

Indiana High Speed Rail

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A Case Study of High Speed Rail Routing in Indiana

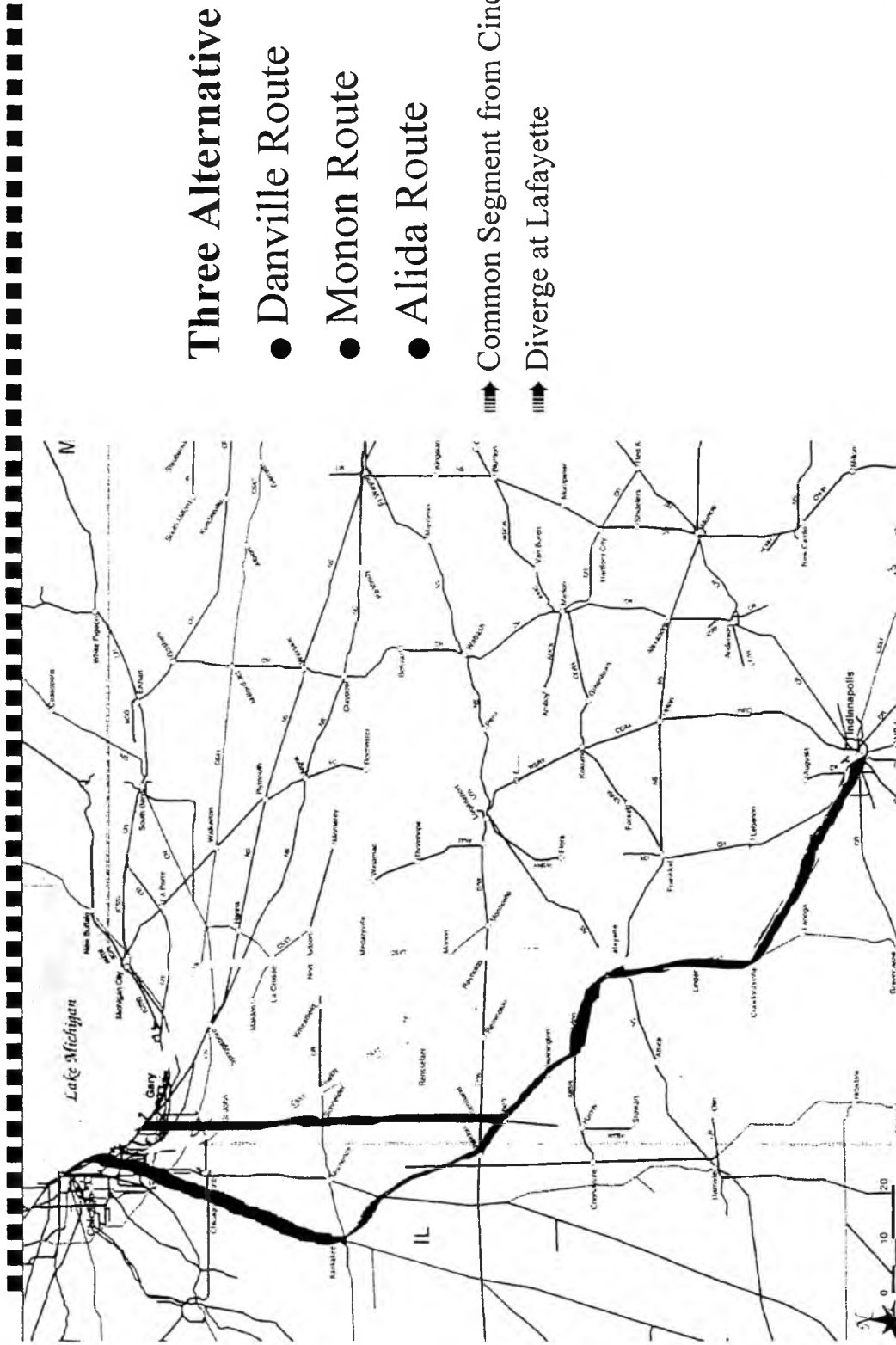
Study Context



Assess potential benefits of providing passenger rail service to Northwest Indiana

