.1 acres <= Required R.O.W. acquisition <= 0.25 acres 5. Required R.O.W. acquisition < 0.1 acres
Environmental Impact Costs	1. Maximum impact 2. Medium impact 3. Minimum impact 4. No impact

Page 1 of 4

How to Evaluate for ABC?

■ STEP 2 - Complete ABC BLCC Tool

■ *Bridge Life Cycle Comparison Tool*

- Automatically calculates an ABC Rating Score

Total ABC BLCC Rating Score					
	Alt #1	Alt #2	Alt #3	Alt #4	Alt #5
Initial Costs (IC)					
Traffic Impact Costs (TIC)					
Maintenance Costs (MC)					
Total ABC BLCC Rating Score	0	0	0	0	0



Individual Category
Rating Scores

How to Evaluate for ABC?

■ STEP 2 - Complete ABC BLCC Tool

■ *Bridge Life Cycle Comparison Tool*

- Automatically calculates an ABC Rating Score

Total ABC BLCC Rating Score					
	Alt #1	Alt #2	Alt #3	Alt #4	Alt #5
Initial Costs (IC)					
Traffic Impact Costs (TIC)					
Maintenance Costs (MC)					
Total ABC BLCC Rating Score	0	0	0	0	0



Total BLCC
Rating Scores

How to Evaluate for ABC?

■ **STEP 2 - Complete ABC BLCC Tool**

■ *Bridge Life Cycle Comparison Tool*

- ❑ Higher Scores represent a more economical choice
- ❑ Tool makes assumptions about costs and service life
- ❑ DSE may adjust scores if project data disagrees with assumptions

THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
ACCELERATED BRIDGE CONSTRUCTION (ABC) - BRIDGE LIFE CYCLE COMPARISON (BLCC) TOOL

Prepared By: JCE Checked By: JCE/KK/KK/KK Date: 12/15/10
Bridge No.: 00000 Mile Post: 10.00
Location: 000000 Date: 12/15/10

ABC BLCC Tool December 2010

Notes to User: Refer to Structure Design Manual Article 27.3.2 for general guidance on using this tool.

INDIVIDUAL ABC BLCC RATING SCORE INPUT

INITIAL COSTS (\$)	
Total Labor (On-Site and Off-Site)	1. Estimated construction time >= 18 months 2. 13 months <= Estimated construction time < 18 months 3. 8 months <= Estimated construction time < 13 months 4. 3 months <= Estimated construction time < 8 months 5. Estimated construction time < 3 months
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Agency Costs	1. Extensive agency coordination 2. Moderate agency coordination 3. Normal agency coordination
Right-of-Way	1. Required R.O.W. acquisition < 1 acre 2. 0.5 acres <= Required R.O.W. acquisition <= 1 acre 3. 0.25 acres <= Required R.O.W. acquisition <= 0.5 acres 4. 0.1 acres <= Required R.O.W. acquisition <= 0.25 acres 5. Required R.O.W. acquisition < 0.1 acres
Environmental Impact Costs	1. Maximum impact 2. Medium impact 3. Minimum impact 4. No impact

Page 1 of 4

How to Evaluate for ABC?

■ **STEP 2 - Complete ABC BLCC Tool**

■ *Bridge Life Cycle Comparison Tool*

❑ Use Bridge Alternative Data to fill out tool

❑ **Separate Tool required for each Bridge Alternative**

The screenshot shows the 'THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY' logo and the title 'ACCELERATED BRIDGE CONSTRUCTION (ABC) - BRIDGE LIFE CYCLE COMPARISON (BLCC) TOOL'. Below the title, there are fields for 'Prepared By', 'Checked By', 'Bridge No.', 'Location', 'Prepared On', 'Checked On', and 'Mile Post'. The 'ABC BLCC Tool' is dated December 2010. A note at the bottom states: 'Note to User: Refer to Structure Design Manual Article 27.3.2 for general guidance on using this tool.'

The main section is titled 'INDIVIDUAL ABC BLCC RATING SCORE INPUT' and contains a table with two columns: 'INITIAL COSTS (\$)' and 'RATING'. The table lists various bridge components and their associated costs and ratings.

