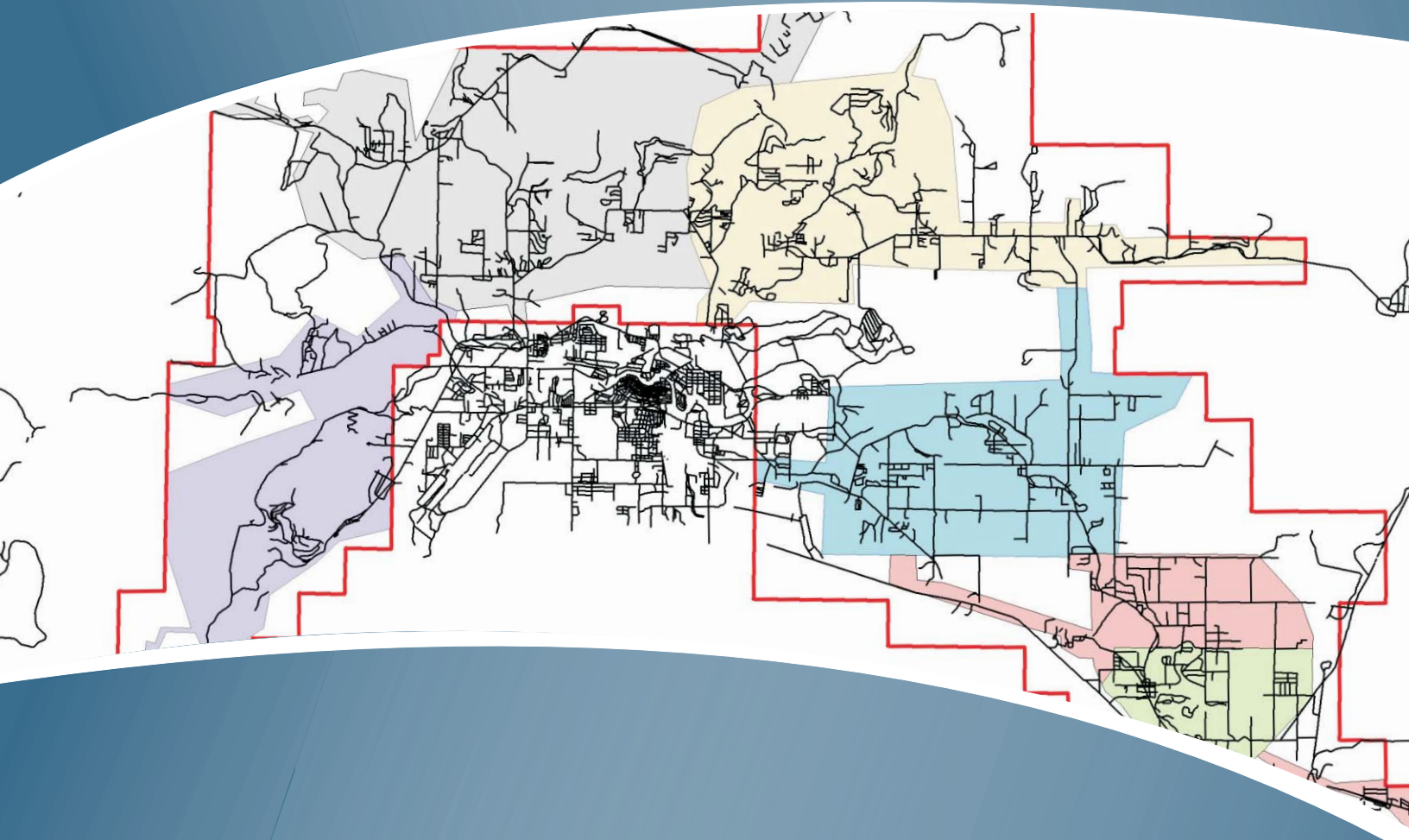


# SIX-YEAR PLAN

FINAL

May 20, 2014

Prepared For





**Interior Gas Utility**

**Six-Year Plan**

**FINAL**

***Prepared for:***

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**May 20, 2014**



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## LIST OF ACRONYMS AND ABBREVIATIONS

%	percent
AEA	Alaska Energy Authority
ADOT&PF	Alaska Department of Transportation and Public Facilities
AHFC	Alaska Housing and Financing Corporation
AIDEA	Alaska Industrial Development and Export Authority
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
COF	City of Fairbanks
CONP	City of North Pole
CPCN	Certification of Public Convenience and Need
EPA	U.S. Environmental Protection Agency
FEDC	Fairbanks Economic Development Corporation
FNG	Fairbanks Natural Gas
FNSB	Fairbanks North Star Borough
FOB	Free on Board
GVEA	Golden Valley Electric Association
IEP	Interior Energy Project
IGU	Interior Gas Utility
IMPLAN	Impact Analysis for Planning
LNG	liquefied natural gas
M	million (dollars)
MBJ	Michael Baker, Jr., Inc.
mcf	thousand cubic feet
MG	million gallon(s)
MWH	MWH Americas, Inc.
NEI	Northern Economics, Inc.
NEPA	National Environmental Policy Act
NGSP	Northern Gas Supply Plant
OBF	on-bill financing
PHMSA	Pipeline and Hazardous Materials Safety Administration
RCA	Regulatory Commission of Alaska
RFP	Request for Proposal
ROW	Right-of-Way
SB	Senate Bill
SETS	Sustainable Energy Transmission and Supply
SIP	State Implementation Plan
SWOT	Strengths, Weaknesses, Opportunities, and Threats

## EXECUTIVE SUMMARY

The Interior Gas Utility (IGU) was formed late in 2012 in response to a community need to lower energy costs by bringing natural gas to Interior Alaska with a goal to deliver gas to the customers' meter in the range of \$15/thousand cubic feet (mcf). On December 20, the IGU was awarded a Certificate of Public Convenience and Need (CPCN) determining a service area within the Fairbanks North Star Borough (FNSB).

