

Figure 1

Timeline of Construction and Annual Operations for the Project



Table 1

Summary of Annual Direct Operations Employment at the Project

Phase I Construction

Description	Onsite	Offsite	Total
Steel erecting	32	-	32
Laborers	53	10	63
Mechanical & piping	50	15	65
Equipment operators	25	4	29
Tank erectors	40	10	50
Electrical	25	20	45
Concrete	25	20	45
Ground improvements/pilling	22	10	32
Dock seismic upgrades	20	10	30
Fire system installation	6	10	16
Total number of workers employed	298	109	407
Total full-time jobs (given 50% average on-site)	149	55	204
Additional permitting and engineering support	-	35	35
Total (full-time jobs)	149	90	239

Note: Employment figures reflect full-time jobs or their equivalent. Facility construction would result in 298 on-site positions, although it is assumed that only 50 percent would be employed at any given time. Consequently, on-site employment levels would be comparable to 149 full-time on-site positions. Facility construction would also result in 109 off-site positions, with 50 percent active at any given time, resulting in the equivalent of 55 full-time positions.

Table 2

Summary of IMPLAN Inputs for Annual Operations at the Project

Description	IMPLAN Activity Type(s)	IMPLAN Sector(s)	Start-up (2014 dollars, annually)	Full Build-out (2014 dollars, annually)
General Operating Expenses	Labor Income, Commodity Change	3032, 3033, 3326, 3327, 3329, 3351, 3367, 3369, 3382, 3413, 5001	\$25.06 million	\$52.07 million
Property Tax	Commodity Change	3437 & 3438 (50/50 split)	\$2.31 million	\$2.31 million
Port of Vancouver Lease/Fees	Commodity Change	See report text	\$19.17 million	\$44.86 million
Total Operations			\$46.54 million	\$99.24 million

Table 3

Summary of Annual Direct On-Site Operations Employment at Project

Description	Start-up Employment	Full Build-out Employment
Marine (dock, vessel securement, etc.)	16	19
Rail (engineers, switchmen, inspectors, etc.)	20	40
Transload (transloaders, tanks farm, trainers, etc.)	30	79
Safety Health Environment & Maintenance (mechanics, maintenance, EHS, etc.)	9	13
Office/Management (managers, coordinators, supervisors, etc.)	16	25
Total Operations	91	176

Note: Employment figures reflect full-time jobs or their equivalent. Table 3 includes direct on-site employment, while Table 4 includes both direct on-site employment and direct off-site employment, including activities resulting from the Project’s operations and leases/fees paid to the Port of Vancouver.

Table 4
Summary of IMPLAN Results
Construction and Annual Operations at the Project, 2015-2030

	Direct Impacts			Total Impacts (Direct, Indirect and Induced)		
	Total	Labor	Economic	Total	Labor	Economic
	Employment (Full-time Jobs)	Income (\$ millions)	Value Added (\$ millions)	Employment (Full-time Jobs)	Income (\$ millions)	Value Added (\$ millions)
Construction						
Phase I	239	\$23.3	\$23.3	1,031	\$62.6	\$89.6
Phase II	81	\$8.1	\$8.1	398	\$24.2	\$35.2
Total for Phase I and II	320	\$31.4	\$31.4	1,429	\$86.8	\$124.8
Operations (Annual)						
Start-up (2016 only)	302	\$33.5	\$35.7	519	\$44.1	\$55.5
Full Build-out (2017-2030) ¹	616	\$67 - \$88	\$73 - \$95	1,081	\$90 - \$118	\$116 - \$151
Construction and Operations Total over 16 year lifespan	9,245	\$1,144	\$1,239	17,082	\$1,581	\$2,042
Net Present Value over 16 year lifespan	n/a	\$634	\$686	n/a	\$892	\$1,156

Note: Labor income and economic value added grow over the Project's 2017-2030 lifespan due to inflation.