INITIAL COSTS (\$)	RATING
Total Labor (On-Site and Off-Site)	1
Deck Material	2
Superstructure Material	3
Substructure Material	4
Equipment	5
Agency Costs	6
Right-of-Way	7
Environmental Impact Costs	8

Page 1 of 4

3 Major Categories

■ *Initial Costs (IC)*

❑ Direct Costs associated with Construction

❑ Input Variables:

- Total Labor
- Deck Material
- Superstructure Material
- Substructure Material
- Equipment
- Agency Costs
- Right-of-Way
- Environmental Impact Cost

**Does not
Capture
Actual Costs**

3 Major Categories

■ *Traffic Impact Costs (TIC)*

- Indirect Costs associated with traffic impact

- Input Variables:

- Maintenance of Traffic Costs
- Economic Impacts
- Railroad/Waterway Impacts

Does not capture service disruptions (including traveler delay or revenue impacts)

Additional Analysis may be required at the request of the Tollway (Traffic Analysis study)

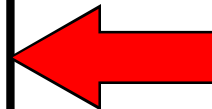
3 Major Categories

■ *Maintenance Costs (MC)*

❑ Costs for Maintenance and Future Replacement

❑ Input Variables

- Maintenance / Rehabilitation Life Cycle Costs
- Cost of Repair
- Total Replacement Costs
- Future Traffic Impact for Routine Maintenance
- Future Traffic Impact for Rehab/Replace
- Joint Durability
- Unforeseen Performance
- Salvage Value



Does not capture LCCA costs

Bridge Life Cycle Comparison Tool

THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
ACCELERATED BRIDGE CONSTRUCTION (ABC) - BRIDGE LIFE CYCLE COMPARISON (BLCC) TOOL

Prepared By XX Prepared On xx/xx/xxxx
Checked By XX Checked On xx/xx/xxxx
Bridge No. XXXXX Mile Post xx.xx
Location xxxxxx

ABC BLCC Tool December

Note to User: Refer to Structure Design Manual Article 27.3.2 for general guidance on using this tool.

INDIVIDUAL ABC BLCC RATING SCORE INPUT

INITIAL COSTS (IC)

Total Labor (On-Site and Off-Site)	<input type="text"/>	1	Estimated construction time >= 18 months
		2	13 months <= Estimated construction time < 18 months
		3	8 months <= Estimated construction time < 13 months
		4	3 months <= Estimated construction time < 8 months
		5	Estimated construction time < 3 months
Deck Material	<input type="text"/>	1	Deck type is cast-in-place concrete
		2	Deck type is precast concrete
Superstructure Material	<input type="text"/>	1	Superstructure type is cast-in-place concrete
		2	Superstructure type is precast concrete or steel
Substructure Material	<input type="text"/>	1	Substructure type is cast-in-place concrete
		2	Substructure type is precast concrete
Equipment	<input type="text"/>	1	Propelled Modular Transport equipment required
		2	Bridge Slide-In equipment required
		3	Specialty Crane Based equipment required
		4	Prefabricated Bridge Element System or Longitudinal Launch required
		5	Typical cast-in-place concrete/steel construction equipment required
Agency Costs	<input type="text"/>	1	Extensive agency coordination
		2	Moderate agency coordination

Summary BLCC BLCC Guidance

BLCC Guidance Tab
Provides description
and instructions for
each variable

SDM 27.3.2
provides additional
guidance on how to
use tool

Bridge Life Cycle Comparison Tool

■ *Input Variables*

- ☐ Majority are Self-Explanatory
- ☐ Input directly related to the Bridge Alternatives previously identified
- ☐ Example only reviews variables that need further explanation
- ☐ Example explains how to adjust scoring based on assumptions for ABC Technologies

Bridge Life Cycle Comparison Tool

- *Jane Addams Memorial Tollway (I-90) over the Fox River dual structures*



ABC BLCC TOOL INPUT – INITIAL COST (IC)