Currently, the IGU is building the framework for which the utility will operate, securing funding, developing a capital program to build out the necessary infrastructure, and establishing public outreach protocol to assist homeowners in converting to natural gas. IGU has contracted with MWH Americas, Inc. (MWH) to provide Project Management services for the startup of IGU.

IGU has secured sources of funding for 2014 operations and pre construction activities from the Fairbanks North Star Borough (FNSB) and the Alaska Industrial Development and Export Authority (AIDEA). In April 2014, the IGU secured a line of credit up to \$7.5 million (M) from the FNSB to serve as bridge loan funding for the project and IGU was also authorized, in April 2014 an \$8.1 million through AIDEA from the Sustainable Energy Transmission and Supply (SETS) Loans, available through Senate Bill (SB) 23.

This Six-Year work plan identifies the following major activities:

- 2014 – Utility Set Up: Locate and set up an office, hire a General Manager and Chief Financial Officer, select a Gas Distribution Operator, develop a Business Plan, and develop a Conversions Initiative.  
Design Activities: Permitting and Right-of-Way (ROW) coordination, including federal, state and local; develop hydraulic modeling; develop design standards; select consultant design team (Phase 1); host “Industry Day”, community outreach, and identify permanent and temporary LNG storage requirements; and initiate design of Phase 2.
- 2015 – Initial Construction in North Pole: Construct distribution system and gas storage (Phase 1); finalize design, ROW, permitting, and engineering for LNG gas storage and order long lead items; and initiate design of Phase 3.
- 2016 – First gas delivered to customers; continue construction of distribution through North Pole/Badger Road (Phase 2); finalize design, ROW, permitting, and engineering for distribution and begin construction of LNG gas storage (Phase 3); and initiate design Phase 4.
- 2017 – Complete construction of natural gas distribution system in Badger Road; move North and West from North Pole to complete construction of a permanent LNG storage facility (Phase 3); finalize design, ROW, permitting, and engineering for distribution (Phase 4); and initiate design Phase 5.
- 2018 – North of Fairbanks: Complete construction of Chena Hot Springs Road (Phase 4); finalize design, ROW, permitting, and engineering for distribution (Phase 5); and initiate design Phase 6.

- 2019 – Complete construction of Farmer’s Loop and Goldstream areas to University of Alaska, Fairbanks (Phase 5), and finalize design, ROW, permitting, and engineering for distribution (Phase 6).
- 2020 – Complete Chena Ridge and West of Fairbanks (Phase 6).
- 2021 – Ongoing service line construction.

### **2014 Work Plan**

The 2014 Work Plan includes:

- **Initiate Phase 1** of the gas distribution system:
  - Contract for gas distribution system design consultants.
  - Identify and acquire gas distribution pipe and system material necessary for Phase 1.
  - Identify and acquire ROWs and easements, where appropriate.
  - Acquire associated permits.
- Utility Set Up: locate and set up office, hire General Manager and Chief Financial Officer, develop Business Plan.
- Develop conversion initiatives and community support.
- Develop standards for a gas distribution network and hire an engineering firm to design the gas distribution system.
- Begin hydraulic modeling of the gas system for optimization and future planning, establishing the criteria necessary for design and construction.
- Select an operation contractor and develop operational scenarios and operational standards for the day-to-day operations of the gas distribution system.
- Develop a Scope of Work and hire engineering services for temporary and permanent liquefied natural gas (LNG) storage and a regasification facility (Contractor to be hired).
- **Initiate Phase 2** of the gas distribution system:
  - Gas distribution system design.
  - Initiate permitting process.
  - Initiate ROWs and easement requirements.
  - Continue Community Outreach, conversion initiative, and government relations.

The IGU will continue to develop the scope of work and refine the needs of the project by working directly with AIDEA and strategic partners of the Interior Energy Project (IEP) to keep the project on schedule and within budget, while demonstrating the feasibility of the project through thorough analysis of the cost models and financial analysis, and devising an implementation structure to meet the needs of the Certification of Public Convenience and Need (CPCN) that will optimize the entire IEP.

## **Financing**

Overall project financing will be a mix of the aforementioned FNSB Interfund loans, funding available through SB 23 (State of Alaska loans via AIDEA SETS Loan Funds, and revenue bonds).

The IGU estimates costs for gas distribution lines and storage for Phases 1 through 6 will require \$287 million.

The first customers are currently planned to come on line in the heating season of 2016/2017. With secured funding, anticipated detailed costs of the project can be further developed, such that IGU can work with AIDEA to negotiate the long-term financing for terms and conditions that will allow the price of gas to approach an approximate cost of \$15/mcf at the customer's meter – the IEP target price structure.

## **Environment**

In December 2009, the U.S. Environmental Protection Agency (EPA) formally designated the FNSB as a non-attainment area for federal fine particulate matter (PM 2.5) air quality standards, and set a deadline of December 2014 for the FNSB to comply with these regulations (Clean Air Act Sections 110 and 172). Accomplishing conversions from wood to natural gas, which is expected to reduce PM 2.5 emissions by 32 percent, will require natural gas to be priced competitively with wood as a fuel source (CE, 2014a).

Poor air quality has led to a proven increase of adverse health effects, particularly in children, the elderly, and vulnerable adults. Health savings and benefits, including a decrease in mortality rates, could benefit the community by \$64 million to \$200 million by 2020, based on various sources (CE, 2014a).

## **Economic Impacts**

Initial economic impacts show that, depending on the construction year, total jobs related to the project are estimated between 250 and 840 – accounting for between \$16.5 million and \$55.2 million of total income in the FNSB. An average of 440 direct and indirect induced jobs over the construction period is predicted, with an average labor income of \$29.1 million between the years of 2014 and 2021 (CE, 2014b).

Long term operations analyses are predicted from 2014 to 2028 and conclude an average of 580 local jobs, with an average labor income of \$23.4 million. The study predicts an indirect economic impact from other FNSB businesses to equate to approximately 520 jobs and \$10.9 million (CE, 2014b).