- **Access to Gary Regional Airport**
- **Capitalize on the potential travel market between Gary and Indianapolis**
- **Integration with potential new commuter rail service in West Lake County**

Study Area



Three Alternative Routes

- Danville Route
- Monon Route
- Alida Route

- ▬ Common Segment from Cincinnati to Lafayette
- ▬ Diverge at Lafayette

Scope



- **Identify a re-alignment of the Chicago-Cincinnati Corridor through Gary, Indiana**
- **Assess relative feasibility of three alternative routes selected by INDOT**
- **Identify best alternative**

Project Approach



MWRRI Context

- **Infrastructure**
- **Operating Plan**
- **Ridership/Revenue Analysis**
- **Capital and Operating Costs**
- **Financial Analysis**
- **Economic Benefit-Cost Analysis**

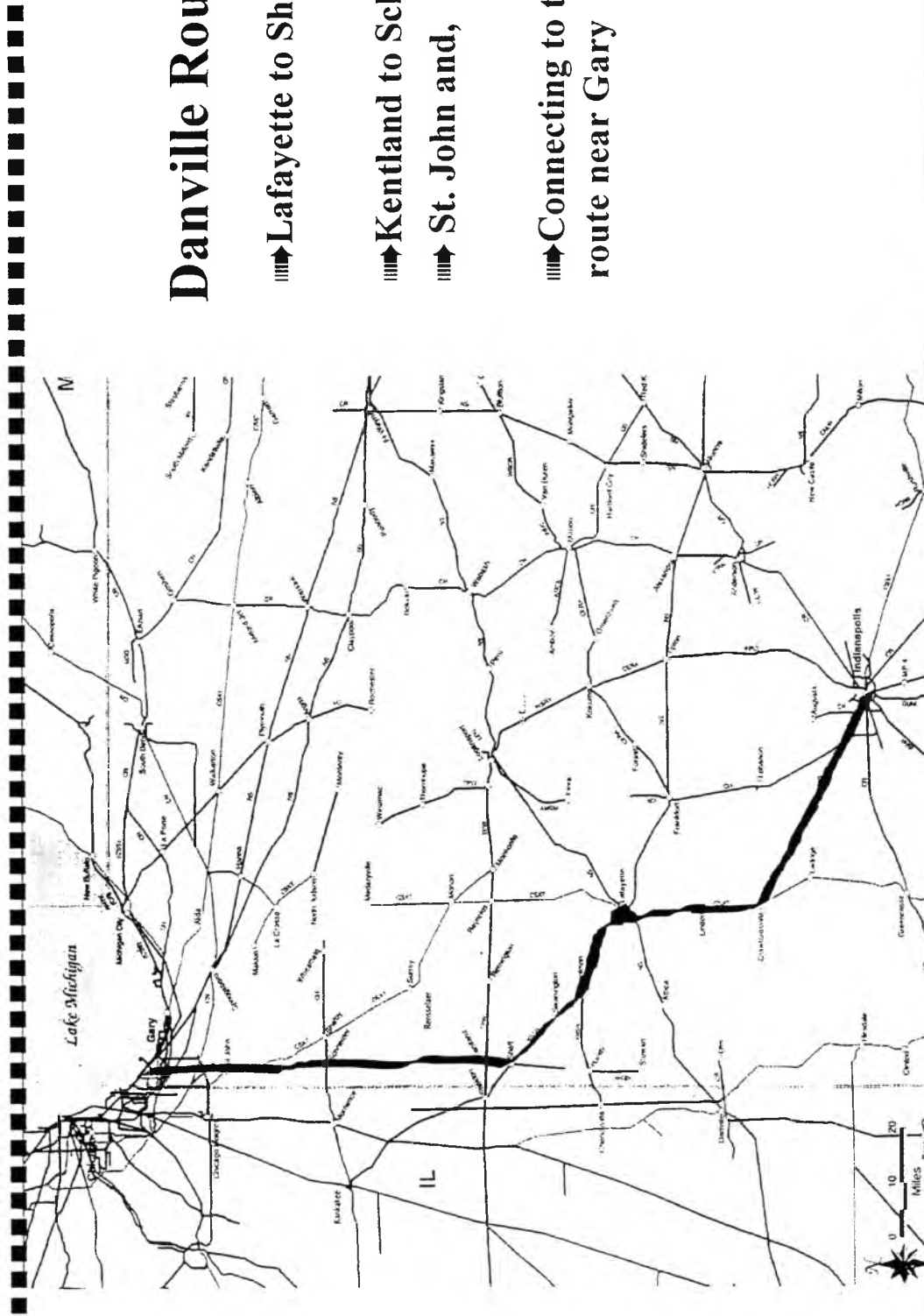
Infrastructure Analysis



Engineering Analysis

- Site surveys of track conditions, freight traffic, yards, junctions, stations
- Infrastructure assessment for 79-mph and 110-mph service
- Identify constraints