	<div>Conventional</div> Bridge #1	<div>Long Launch</div> Bridge #2	<div>PBES Sub</div> Bridge #3	<div>PBES Deck</div> Bridge #4	<div>Gantry Crane</div> Bridge #5
Total Labor Duration	> 18 months	btwn 13 and 18 months	btwn 13 and 18 months	btwn 13 and 18 months	btwn 13 and 18 months
Deck	CIP	CIP	CIP	Precast	CIP
Super	Precast	Precast	Precast	Precast	Precast
Sub	CIP	CIP	Precast	Precast	CIP
Equipment	Typ CIP	Long Launch	PBES	PBES	Gantry Crane
Agency Costs	Normal	Extensive	Moderate	Extensive	Moderate
ROW	btwn 0.5 and 1.0 acres	btwn 0.5 and 1.0 acres	> 1.0 acre	> 1.0 acre	btwn 0.5 and 1.0 acres
Environmental Impacts	Maximum	Maximum	Medium	Medium	Medium

Bridge Life Cycle Comparison Tool

■ *Total Labor*

- Accounts for both on-site and off-site labor costs
- Projects that require longer construction periods will generally lead to higher labor costs and will have lower scores in this category

Total Labor

(On-Site and Off-Site)



1

Estimated construction time ≥ 18 months

2

13 months \leq Estimated construction time < 18 months

3

8 months \leq Estimated construction time < 13 months

4

3 months \leq Estimated construction time < 8 months

5

Estimated construction time < 3 months

Pre-Stage = 9 months

Conventional Staging = 19 months

ABC BLCC TOOL INPUT – INITIAL COST (IC)

	<div>Conventional</div> Bridge #1	<div>Long Launch</div> Bridge #2	<div>PBES Sub</div> Bridge #3	<div>PBES Deck</div> Bridge #4	<div>Gantry Crane</div> Bridge #5
Total Labor Duration	> 18 months	btwn 13 and 18 months	btwn 13 and 18 months	btwn 13 and 18 months	btwn 13 and 18 months
Deck	CIP	CIP	CIP	Precast	CIP
Super	Precast	Precast	Precast	Precast	Precast
Sub	CIP	CIP	Precast	Precast	CIP
Equipment	Typ CIP	Long Launch	PBES	PBES	Gantry Crane
Agency Costs	Normal	Extensive	Moderate	Extensive	Moderate
ROW	btwn 0.5 and 1.0 acres	btwn 0.5 and 1.0 acres	> 1.0 acre	> 1.0 acre	btwn 0.5 and 1.0 acres
Environmental Impacts	Maximum	Maximum	Medium	Medium	Medium

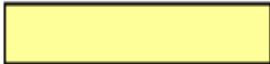
ABC BLCC TOOL INPUT – INITIAL COST (IC)

	<div>Conventional</div> Bridge #1	<div>Long Launch</div> Bridge #2	<div>PBES Sub</div> Bridge #3	<div>PBES Deck</div> Bridge #4	<div>Gantry Crane</div> Bridge #5
Total Labor Duration	> 18 months	btwn 13 and 18 months	btwn 13 and 18 months	btwn 13 and 18 months	btwn 13 and 18 months
Deck	CIP	CIP	CIP	Precast	CIP
Super	Precast	Precast	Precast	Precast	Precast
Sub	CIP	CIP	Precast	Precast	CIP
Equipment	Typ CIP	Long Launch	PBES	PBES	Gantry Crane
Agency Costs	Normal	Extensive	Moderate	Extensive	Moderate
ROW	btwn 0.5 and 1.0 acres	btwn 0.5 and 1.0 acres	> 1.0 acre	> 1.0 acre	btwn 0.5 and 1.0 acres
Environmental Impacts	Maximum	Maximum	Medium	Medium	Medium

Bridge Life Cycle Comparison Tool

■ *Right of Way*

- Accounts for the ROW acquisition costs required for the bridge construction only
- ROW acquisition required for roadway construction (alignment shift, widening etc) should not be included

Right-of-Way		1	Required R.O.W. acquisition > 1 acre
		2	0.5 acres < Required R.O.W. acquisition <= 1 acre
		3	0.25 acres < Required R.O.W. acquisition <= 0.5 acres
		4	0 acres < Required R.O.W. acquisition <= 0.25 acres
		5	Required R.O.W. acquisition = 0 acres