## **Design**

At least three consultants are expected to be hired for work pertaining to the design and layout (Phase 1), engineering (Phase 2), and storage development. Design consultants are expected to be hired in the second quarter or early third quarter of 2014. These consultants will be contracted through IGU and managed by MWH. The consultants will begin work on design,

environmental documentation, ROW acquisition, and permitting for the distribution system, and will stay with the phase of the project for which they are hired until its completion.

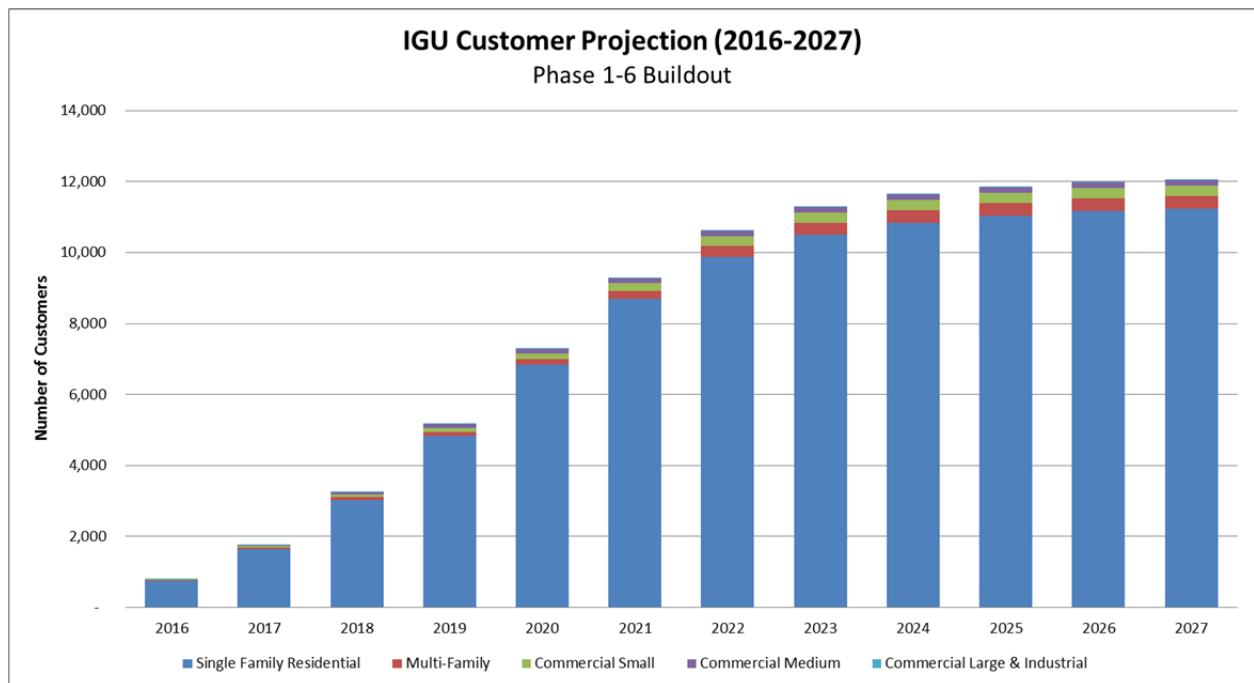
**Operations**

IGU intends to contract the operations portion of the system. A Statement of Qualification will be developed to select qualified companies who will be requested to submit and respond to a Request for Proposal (RFP). It is expected that the service provided will include, at a minimum: operations and maintenance of the system, Pipeline and Hazardous Material Safety Administration (PHMSA) response, the customer service components of responding to requests for new connections, billing, and collections.

IGU currently anticipates maintaining an initial staff consisting of a General Manager and Chief Financial Officer to be hired in 2014, and a single support staff, as direct employees.

**Conversions**

It is estimated that 4,974 customers will connect by 2019, with a potential customer base of 11,920 by 2027, as shown on **Figure ES-1**. The IGU will work with the legislature, community members, and local businesses to determine an appropriate solution for conversion assistance. At this time, an on-bill payment plan allowing conversion costs to be rolled into a customer’s monthly bill is thought to be the most favorable solution to overcome conversion costs averaging thousands of dollars (CE, 2014a). This solution expects homeowners to pay off the conversion price within 3 to 5 years, while immediately lowering their monthly heating bill. The IGU anticipates converting up to 77 percent of the service area population by 2027.



**Figure ES-1 IGU Customer Projection (2016-2027)**

## 1.0 INTRODUCTION

### 1.1 Purpose

This document presents Interior Gas Utility's (IGU's) Six-Year Plan for building and operating a natural gas distribution system to serve the Interior communities of Alaska. The plan calls for liquefied natural gas (LNG) supply from the North Slope, transportation, storage (including gas transmission), distribution, and customer gas conversion in the areas of the Fairbanks North Star Borough (FNSB) that are not currently served by Fairbanks Natural Gas (FNG).

This Six-Year Plan is meant to be a roadmap to achieve the desired outcomes, perceived challenges, and attainable solutions to meet the IGU mission / vision:

*“The IGU's mission is to provide low cost, clean burning, natural gas to the most people in the Fairbanks North Star Borough as soon as possible.*

*As a public utility, the IGU is focused on lowering energy costs, improving the quality of life for all those who live here and visit here and bringing both economic and environmental relief to the residents of the Interior to keep our community vibrant.”*

In January 2014, MWH Americas, Inc. (MWH) was retained by IGU to assist with management of the project and to develop an initial plan for the utility. A Six-Year Plan has been developed to reflect the nature of the project, which has a tentative 6-year build-out. The following drivers and benefits have been identified for the IGU project:

- Interior Alaska has the highest utility costs in the nation, according to the Council for Community and Economic Research in 2012 (*Juneau Empire*, 2012). Bringing LNG to Interior residents will significantly reduce their home heating bills, making life in the Interior more affordable and enjoyable.
- Interior Alaska has suffered from hazardous fine particulate matter (PM 2.5) air quality conditions, in part due to solid fuel heating system emissions. This Six-Year Plan reviews environmental conditions and demonstrates the benefits that converting to a natural gas distribution system will assist in addressing federal and local air quality attainment goals and providing economic benefits to the area. The evidence suggests significant reductions in harmful air particles and community health costs may be achievable through the operation of a natural gas system.
- In order for Interior Alaska to benefit from lower utility costs and better air quality, this project must be delivered in the range of \$15 per thousand cubic feet (mcf). Financial modeling is based on this price point. Alaska Senate Bill (SB) 23 allows for financial terms and conditions flexibility to reach this goal.