Infrastructure Analysis



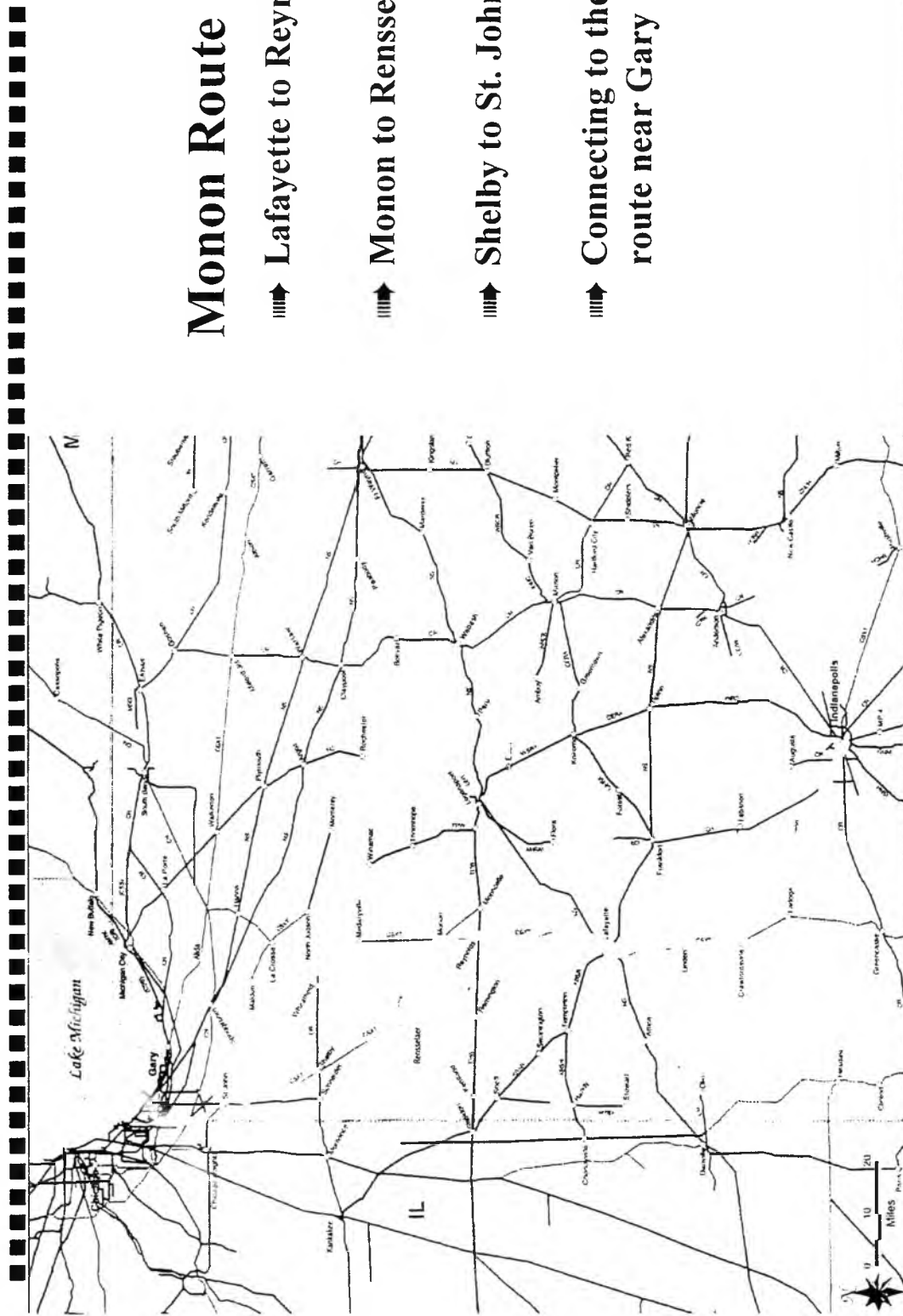
Danville Route

- ◆◆◆◆ Lafayette to Sheff to
- ◆◆◆◆ Kentland to Schneider to
- ◆◆◆◆ St. John and,
- ◆◆◆◆ Connecting to the Amtrak route near Gary

February 15, 2000
Project 296

Transportation Economics & Management Systems, Inc.