Figure 2
Summary of IMPLAN Results - Employment
Construction and Annual Operations at the Project, 2015-2030

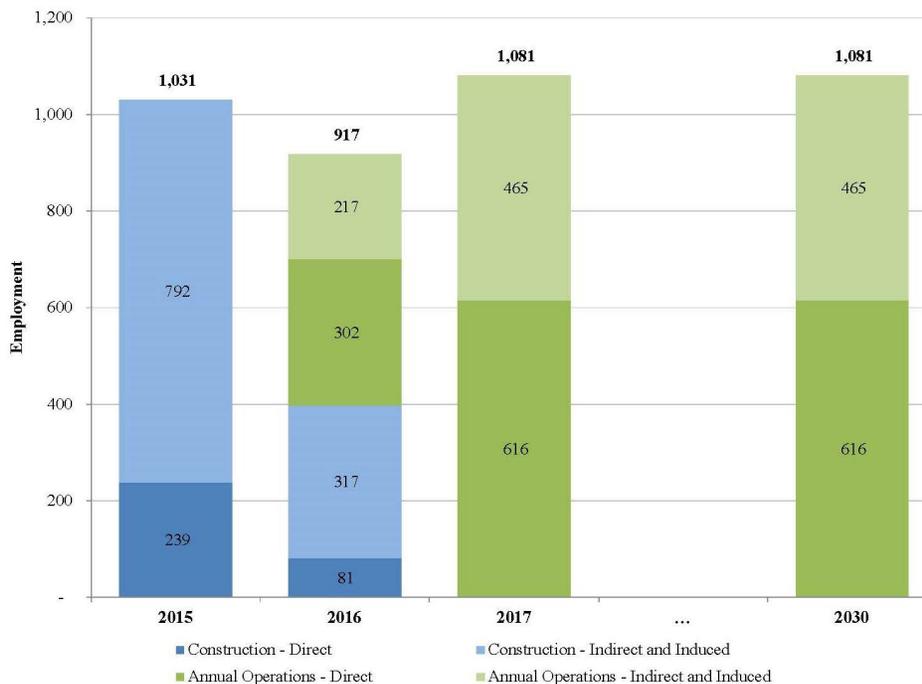
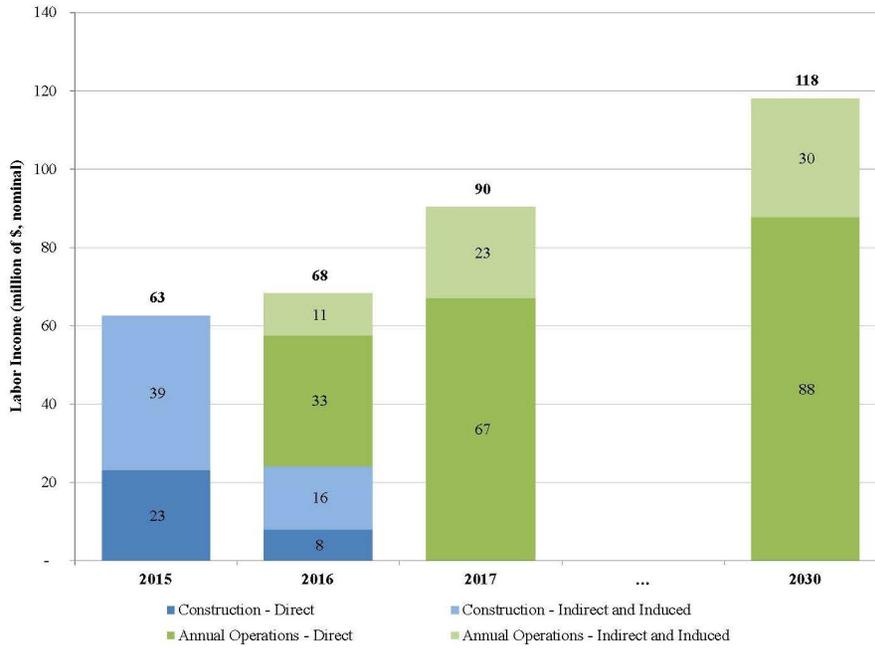
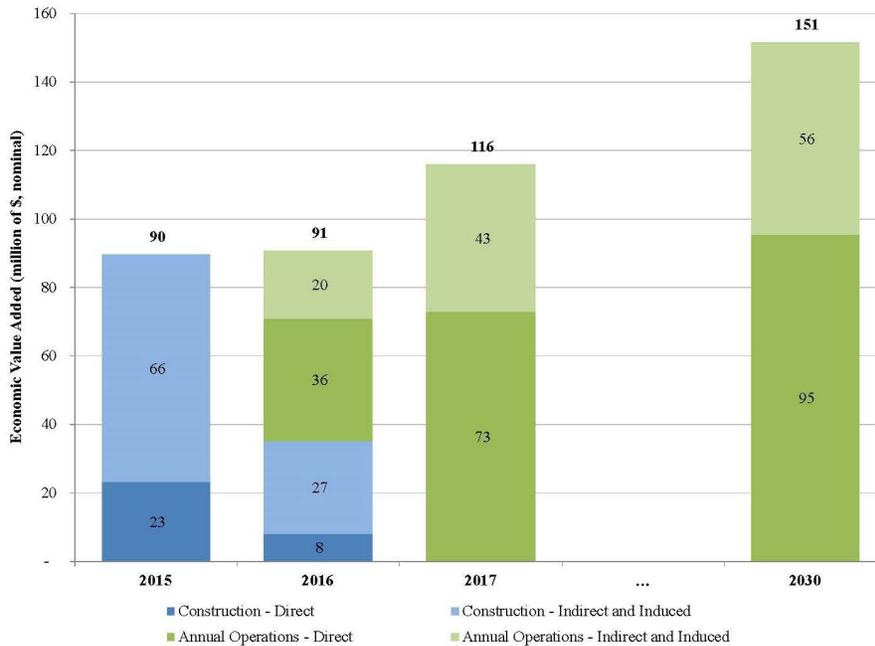