### 1.2 Six-Year Plan Organization

This Six-Year Plan is organized into 13 sections and two appendices, as follows:

- Section 1.0, Introduction – Introduces the purpose of the Six-Year Plan and provides the organization of the plan.

- Section 2.0, IGU Structure – Describes the structure of the IGU and how the gas distribution utility was created to achieve the mission and vision described in Section 1.0.
- Section 3.0, General Overview – Describes the legislative history, the Regulatory Commission of Alaska (RCA) process, service areas, and timeline for the project, and provides an overview of the current status of IGU.
- Section 4.0, Previous Studies – Presents a cumulative list of previous studies that were used for the Six-Year Plan to incorporate the work on demand analysis, conversion, build-outs, economic and environmental impacts, storage, trucking, distribution, and financing that has been done by other consultants and agencies since 2012.
- Section 5.0, FNSB Benefits – Discusses the benefits, both environmental and economic, for implementing the IGU project.
- Section 6.0, Community Involvement – Discusses public involvement and how IGU will communicate to create a “Community Plan”, incorporate implementation strategies for communications and examine the use of a wide range of outreach tools for stakeholders in the community.
- Section 7.0, Strategic Partnerships and Working Relationships – Addresses the strategic partnerships that are needed for the project to succeed and the working relationships required for the successful completion of a 6-year build out.
- Section 8.0, System Design and Construction – Describes the approach to the gas distribution system design, including technical and safety standards. This will include mapping, natural gas demand analysis, construction prioritization, storage and interties, cost estimating, permitting, Right-of-Ways (ROWs), and operations.
- Section 9.0, Operations – Describes the services to be provided and IGU’s intent to contract out the operation of the system.
- Section 10.0, Conversion – Reviews the natural gas demand and customer conversions using information available through existing studies and offers several solutions to engage and assist potential customers in cost effective conversions.
- Section 11.0, Financial Analysis – Provides descriptions and analysis of the project feasibility and costs using the most current available data and financing options. Projections are provided by using assumed permitting and ROW issues, design considerations, construction estimates, price of natural gas Free on Board (FOB) Fairbanks, and operational assumptions.
- Section 12.0, Path Forward – Presents a recommended path for the next 6 years to deliver natural gas to IGU customers.
- Section 13.0, References – Provides a list of the references used in this Six-Year Plan.
- Appendix A, IGU Project Phases 1 through 6 – Presents figures showing each phase of the project.
- Appendix B, IGU Project Class 4 (+50%/-30%) Cost Estimate – Presents the cost details.

## 2.0 IGU STRUCTURE

In 2012, the movement to create a public natural gas utility for Interior Alaska gained momentum when the City of Fairbanks (COF), City of North Pole (CONP), and FNSB recognized the need to explore economic energy relief by way of a natural gas project. In order to create a borough-wide utility, it was necessary for both cities to authorize a transfer of their utility powers to the FNSB by ordinance. On September 10, 2012, the COF passed Ordinance No. 5895 to transfer their utility powers to the FNSB, and on October 1, 2012, the CONP passed Ordinance 12-18 to transfer their utility powers to the FNSB. These acts allowed the FNSB to create the Interior Alaska Natural Gas Utility (IANGU) referred to as Interior Gas Utility (IGU), which was done on October 11, 2012 (FNSB Ordinance 2012-52).

The FNSB Assembly created and approved IGU as a public corporation, wholly-owned subsidiary of the FNSB. The IGU Board is authorized to manage and operate the utility in accordance with prevailing industry practices and general standards common to utilities providing the same service. The respective governing bodies appointed the following members for staggered terms as follows:

- Robert Shefchik, Chairman (FNSB) – Term expires on December 31, 2015
- Michael Meeks, Vice-Chair (Fairbanks) – Term expires on December 31, 2015
- Steve Haagenson, General Manager (FNSB) – Term expires on December 31, 2016
- Frank Abegg, Director (Fairbanks) – Term expires on December 31, 2016
- Jim Laiti, Director (FNSB) – Term expires on December 31, 2014
- Oran Paul, Director (FNSB) – Term expires on December 31, 2014
- William Butler, Director (North Pole) – Term expires on December 31, 2016

After the first four appointed terms in December 31, 2014 and 2015 have expired, their successors will be voted in by the voters of the FNSB. The Borough Clerk is currently working on an ordinance setting up this election. Upon the term expiration of the final three members in 2016, their successors will be appointed – one each by the COF, CONP, and FNSB Mayors.

In January and February 2013, the IGU bylaws were created and approved by the FNSB and a gas distribution plan was presented to the RCA.

On the first Tuesday of every month from 4:00 to 6:00 pm, the IGU Board meets in the Fairbanks City Hall for a Board meeting, and on the third Tuesday of every month, the Board meets for a work session at the Fairbanks Economic Development Corporation (FEDC). All IGU meetings where three or more board members are present are publically noticed 5 days prior to the event, and are open to the public, with exception of Executive Sessions.

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## **3.0 GENERAL OVERVIEW**

This section provides a general overview of the IGU Six-Year Plan, including: the framework on which the IGU was created, how this project integrates with the Interior Energy Project (IEP), areas within the FNSB and timelines to be served, an overview of the financial projections, and the keys to successful implementation.