0.924 acres were acquired for haul road

ABC BLCC TOOL INPUT – INITIAL COST (IC)

	<div>Conventional</div> Bridge #1	<div>Long Launch</div> Bridge #2	<div>PBES Sub</div> Bridge #3	<div>PBES Deck</div> Bridge #4	<div>Gantry Crane</div> Bridge #5
Total Labor Duration	> 18 months	btwn 13 and 18 months	btwn 13 and 18 months	btwn 13 and 18 months	btwn 13 and 18 months
Deck	CIP	CIP	CIP	Precast	CIP
Super	Precast	Precast	Precast	Precast	Precast
Sub	CIP	CIP	Precast	Precast	CIP
Equipment	Typ CIP	Long Launch	PBES	PBES	Gantry Crane
Agency Costs	Normal	Extensive	Moderate	Extensive	Moderate
ROW	btwn 0.5 and 1.0 acres	btwn 0.5 and 1.0 acres	> 1.0 acre	> 1.0 acre	btwn 0.5 and 1.0 acres
Environmental Impacts	Maximum	Maximum	Medium	Medium	Medium

Bridge Life Cycle Comparison Tool

■ *Individual ABC BLCC Rating Score*

- ☐ Initial Costs (IC)
- ☐ Traffic Impact Costs (TIC)
- ☐ Maintenance Costs (MC)

■ *Higher scores represent more economical alternatives*

INITIAL COSTS (IC)					
Variable	Bridge Alt #1	Bridge Alt #2	Bridge Alt #3	Bridge Alt #4 <i>PBES Deck</i>	Bridge Alt #5 <i>Gantry Crane</i>
Total Labor	1	2	2	2	2
Deck Material	1	1	1	2	1
Superstructure Material	2	2	2	2	2
Substructure Material	1	1	2	2	1
Equipment	5	4	4	4	3
Agency Costs	3	1	2	1	2
Right-of-Way	2	2	1	1	2
Environmental Impact Costs	1	1	2	2	2
IC Rating Score:	60	56	62	64 High	55 Low

**Most
Economical**

**Least
Economical**

TRAFFIC IMPACT COSTS (TIC)

Variable	<div style="border: 1px solid red; transform: rotate(-45deg); padding: 2px; display: inline-block;">Conventional</div> Bridge Alt #1	Bridge Alt #2	<div style="border: 1px solid red; transform: rotate(-45deg); padding: 2px; display: inline-block;">PBES Sub</div> Bridge Alt #3	Bridge Alt #4	Bridge Alt #5
MOT Costs	1	2	2	2	2
Economic Impacts	2	3	3	3	3
Waterway Impacts	5	5	5	5	5
TIC Rating Score:	50	67	67	67	67

Low

High

**Least
Economical**

**Most
Economical**

MAINTENANCE COSTS (MC)					
Variable	Bridge Alt #1	Bridge Alt #2	Bridge Alt #3 <i>PBES Sub</i>	Bridge Alt #4 <i>PBES Deck</i>	Bridge Alt #5
Maintenance/Rehab Costs	1	1	2	3	1
Cost of Repair	4	4	3	2	4
Total Replacement Costs	1	1	2	2	1
Future TIC Maintenance	2	2	2	1	2
Future TIC Rehab/Replace	1	2	2	2	2
Joint Durability	2	2	1	1	2
Unforeseen Performance	3	3	2	1	3
Salvage Value	1	1	1	1	1
MC Rating Score:	59	60	62 High	57 Low	60

**Most
Economical**

**Least
Economical**

Bridge Life Cycle Comparison Tool

■ *Total ABC BLCC Rating Score*

- ☐ Average of Individual Rating Scores
- ☐ Each Individual score weighted equally
- ☐ $0.33 \times IC + 0.34 \times TIC + 0.33 \times MC$

■ *Higher scores represent more economical alternatives*

MAINTENANCE COSTS (MC)					
Variable	Bridge Alt #1	Bridge Alt #2	Bridge Alt #3	Bridge Alt #4	Bridge Alt #5
Maintenance/Rehab Costs	1	1	2	3	1
Cost of Repair	4	4	3	2	4
Total Replacement Costs	1	1	2	2	1
Future TIC Maintenance	2	2	2	1	2
Future TIC Rehab/Replace	1	2	2	2	2
Joint Durability	2	2	1	1	2
Unforeseen Performance	3	3	2	1	3
Salvage Value	1	1	1	1	1
MC Rating Score:	59	60	62	57	60
			High	Low	