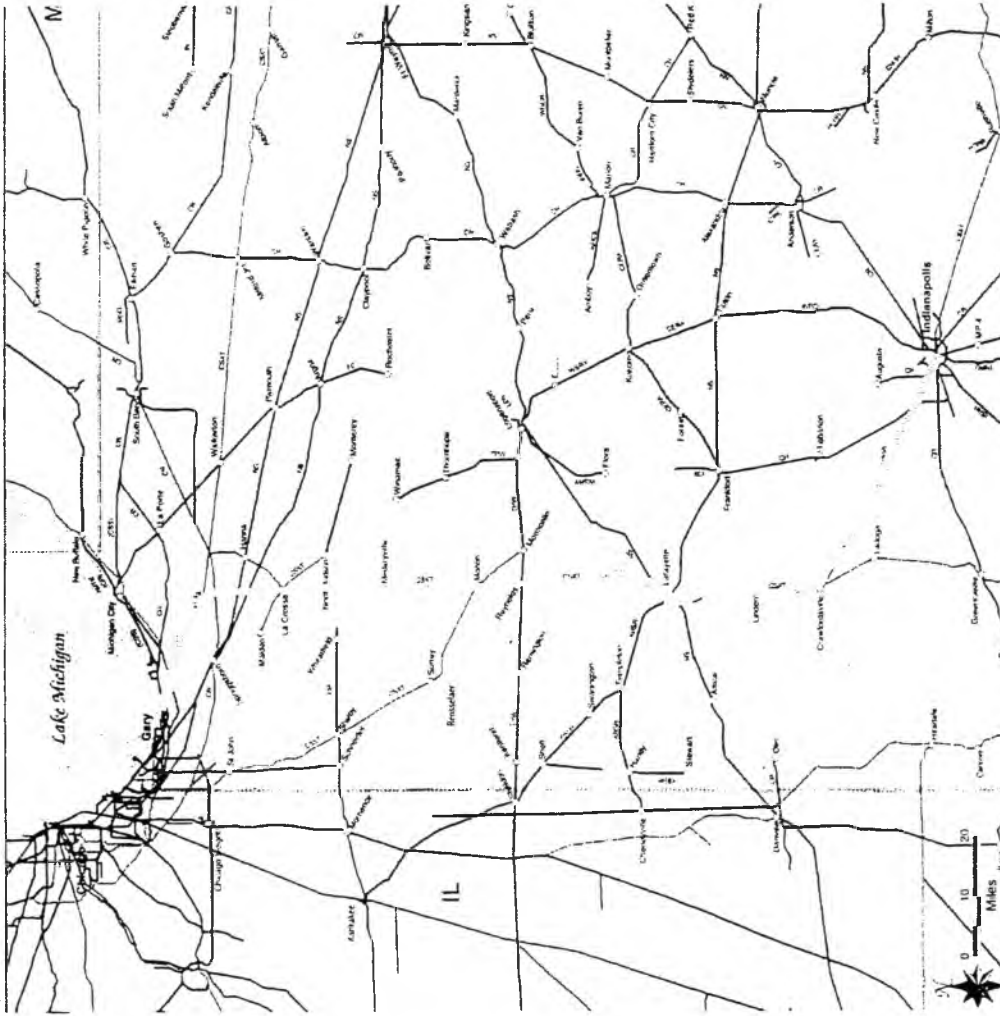
Infrastructure Analysis



Monon Route

- ➡ Lafayette to Reynolds to
- ➡ Monon to Rensselaer to
- ➡ Shelby to St. John
- ➡ Connecting to the Amtrak route near Gary

Infrastructure Analysis



Alida Route

- ➡ Lafayette to Reynolds to Monon
(same as *Monon Route*)
- ➡ New ROW from Monon north
- ➡ Connecting to South-of-the-Lakes
re-route at Willow Creek
(Northeast of Gary)

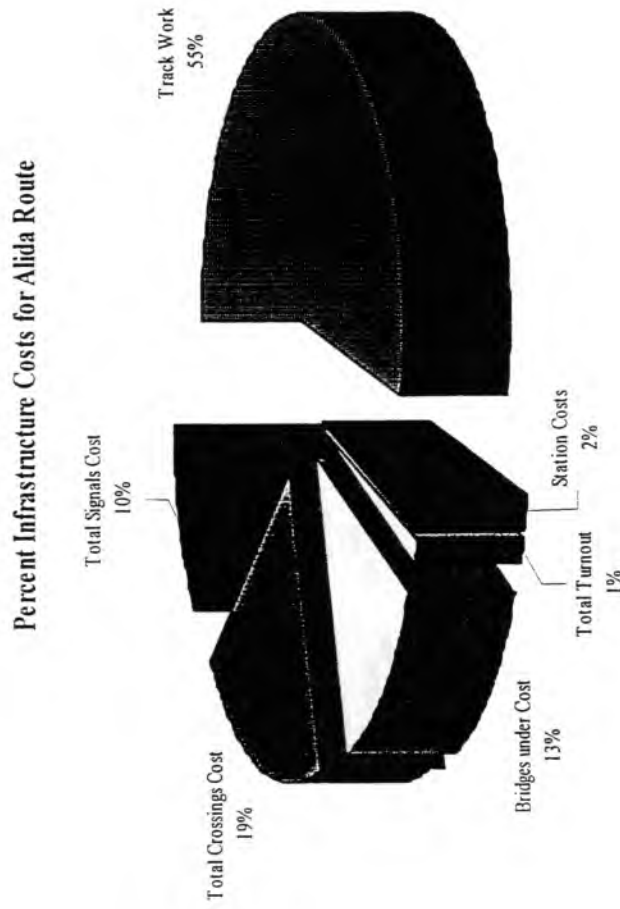
Infrastructure Analysis

Costs & Speeds Comparison

Route Alternative	Net Infrastructure \$ Million	Avg. Cost per Mile	% 110-mph Service	% 79-mph Service
Alida	\$349	\$1.111	63%	37%
Monon	\$279	\$0.894	47%	53%
Danville	\$352	\$1.122	47%	53%
Kankakee	\$282	\$0.893	51%	49%

Infrastructure Analysis

Distribution of Costs by Type



Infrastructure Costs

Danville Route

Costs by Segment	Miles (000)	Total (\$000)	Avg Cost per Mile
Chicago to Buffington Harbor	22	\$21,048	\$957
Buffington Harbor to EJ&E (from SOLR)	9	\$13,366	\$1,453
Gary Airport to Dyer	9	\$13,432	\$1,460
Dyer to Scheff (79 MPH)	52	\$74,752	\$1,449
Sheff to Lafayette	38	\$25,358	\$667
Lafayette to Shelbyville	102	\$70,350	\$690
Shelbyville to Cincinnati	82	\$147,642	\$1,801
Terminals, Stations, and Maintenance Facilities	-	\$7,500	
Total Costs of Improvements	314	\$373,448	\$1,189
Gary to Cincinnati Segment	314	\$352,400	\$1,122