### **3.1 Background**

The Alaska 28<sup>th</sup> Legislature passed SB 23 in 2013, which detailed a financing package of \$332.5 million (M) for the advancement of the IEP, including the development of an LNG plant on the North Slope, trucking and storage options, and a gas distribution system in the Fairbanks area. A combination of appropriation and financing authority were provided to the Alaska Industrial Development and Export Authority (AIDEA).

The IGU Board has been supported by the Fairbanks Economic Development Corporation (FEDC) with staff assistance and \$9,500 in private equity. The FNSB has also supported IGU with staff assistance and delegated IGU to fulfill a 2012 state appropriation of \$3 million awarded to the FNSB for natural gas distribution. These monies were granted for pre-construction activities that allowed IGU to determine the community need for such a project and apply to the RCA for a service area resulting in a Certification of Public Convenience and Need (CPCN).

On December 20, 2013, IGU was granted the CPCN to service the area outside of the existing Fairbanks Natural Gas (FNG) service area, located within the City of Fairbanks (RCA Order U-13-103(19)). The IGU has since hired MWH as staff to: conduct the day-to-day business needs of the utility, develop a Business Plan for the utility, assist in securing funding, develop a Request for Proposal (RFP) to hire a design firm(s) and an operational contractor, develop a capital program to build out the necessary infrastructure, and work on public outreach to assist homeowners in converting to natural gas.

Additionally, the FNSB has authorized a \$7.5 million line of credit to IGU to be used as bridge loans for funding gaps.

### **3.2 State and Federal Legislative History, Past and Current**

The passing of SB 23 is an initiative by the State of Alaska as a first step commitment to provide energy relief for the residents of Interior Alaska. The below sections outline the premise of SB 23 and the specific expectations of the IEP, as well as review state and federal legislation that could have an impact on the project, if passed.

#### **3.2.1 Senate Bill 23 – The Interior Energy Plan**

SB 23 is the enabling legislation for the IEP, and seeks to provide a reliable natural gas energy supply to Interior Alaska, which is currently suffering under extremely high energy prices, poor

air quality, and poor economic growth. On April 12, 2013, the legislature passed SB 23, which provides for partial financing of a LNG plant by AIDEA, trucking of LNG, and build-out of a natural gas distribution system to bring gas to the homes and businesses of most people in the FNSB.

As of April 3, 2014, AIDEA has authorized IGU \$8.1 million for initial start-up costs and FNG \$15 million for the expansion of their existing distribution system in Sustainable Energy Transmission and Supply (SETS) loan financing.

Developments are ongoing relating to the North Slope LNG Facility – commercial terms negotiations are underway, while permitting and construction procurement proposals are ongoing and under review (AIDEA, 2014). Additionally, AIDEA has hired a consulting firm to look at a total supply chain management analysis (gas production, trucking, storage, and regasification) to allow for the most efficient and lowest cost of gas FOB Fairbanks.

The goals of the IEP are to:

1. Bring relief in the form of reduced heating fuel costs and electricity prices to Interior Alaska.
2. Provide an abundant source of reliable natural gas at a reasonable cost within 3 years for residential, commercial, and industrial use.
3. Benefit residents in other parts of the state.

The IEP has the following components:

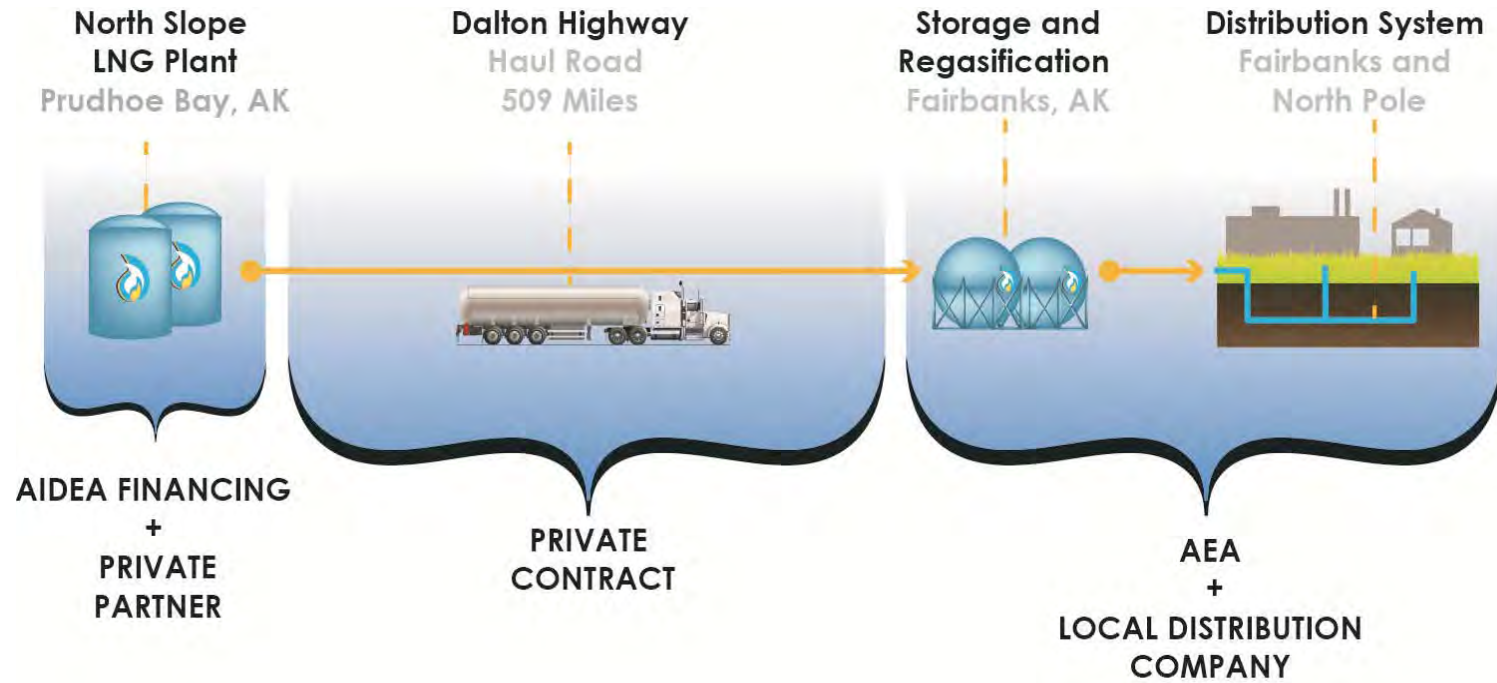
- Construct a gas conditioning and liquefaction plant on the North Slope.
- Establish a truck delivery system to Fairbanks.
- Construct a LNG storage and regasification facility in Fairbanks.
- Expand the gas distribution system in the FNG service area and develop the IGU service area, and provide for potential propane delivery system to the lower density areas in the Interior.