TOTAL RATING SCORE:	56	61	63	63	61
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**Least
Economical**

**Most
Economical**

Bridge Life Cycle Comparison Tool

THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY
ACCELERATED BRIDGE CONSTRUCTION (ABC) - BRIDGE LIFE CYCLE COMPARISON (BLCC) TOOL

Prepared By XX Prepared On xx/xx/xxxx
Checked By XX Checked On xx/xx/xxxx
Bridge No. XXXXX Mile Post xx.xx
Location xxxxxx

ABC BLCC Tool December

Note to User: Refer to Structure Design Manual Article 27.3.2 for general guidance on using this tool.

INDIVIDUAL ABC BLCC RATING SCORE INPUT

INITIAL COSTS (IC)

Total Labor (On-Site and Off-Site)	<input type="text"/>	1 Estimated construction time >= 18 months
		2 13 months <= Estimated construction time
		3 8 months <= Estimated construction time
		4 3 months <= Estimated construction time
		5 Estimated construction time
Deck Material	<input type="text"/>	1 Deck type is cast-in-place concrete
		2 Deck type is precast concrete panels
Superstructure Material	<input type="text"/>	1 Superstructure type is cast-in-place concrete
		2 Superstructure type is precast concrete or steel
Substructure Material	<input type="text"/>	1 Substructure type is cast-in-place concrete
		2 Substructure type is precast concrete
Equipment	<input type="text"/>	1 Self-Propelled Modular Transport equipment required
		2 Bridge Slide-In equipment required
		3 Specialty Crane Based equipment required
		4 Prefabricated Bridge Element System or Longitudinal Launch required
		5 Typical cast-in-place concrete/steel construction equipment required
Agency Costs	<input type="text"/>	1 Extensive agency coordination
		2 Moderate agency coordination

Summary BLCC BLCC Guidance

Summary Tab

Provides visualization of bridge alternative scores to compare and eliminate.

Bridge Life Cycle Comparison Tool

■ *Summary Tab*

Bridge Alternates Investigated					
Name	Construction Type	Deck	Super	Sub	Method
Bridge Alternative #1					
Bridge Alternative #2					
Bridge Alternative #3					
Bridge Alternative #4					
Bridge Alternative #5					



**Manually Input
Bridge Alternatives**

Bridge Life Cycle Comparison Tool

■ *Summary Tab*

Bridge Alternates Investigated					
Name	Construction Type	Deck	Super	Sub	Method
Bridge Alternative #1					
Bridge Alternative #2	Conventional				
Bridge Alternative #3	ABC				
Bridge Alternative #4	N/A				
Bridge Alternative #5					



Drop Down
Menu

Bridge Life Cycle Comparison Tool

■ *Summary Tab*

Total ABC BLCC Rating Score					
	Alt #1	Alt #2	Alt #3	Alt #4	Alt #5
Initial Costs (IC)					
Traffic Impact Costs (TIC)					
Maintenance Costs (MC)					
Total ABC BLCC Rating Score	0	0	0	0	0



**Manually Input
Individual Scores**

Bridge Life Cycle Comparison Tool

■ *Summary Tab*

Total ABC BLCC Rating Score					
	Alt #1	Alt #2	Alt #3	Alt #4	Alt #5
Initial Costs (IC)					
Traffic Impact Costs (TIC)					
Maintenance Costs (MC)					
Total ABC BLCC Rating Score	0	0	0	0	0

**Calculates ABC
Total Scores**

MAINTENANCE COSTS (MC)					
Variable	Bridge #1 <i>Conventional</i>	Bridge #2 <i>Long Launch</i>	Bridge #3 <i>PBES Sub</i>	Bridge #4 <i>PBES Deck</i>	Bridge #5 <i>Gantry Crane</i>
Maintenance/Rehab Costs	1	1	2	3	1
Cost of Repair	4	4	3	2	4
Total Replacement Costs	1	1	2	2	1
Future TIC Maintenance	2	2	2	1	2
Future TIC Rehab/Replace	1	2	2	2	2
Joint Durability	2	2	1	1	2
Unforeseen Performance	3	3	2	1	3
Salvage Value	1	1	1	1	1
MC Rating Score:	59	60	62	57	60
			High	Low	