Infrastructure Analysis

Danville Route

Route Segments	Miles	Max. Allowable Speeds
Chicago to Buffington Harbor	22	79
Buffington Harbor to EJ&E (SOL)	9	79
Gary Airport to Dyer	9	79
Dyer to Scheff	52	79
Sheff to Lafayette	37	79
Lafayette to Indianapolis	73	79/110
Indianapolis to Shelbyville	29	110
Shelbyville to Cincinnati	83	110
Total	314	

Infrastructure Costs

Monon Route

Costs by Segment	Miles (000)	Total (\$000)	Avg Cost per Mile
Chicago to Buffington Harbor	22	\$21,048	\$957
Buffington Harbor to EJ&E (from SOLR)	9.2	\$13,366	\$1,453
Gary Airport to Dyer	9.2	\$13,432	\$1,460
Dyer to Monon	55	\$19,032	\$346
Monon to Lafayette	33	\$7,858	\$238
Lafayette to Shelbyville	102	\$70,350	\$690
Shelbyville to Cincinnati	82	\$147,642	\$1,801
Terminals, Stations, and Maintenance Facilities	-	\$7,500	
Total Costs of Improvements	312	\$300,228	\$961
Gary to Cincinnati	312	\$279,180	\$894

Infrastructure Analysis

Monon Route

Route Segments	Miles	Max. Allowable Speeds
Chicago to Buffington Harbor	22	79
Buffington Harbor to EJ&E (SOL)	9	79
Gary Airport to Dyer	9	79
Dyer to Monon	55	79
Monon to Lafayette	33	79
Lafayette to Indianapolis	74	79/110
Indianapolis to Shelbyville	28	110
Shelbyville to Cincinnati	82	110
Total	312	

Infrastructure Costs

Alida Route

Costs by Segment	Miles (000)	Total (\$000)	Avg Cost per Mile
Chicago to Buffington Harbor	22	\$21,048	\$957
Buffington Harbor to Willow Creek	14	\$39,818	\$2,785
Willow Creek to Alida	16	\$5,393	\$329
Alida to Monon	45	\$110,232	\$2,477
Monon to Lafayette	33	\$7,858	\$238
Lafayette to Shelbyville	102	\$70,350	\$690
Shelbyville to Cincinnati	82	\$147,642	\$1,801
Terminals, Stations, and Maintenance Facilities	-	\$7,500	
Total Costs of Improvements	314	\$409,841	\$1,304
Gary to Cincinnati	314	\$348,975	\$1,111

Infrastructure Analysis

Alida Route

Route Segments	Miles	Max. Allowable Speeds
Chicago to Buffington Harbor	22	79
Buffington Harbor to Willow Creek (SOL)	14	79/110
Willow Creek to Alida	16	79
Alida to Monon	45	110
Monon to Lafayette	33	79
Lafayette to Indianapolis	74	79/110
Indianapolis to Shelbyville	28	110
Shelbyville to Cincinnati	82	110
Total	315	

Operating Plan



- **5 Daily Trips Chicago to Cincinnati**
 - ▶▶▶ 3 local trains (2 round-trip, 1 one-way trip)
 - ▶▶▶ 2 express trains (2 round-trips)

- **1 Daily round-trip Chicago to Indianapolis**

- **1 Daily round-trip Indianapolis to Cincinnati**

Operating Plan

Relative Travel Speeds

Alternative Route	Chicago-Lafayette	Effective Speed (mph)
Kankakee	2:01	65.2
Danville	2:13	58.4
Monon	2:21	54.4
Alida	1:49	71.4

Operating Plan



Local Travel Time Comparison

Station Stops	Kankakee	Danville	Monon	Alida
Chicago Union Station	0:00	0:00	0:00	0:00
Gary Regional Airport		0:28	0:28	0:25
Lafayette	2:01	2:13	2:21	1:49
Indianapolis	3:00	3:11	3:20	2:47
Shelbyville	3:26	3:38	3:46	3:13
Cincinnati	4:29	4:40	4:48	4:16