A graphic demonstrating the various components of the IEP is shown on **Figure 3-1**.

SB 23 provided the following financial packages:

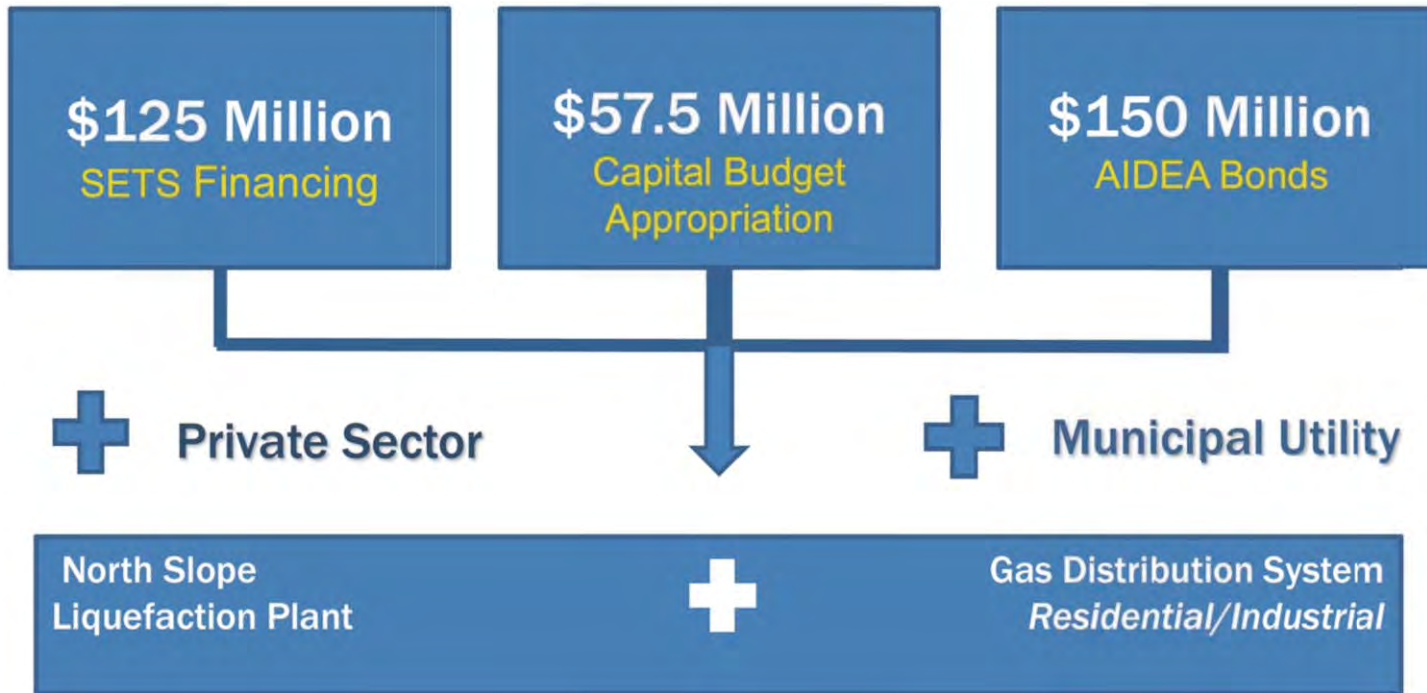
- \$125 million in Sustainable Energy Transmission and Supply (SETS) loans to provide optimal commercial structure at a rate not to exceed 3 percent (%) interest rate, and flexibility on length of loan.
- \$150 million in AIDEA bonds at a 3% interest rate over a 30-year term (projected rate based on current market conditions).
- \$57.5 million in capital appropriations, to be used within 5 years of appropriation.

The \$332.5 million appropriation is shown on **Figure 3-2**.



SOURCE: IEP, 2014 (SLIDE #3)

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SOURCE: IEP, 2013 (SLIDE #4)

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### **3.2.2 Alaska Legislature**

IGU will need to work closely with the members of the Interior Delegation especially, and the Alaska Legislature at large, to educate, inform, and develop legislative action that can help communities benefit from a lower cost heating fuel option and applicable conversion programs. While several loans exist through AHFC, none of them specifically address heating system conversions (CE, 2014a).

One attempt (House Bill 35, 2013-2014) was offered in the 2013 Legislative session and could be used as a framework to create future legislation providing these outcomes. The IGU will continue to consider legislation that sets the framework for a conversion program such as an on-bill payment system, where the utility will assume the debt, while the homeowner enjoys lower energy bills. The homeowner could still typically see a return on this investment within 3 to 5 years (CE, 2014a).

Tax credits for LNG storage development are available within Alaska Statute (AS) Section 43.20.047 of at least \$30 million. The tax credit for a storage tank may not exceed the lesser of \$15 million or 50% of the costs incurred to establish or expand a LNG storage facility, and the facility must have a storage volume of not less than 25,000 gallons of natural gas. Estimates of the permanent storage tank needs are expected to surpass this volume.

