Service lines- tie-in

Description	Class	Dia (in)	Quantity (houses)	Quantity (LF)	Cost	unit	Total cost
Construction							
Residential lines- high density	60 psig	0.625	12,466	807,116	$ 25	LF	$ 20,178,000
Commercial lines- high density	60 psig	1	761	32,975	$ 25	LF	$ 824,000
Subtotal-construction							*$ 21,002,000*

Service lines- tie-in

Description	Class	Dia (in)	Quantity (houses)	Quantity (LF)	Cost	unit	Total cost
Construction							
Residential lines- medium density	60 psig	0.625	8,610	861,000	$ 25	LF	$ 21,525,000
Commercial lines- medium density	60 psig	1	163	16,300	$ 25	LF	$ 408,000
Subtotal-construction							*$ 21,933,000*

Table 2. Estimated Annual Residential, Commercial, and Industrial Sector Natural Gas Requirements for Heating, Power Generation, and Industrial Processing

Category	Count (# of units)	Area (square feet)	Estimated Demand (Bcf/year)
Residential Sector	24,986	57,573,880	5.7
Commercial Sector			
Taxable Structures	978	10,576,081	3.9
Non-Taxable Structures		2,340,000	0.9
Industrial Sector			
Space Heating	571	5,318,832	2.7
Power Generation			2.9
Refinery Processing			4.8
Total	**26,535**	**75,808,793**	**20.9**

Source: Michael Baker, Jr. and Northern Economics, Inc.

2.1.1 Estimated Residential Savings

The current natural gas cost in Fairbanks is $23.35 per Mcf and heating fuel is $3.84 per gallon, at its best rate, delivered, and quoted by two suppliers. Converting to an equivalent heat basis, natural gas costs $23.35 per million British thermal units (MMBtu) and heating oil is $27.67 per MMBtu, an approximate savings of $4.32 per MMBtu.

An average residential home consumes approximately 190 Mcf per year (2009) for a projected natural gas cost of $4,437 per year, versus heating oil of $5,257. This results in an estimated $820 of savings per year, for the average-size home.

Larger natural gas distribution will lead to economies of scale and potentially reduce prices. Team analysts reviewed a range of natural gas prices from $23.35/MCF to $11.00/MCF in $3.00 increments; potential savings ranged from $114 million to $238 million.

Table 1. Potential Conversion Savings, Natural Gas Over Fuel Oil Equivalent, Selected $/Mcf

Natural Gas, $/Mcf	Savings, $
23.35	114,180,000
23.00	118,800,000
20.00	158,400,000
17.00	198,000,000
14.00	237,600,000

Source: Northern Economics Inc.