Operating Plan

Express Travel Time Comparison

Station Stops	Kankakee	Danville	Monon	Alida
Chicago Union Station	0:00	0:00	0:00	0:00
Gary Regional Airport	--	--	0:00	--
Lafayette	--	--	--	--
Indianapolis	2:44	3:02	3:10	2:43
Shelbyville	--	--	--	--
Cincinnati	4:08	4:26	4:35	4:07

Timetables

Alida Route

Train Number	Station	Milepost	Schedule		350	300	302	304	306	308	352
			Time	Daily							
CHICAGO UNION		0.0	0:00	Daily		6:30	10:30	12:30	15:30	17:30	19:00
Gary Regional Airport		23.0	0:25				10:55	12:55		17:55	19:25
Lafayette		129.7	1:49				12:19	14:19		19:19	20:49
Indianapolis		203.0	2:47	6:42	9:13		13:17	15:17	18:13	20:17	21:47
Shelbyville		231.6	3:13				13:43	15:43		20:43	
CINCINNATI		314.8	4:16	8:06	10:37		14:46	16:46	19:37	21:46	

Train Number	Station	Milepost	Schedule		351	301	303	305	307	309	353
			Time	Daily							
CINCINNATI		0.0	0:00	Daily		6:30	10:44	12:30	15:30	17:44	20:30
Shelbyville		83.2	1:00				11:44			18:44	21:30
Indianapolis		111.8	1:26	6:45	7:52		12:10	13:52	16:52	19:10	21:57
Lafayette		185.1	2:24	7:43			13:08			20:08	
Gary Regional Airport		291.8	3:48	9:07	10:37		14:32	16:37	19:37	21:32	
CHICAGO UNION		314.8	4:13	9:33			14:58			21:58	

Timetables



Monon Route

Train Number		Milepost	Schedule Time	350	300	302	304	306	308	352
Station	Daily			Daily	Daily	Daily	Daily	Daily	Daily	
CHICAGO UNION		0.0	0:00		6:30	10:30	12:30	15:30	17:30	19:00
Gary Regional Airport		25.0	0:28			10:58	12:58		17:58	19:28
Lafayette		127.9	2:21			12:51	14:51		19:51	21:21
Indianapolis		200.4	3:20	6:42	9:40	13:50	15:50	18:40	20:50	22:20
Shelbyville		228.9	3:46			14:16	16:16		21:16	
CINCINNATI		312.2	4:48	8:06	11:05	15:18	17:18	20:05	22:18	

Train Number		Milepost	Schedule Time	351	301	303	305	307	309	353
Station	Daily			Daily	Daily	Daily	Daily	Daily	Daily	Daily
CINCINNATI		0.0	0:00		6:04	10:11	12:04	15:04	17:11	20:30
Shelbyville		83.3	1:00			11:11			18:11	21:30
Indianapolis		111.8	1:26	6:13	7:26	11:38	13:26	16:26	18:38	21:57
Lafayette		184.3	2:24	7:11		12:36			19:36	
Gary Regional Airport		287.2	4:17	9:04	10:37	14:29	16:37	19:37	21:29	
CHICAGO UNION		312.2	4:46	9:33		14:58			21:58	

Timetables



Danville Route

Train Number		Milepost	Schedule Time	350	300	302	304	306	308	352
Station	Daily			Daily	Daily	Daily	Daily	Daily	Daily	
CHICAGO UNION		0.0	0:00		6:30	10:30	12:30	15:30	17:30	19:00
Gary Regional Airport		25.0	0:28			10:58	12:58		17:58	19:28
Lafayette		129.4	2:13			12:43	14:43		19:43	21:13
Indianapolis		201.9	3:11	6:42	9:32	13:41	15:41	18:32	20:41	22:11
Shelbyville		230.4	3:38			14:08	16:08		21:08	
CINCINNATI		313.7	4:40	8:06	10:56	15:10	17:10	19:56	22:10	