### **3.2.3 U.S. Federal Government**

On February 27, 2014, a bill was introduced in the Senate that would establish a federal loan program for utilities under the jurisdiction of a local government, serving a community no larger than 50,000 who experience energy costs 200% higher than the national average to build natural gas distribution infrastructure. Based on this definition, IGU would likely be eligible to participate in the “Fuel Grid Distribution Loan Pilot Program” and utilize legislation from the “Energy Efficient Heating and Cooling Tax Credit Act.” This bill awaits a hearing in the Agriculture, Nutrition, and Forestry Committees (Govtrack, 2014).

## **3.3 RCA Process**

In March 2013, IGU began preparation of the CPCN application for a gas distribution system outside of the FNG service area, and on April 22, 2013, IGU filed a CPCN with the RCA.

In July 2013, the RCA scheduled public meetings in Fairbanks over 2 days where community members testified to the need and desire for energy relief. The RCA used these public meetings to receive public input on the granting of a CPCN, which had been requested by both IGU (a public utility) and FNG (a private corporation with an existing service area within the COF).

The RCA convened in September and October 2013 in Anchorage for a review of these two applications to determine the most “fit, willing, and able” entity to service the high and medium density areas of the FNSB outside the existing FNG service area.

On December 20, 2013, the RCA granted IGU the CPCN for the applied service area, with the condition of a minimum 5-day gas storage reserve based on the projected daily demand of non-interruptible customers to protect and promote public interest. This is the same condition imposed on the FNG service area by Order U-96-129(3). While the IGU did make great concessions to regulate the build-out, operations, security of supply, ownership, and enforcement of conditions, the RCA found these to be not necessary to apply as a condition of the certificate as the IGU is a wholly-owned subsidiary of the FNSB, subject to the FNSB Assembly, including rate regulation.

The RCA, therefore, concluded that IGU will not be economically regulated unless requested by the FNSB Assembly (RCA U-13-103).

### **3.4 Serving Areas and Construction Timeline**

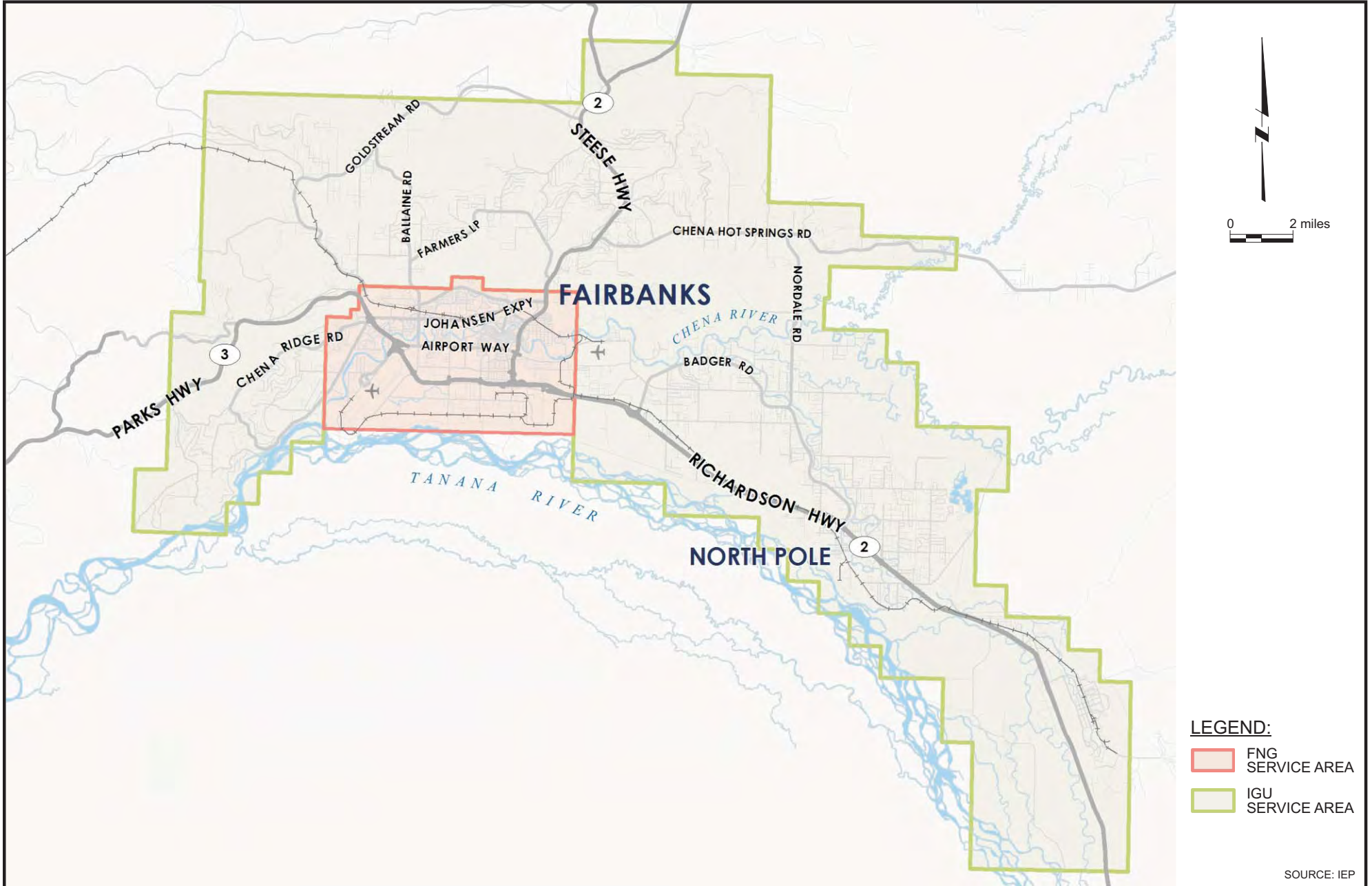
The FNG and IGU service areas are shown on **Figure 3-3**. Transmission lines for IGU that will be built through the FNG area are shown on **Figure 3-4**.