Figure 3
Summary of IMPLAN Results - Labor Income
Construction and Annual Operations at the Project, 2015-2030



Note: Values shown represent nominal values and grow between 2017 and 2030 due to inflation.

Figure 4
Summary of IMPLAN Results – Economic Value Added
Construction and Annual Operations at the Project, 2015-2030



Note: Values shown represent nominal values and grow between 2017 and 2030 due to inflation.

Table 5
Summary of Tax Impacts
Construction and Annual Operations at the Project

	Construction (Phase I and II)	Annual Operations (Start-Up)	Annual Operations (Full Build-Out)
Sales Tax	\$17,640,000	\$1,497,657	\$3,225,410
B&O Tax	\$989,100	See note 2	See note 2
Property Tax (Terminal)	n/a	\$2,317,898	\$2,317,898
Property Tax (non-Terminal)	\$2,572,557	\$752,269	\$1,638,342
Other Taxes	\$947,474	\$313,830	\$682,393
Total	\$22,149,131	\$4,881,654	\$7,864,043

Notes: Further details are available in the Primary Impacts Report.

Table 6: Estimates of Percent Change in Single-Family Residential Property Values
from Assumed Incremental Project Traffic (4 Trains per Day)
Based on Futch (2011)

	Baseline	With Additional Explanatory Variables	Pre-"Market Crash" Sales Only
0 - 1/3 mi. from Corridor	-0.85% ***	-0.93% ***	-1.49% ***
1/3 - 2/3 mi. from Corridor	-0.69% ***	-0.59% ***	-0.62% **
2/3 - 1 mi. from Corridor	-0.37% **	-0.34% *	-0.67% ***