TOTAL RATING SCORE:	X	61	63	63	61
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**Suggest carry forward to
Bridge Type Study**


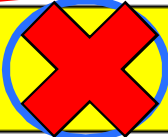

Bridge Life Cycle Comparison Tool

■ *Recommendation*

- ☐ Take a step back
- ☐ Evaluate alternatives from a Global project perspective
- ☐ Does use of ABC really provide a benefit to the project will all project specific information considered




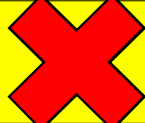

MAINTENANCE COSTS (MC)					
Variable	Bridge #1 <i>Conventional</i>	Bridge #2 <i>Long Launch</i>	Bridge #3 <i>PBES Sub</i>	Bridge #4 <i>PBES Deck</i>	Bridge #5 <i>Gantry Crane</i>
Maintenance/Rehab Costs	1	1	2	3	1
Cost of Repair	4	4	3	2	4
Total Replacement Costs	1	1	2	2	1
Future TIC Maintenance	2	2	2	1	2
Future TIC Rehab/Replace	1	2	2	2	2
Joint Durability	2	2	1	1	2
Unforeseen Performance	3	3	2	1	3
Salvage Value	1	1	1	1	1
MC Rating Score:	59	60	62 High	57 Low	60

TOTAL RATING SCORE:		61			61
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**Pre-Stage to Build Piers
without affecting MOT**

**Wide Flange Beams
Large joints for UHPC**

MAINTENANCE COSTS (MC)					
Variable	Bridge #1 <i>Conventional</i>	Bridge #2 <i>Long Launch</i>	Bridge #3 <i>PBES Sub</i>	Bridge #4 <i>PBES Deck</i>	Bridge #5 <i>Gantry Crane</i>
Maintenance/Rehab Costs	1	1	2	3	1
Cost of Repair	4	4	3	2	4
Total Replacement Costs	1	1	2	2	1
Future TIC Maintenance	2	2	2	1	2
Future TIC Rehab/Replace	1	2	2	2	2
Joint Durability	2	2	1	1	2
Unforeseen Performance	3	3	2	1	3
Salvage Value	1	1	1	1	1
MC Rating Score:	59	60	62 High	57 Low	60

TOTAL RATING SCORE:		61			61
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Longitudinal Launch
(ABC Design)

Crane Based
(ABC Construction)

Bridge Life Cycle Comparison Tool

- *Summary Tab*
- Final Recommended Bridge Alternatives

Recommended Bridge Alternatives

Bridge Alternatives to Consider Based on Total ABC BLCC Rating Score:



Three yellow rectangular boxes, each representing a recommended bridge alternative, are arranged horizontally and circled in red.

Fill in with recommended
Bridge Alternatives

Bridge Life Cycle Comparison Tool

■ *Provide Final Recommendation*

- Incorporate selected alternatives into Bridge Type Study
- Perform Cost Comparison

■ *Items to include*

- ☑ Completed ABC BLCC Tool for all Bridge Alternatives
- ☑ Supporting Material
- ☑ Summary stating Final Recommendation

■ *Normal Tollway Review Process*

- Disposition of Comments

Incorporate into TS&L Plans

Summary

■ *ABC Example*

- ☐ Qualitative vs Quantitative process
- ☐ Scores are Subjective
- ☐ Does not actually calculate costs

■ *So why fill out tool?*

- ☐ Helps “think-thru” the evaluation process
- ☐ Helps determine if ABC provides a benefit to the project
- ☐ Helps narrow down and focus on alternatives



Any Questions?

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- **PDF's of all presentations will be available for download on Tollway website – link will be sent**
- **PDH's will be emailed directly to all participants in the ABC Workshop**
- **FHWA has provided free manuals for anyone interested – available for pick up on way out of Workshop**



Thank you