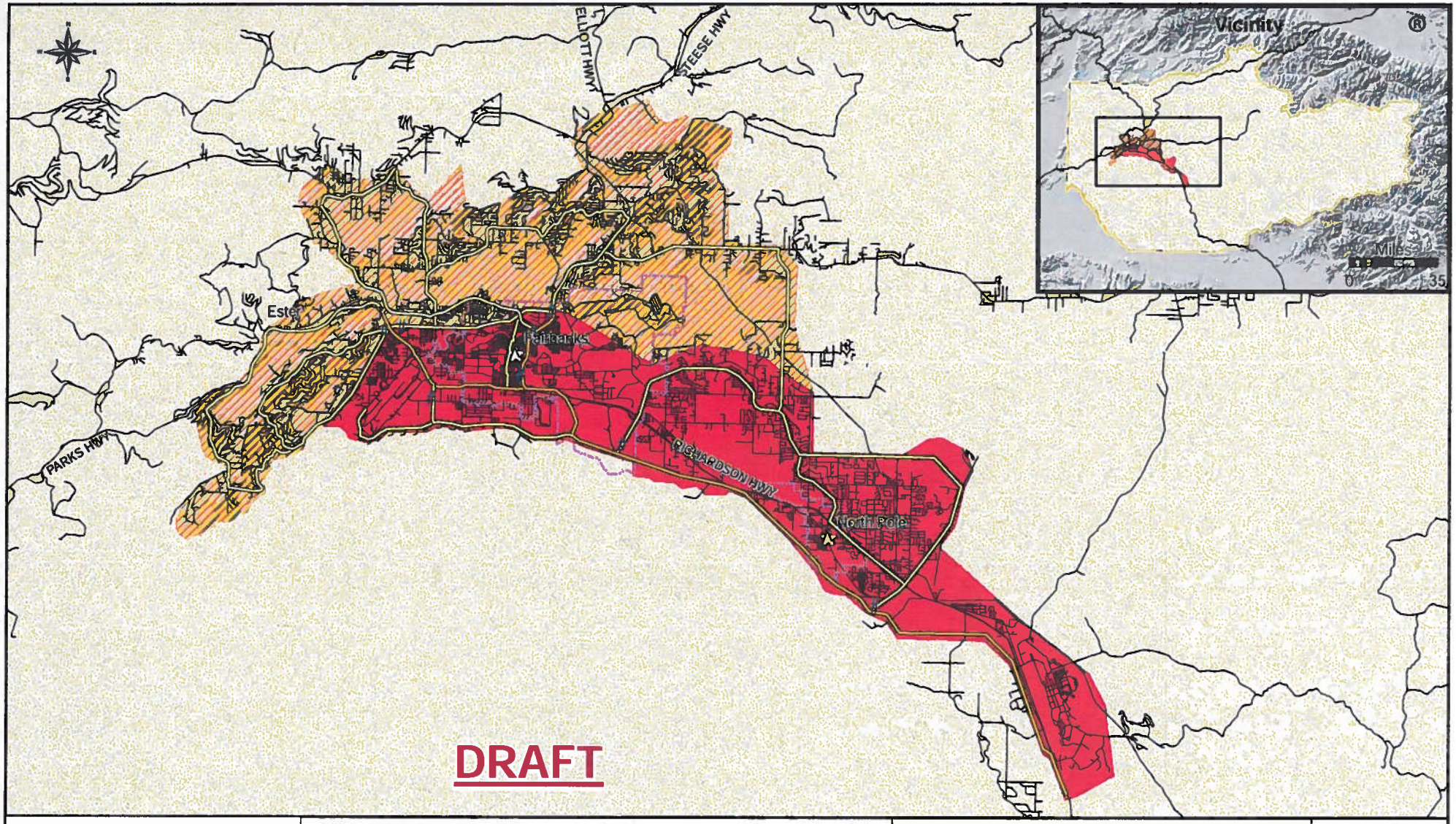

Figure 5
High, Medium, and Low Demand Areas

SCALE	1 in = 3 miles
DATE	01/24/2012

Baker

Legend

- Gas In Point
- Gate Station
- Reg Station
- Roads
- Distribution Pipeline
- Transmission Pipeline
- City Boundary
- Borough Boundary

Demand

- High
- Medium
- Low

Fairbanks North Star Borough
Gas Distribution Analysis

0 1.5 3 6 Miles

Air Quality

The non-attainment designation for the Fairbanks area is a cause for concern for several reasons. First, the local population is at increased risk for respiratory and circulatory health problems. Secondly, the designation negatively affects economic growth in the area. Air quality permits for any commercial or industrial activity cannot be obtained if the activity will increase the amount of PM2.5 emissions over current amounts. Because of this restriction, growth of existing commercial and industrial activity will likely not occur, and new commercial and industrial activities will likely not take root in the Fairbanks area until the U.S. Environmental Protection Agency is satisfied that compliance with the ambient PM2.5 standard is attained and a plan is in place to maintain compliance with the ambient standard.

Natural gas conversion in Fairbanks will reduce the emissions of PM2.5 from residential and commercial facilities. The conversion to natural gas will also reduce Oxides of nitrogen (NOX) and Sulfur dioxide (SO2) emissions, which are precursors to the formation of secondary PM2.5 in the atmosphere. The reduction will help bring the Fairbanks area into attainment with the ambient PM2.5 air quality standard.

Environmental engineers based potential reductions in emissions on a five-year build-out of natural gas distribution with the high demand (high density) zone. Preliminary results, using stated assumptions, suggest reductions in PM2.5 emission of up to 95 percent are possible. Table 4 illustrates these results.

Table 4. Change in Emissions Due to Conversion in the High Demand Zone

Category	NO_x	CO	PM_{10}	$PM_{2.5}$	SO_2	VOC
	(%)					
Residential	-50	-94	-94	-94	-95	-95
Commercial	-35	9	-71	-69	-100	37
Total	-43	-83	-93	-93	-97	-95

Source: SLR International Corp 2012
Notes: CO = Carbon monoxide; VOC = volatile organic compounds.