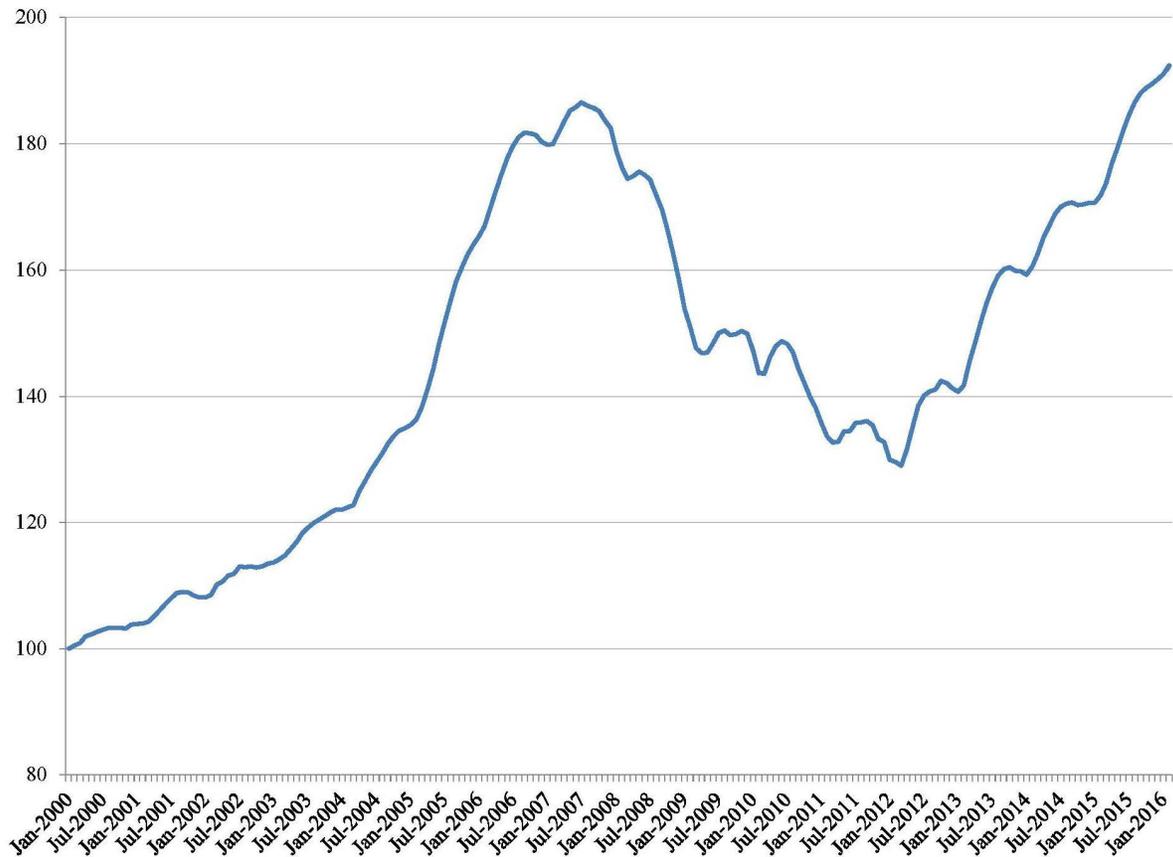
Note: * significant at 10% level; ** significant at 5% level; *** significant at 1% level. Estimates reflect per ton-mile impacts as estimated by Futch, which are translated into per rail car impacts based on average rail car weight. Project impacts reflect assumed incremental traffic, given these per rail car impacts. Results are reported for three specifications: a baseline specification, a specification with additional explanatory variables (e.g., geographic zones, seasons and house characteristics), and a specification excluding transactions after the 2006-2007 "market crash" in housing prices. Average values reflect the unweighted average of the three model estimates. Among the models estimated, the "with additional explanatory variables" specification has the greatest explanatory power. Reported estimates reflect (1) the specification that allows for asymmetric marginal effects for increases and decreases in rail traffic and (2) the sample that includes the construction period. Futch (2011).

**Table 7: Estimates of Percent Change in Single-Family Residential Property Values
from Assumed Incremental Project Traffic (4 Trains per Day)
Based on Simons and El Jaouhari (2004)**

Distance from Rail Line	Property Size		
	Small	Medium	Large
Less than 250 feet	-0.85% **	-1.07% **	-0.76%
250 to 500 feet	-0.37% **	-0.44%	-0.01%
500 to 750 feet	-0.41% ***	-0.29%	0.00%

Note: ** significant at 5% level; *** significant at 1% level.

Figure 5: S&P/Case-Shiller Portland, Oregon Home Price Index



Source: S&P Dow Jones Indices LLC.

Table 8: Independent Variables in Housing Price Regression Model

Variable Category	Specific Variables
Housing characteristics	<ul style="list-style-type: none"> • Year built • Number of bathrooms • Number of bedrooms • Finished square footage • Lot square footage • Cooling system (central, wall or none)
Transaction timing	<ul style="list-style-type: none"> • Year fixed effects • Month fixed effects • Year-month fixed effects
Housing location	<ul style="list-style-type: none"> • Zip code fixed effects • Census tract fixed effects
Distance From Rail	<ul style="list-style-type: none"> • Continuous distance measure (log and quadratic) • Distance Bandwidths: < 250 feet; 250 to 1,000 feet; 1,000 feet to one-half mile; and one-half to one mile
Time Period After Announcement	<ul style="list-style-type: none"> • Quarterly variables • Monthly variable

Table 9
Impact of Proximity to Rail on Property Values, Distance Bandwidths
Change in Impact After the Vancouver Energy Announcement