Train Number		Milepost	Schedule Time	351	301	303	305	307	309	353
Station	Daily			Daily	Daily	Daily	Daily	Daily	Daily	Daily
CINCINNATI		0.0	0:00		6:11	10:20	12:11	15:11	17:20	20:30
Shelbyville		83.3	1:00			11:20			18:20	21:30
Indianapolis		111.8	1:26	6:21	7:33	11:46	13:33	16:33	18:46	21:57
Lafayette		184.3	2:24	7:19		12:44			19:44	
Gary Regional Airport		288.7	4:09	9:04	10:37	14:29	16:37	19:37	21:29	
CHICAGO UNION		313.7	4:37	9:33		14:58			21:58	

Demand Analysis



2010 2020

Demand Forecast (Millions)	2010					2020						
	Kankakee Route	Danville Route	Monon Route	Alida Route	Kankakee Route	Danville Route	Monon Route	Alida Route	Kankakee Route	Danville Route	Monon Route	Alida Route
Revenue	\$37.9	\$33.6	\$32.5	\$36.9	\$43.1	\$38.3	\$37.0	\$41.9	\$43.1	\$38.3	\$37.0	\$41.9
Ridership (thousands)	716	721	700	784	816	822	798	894	816	822	798	894
Passenger Miles	151	136.6	132.1	150.0	173	155.9	150.7	171.1	173	155.9	150.7	171.1
Consumer Surplus	51.6	36.8	34.7	42.7	58.7	41.8	39.5	48.6	58.7	41.8	39.5	48.6

Alida has highest level of ridership and revenue of 3 alternatives

Higher ridership than baseline; lower revenue due to shorter trip lengths

Financial Performance



Total Capital Costs

Capital Investment (\$ Millions)	Kankakee Route	Danville Route	Monon Route	Alida Route
Infrastructure	\$282	\$352	\$279	\$349
Rolling Stock	\$123	\$123	\$123	\$123
<i>Total</i>	\$405	\$475	\$402	\$472
Number of Trainsets	5	5	5	5

Financial Performance



Operating Performance	2010				2020			
	Kankakee Route	Danville Route	Monon Route	Alida Route	Kankakee Service	Danville Service	Monon Service	Alida Route
Operating Revenue	\$43.3	\$38.7	\$37.6	\$42.0	\$50.4	\$45.2	\$43.9	\$48.9
Operating Costs	\$29.0	\$28.0	\$27.8	\$28.4	\$29.5	\$28.4	\$27.8	\$28.9
Ridership	716	721	700	784	816	822	798	894
Operating Ratio	1.49	1.38	1.35	1.48	1.71	1.59	1.56	1.70

- ▶▶▶▶ Alida has highest operating ratio of the 3 alternatives and is competitive with Kankakee baseline
- ▶▶▶▶ Danville and Monon routes have operating ratios above 1.0

Economic Benefit - Cost Analysis



\$ Millions

Net Present Value	Kankakee	Alida	Monon	Danville
Gross Consumer Surplus	\$504	\$436	\$374	\$390
Operating Revenue	\$440	\$432	\$398	\$407
Operating & Capital Costs	\$525	\$598	\$532	\$581
Total Project Revenue	\$944	\$867	\$772	\$796
Total Project Costs	\$525	\$598	\$532	\$581
Benefit/Cost Ratio	1.80	1.45	1.45	1.37

- ▶▶▶ All the alternatives have a positive benefit/cost ratio
- ▶▶▶ High capital costs for Alida Route lowers benefit/cost ratio to that of Monon alternative

Recommendations



- For passenger service via Gary, Indiana the Alida Route is the preferred alternative.

- ▣ highest ridership levels
- ▣ highest operating ratio
- ▣ benefit cost ratio highest or equal to next best alternative

Next Steps



- Identify trade-off between capital costs and operating ratio for Alida and Monon Route alternatives
- Land Acquisition Costs/Issues for Alida Route
- Higher speeds on Monon Route.
- Impact on linkages with commuter rail plans & airport expansion