<u>Proximity to Rail</u>	<u>Percent Impact</u>	<u>Change in Percent Impact After Announcement</u>
1/2 mile to 1 mile from rail	4.31%***	0.65%
1000ft to <1/2 mile from rail	5.36%***	2.41%
250ft to <1000ft from rail	2.69%	-1.47%
< 250ft from rail	-4.56%	4.65%

Notes:

[1] Measure of statistical significance: *** = at 1% level; ** = at 5% level; * = at 10% level;

[2] The net Percent Impact after the announcement reflects that sum of the (1) Percent Impact and (2) Change in Percent Impact After Announcement. For example, the net impact after the announcement for properties less than 250 feet from the rail is +0.11% (= -4.46% + 4.57%).

[2] Estimates control for house characteristics, location (zip codes) and time of sale (year-month dummy variables).

Sources: Realty Trac, ArcGIS

Table 10
Impact of Proximity to Rail on Property Values
Impact as a Function of Continuous Distance
Change in Impact After the Vancouver Energy Announcement

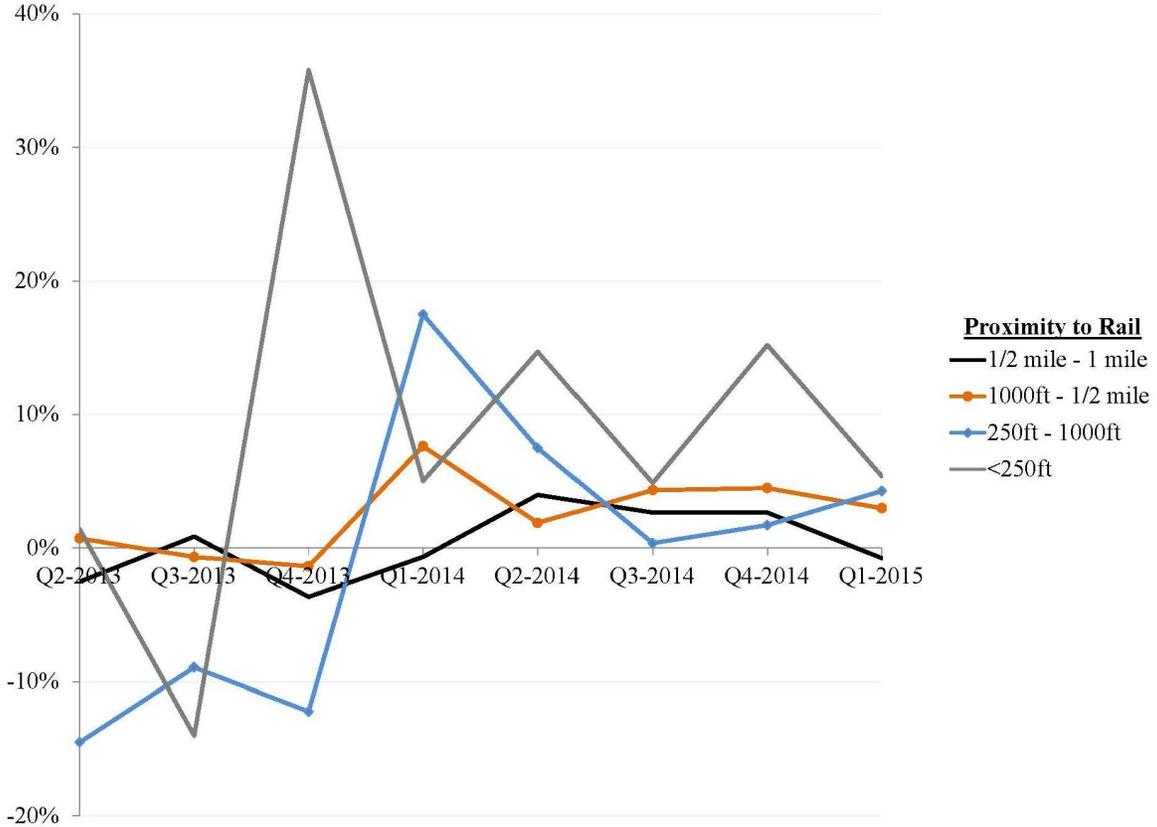
	<u>Percent Impact</u>	<u>Change in Percent Impact After Announcement</u>
<i>Quadratic</i>		
Kilometers from rail	0.0000311	-0.00157
Kilometers from rail (squared)	-0.0000956	-0.0000291
<i>Logarithmic</i>		
Log(kilometers from rail)	-0.00286	-0.00584

Notes: [1] Measure of statistical significance: *** = at 1% level; ** = at 5% level; * = at 10% level;

[2] Estimates control for house characteristics, location (zip codes) and time of sale (year-month dummy variables).

Sources: Realty Trac, ArcGIS

Figure 6
Change in Impact to Property Value from Proximity to Rail
By Quarter Since the Announcement



Note: The estimates reflect the change in the impact of proximity to the rail in each quarter after the announcement of the Vancouver Energy project as compared to the pre-announcement impact of proximity to the rail. For example, in Q1 2015, properties within 250 of the rail sold at a premium (on average, all else equal) of 5.4 percent relative to the discount/premium of proximity to the rail prior to the announcement, which was -5.6 percent (as estimated in this specification).

Table 11: Estimates of Delay Costs Associated with Increased Rail Traffic

Select Locations within Vancouver

	Intersection Characteristics			Volume per Delay		Annual Costs	
	Additional	Average	%	Cars	Trucks	All	Business
	Trains	Vehicles	Trucks			Vehicles	Travel
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Vancouver, Washington:							
Hill Street	4	100	4%	0.2	0.0	\$154	\$24
Beach Drive	4	342	1%	0.9	0.0	\$511	\$52
11th Street	4	1,000	5%	2.4	0.1	\$1,552	\$265
Ind St W 16th St	4	4,400	5%	10.6	0.6	\$6,827	\$1,164
SE 139th St	4	1,250	1%	3.1	0.0	\$1,867	\$191
SE 147th Ave	4	300	1%	0.8	0.0	\$448	\$46
Total						\$11,359	\$1,741

Notes and sources: see Secondary Impacts Report.

Table 12: Estimates of Delay Costs Associated with Increased Rail Traffic

Select Locations Outside Vancouver

	Intersection Characteristics			Volume per Delay		Annual Costs	
	Additional Trains	Average Vehicles	% Trucks	Cars	Trucks	All Vehicles	Business Travel
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Bingen, Washington:							
Maple St	4	330	12%	0.7	0.1	\$545	\$152
Spokane,^[9] Washington:							
East of Spokane							
N Park Rd	8	6,682	9%	15.4	1.5	\$21,508	\$5,032
N Vista Rd	8	2,185	9%	5.0	0.5	\$7,033	\$1,645
N University Rd	8	2,662	9%	6.1	0.6	\$8,569	\$2,005
N Pines Rd	8	11,000	7%	26.0	2.0	\$34,772	\$7,052
N Evergreen Rd	8	1,258	9%	2.9	0.3	\$4,049	\$947
N Flora Rd	8	362	9%	0.8	0.1	\$1,165	\$273
N Barker Rd	8	1,258	9%	2.9	0.3	\$4,049	\$947
Southwest of Spokane							
S Scribner Rd	8	37	11%	0.1	0.0	\$121	\$32
W Anderson Rd	8	90	11%	0.2	0.0	\$295	\$78
Pine St	8	480	5%	1.2	0.1	\$1,490	\$254
F Cheney Spa Rd	8	2,300	5%	5.5	0.3	\$7,138	\$1,217
Cheney-Plaza Rd	8	670	5%	1.6	0.1	\$2,079	\$355
Total						\$92,269	\$19,837

Notes and sources: see Secondary Impacts Report.

Table 13

Estimated Real Market Value and Annual Tax Impact, Vancouver Energy

Study	Geographic Range	Average Effect Over Range	Real Market Value Impact (\$ Million)	Annual Tax Impact (\$000s)
Futch	1 Mile	-0.65%	-65.57	-801.8
Simons and El Jaouhari - 1996	1/3 Mile	0.00%	0.00	0.0
Simons and El Jaouhari - 1999	1/3 Mile	-0.30%	-12.79	-146.1

Note: Estimates reflect market values for properties within one mile of the rail line in Clark County as estimated by Johnson Economics. Effects are based on estimated effects from Futch, and Simons and El Jaouhari. Conservative assumptions are used to translate estimated effects from the hedonic studies to the aggregate property values estimated by Johnson Economics for properties within one-third of a mile of the rail, and properties from one-third to one mile from the rail.