The IGU project follows an aggressive schedule, with construction work tentatively planned to begin in the downtown North Pole area in the summer of 2015. Currently, the IGU project is a six-phase build out, as shown on **Figure 3-5**. Details of each phase are provided in **Appendix A**. This schedule depends heavily on several variables, the largest of which is to secure funding at each stage of the project.

The proposed timeline for phased construction is:

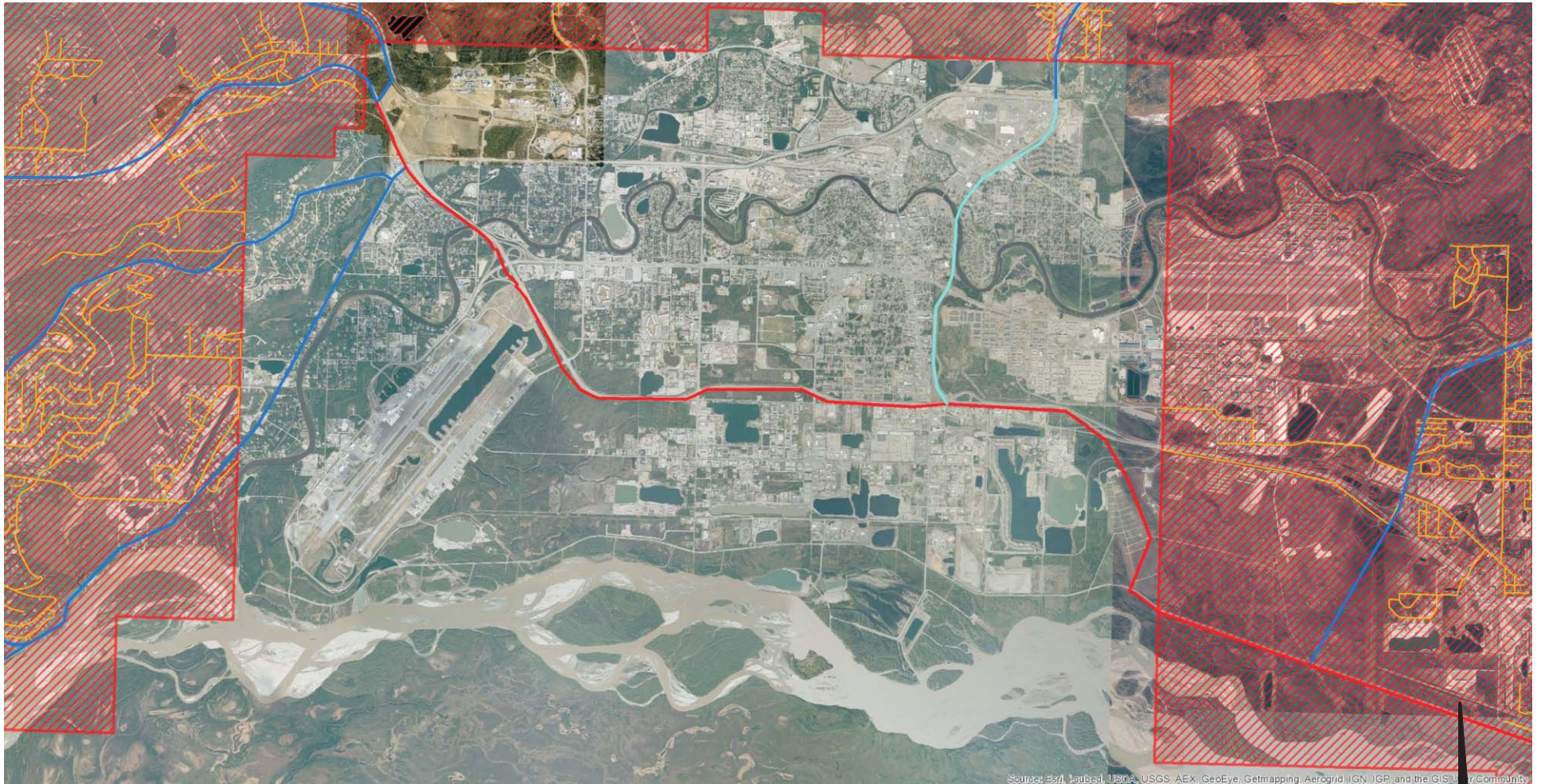
- 2014 – Gas Distribution Phase 1: Design, ROW, permitting, and engineering for distribution and temporary LNG gas storage.
- 2015 – Initial Construction in North Pole: Construction of distribution system temporary LNG gas storage (Phase 1), including design, ROW, permitting, and engineering.
- 2016 – First gas is delivered to customers: continue through North Pole/Badger Road (Phase 2), including design, ROW, permitting, and engineering for distribution and LNG gas storage.
- 2017 – Complete Badger Road, move North and West from North Pole; complete construction of a permanent LNG storage facility (Phase 3), including design, ROW, permitting, and engineering for distribution and LNG gas storage.
- 2018 – North of Fairbanks: Chena Hot Springs Road (Phase 4) design, ROW, permitting, and engineering for distribution and LNG gas storage.
- 2019 – Farmer’s Loop and Goldstream areas to University of Alaska, Fairbanks (Phase 5) design, ROW, permitting, and engineering for distribution and LNG gas storage.
- 2020 – Chena Ridge and West of Fairbanks (Phase 6) design, ROW, permitting, and engineering for distribution and LNG gas storage.
- 2021 – Ongoing service line construction.

For a more detailed analysis and maps of the timeline and design, refer to Section 8, System Design and Construction.



SOURCE: IEP

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**LEGEND:**



IGU BOUNDARY



10-INCH TRANSMISSION LINE



6-INCH DISTRIBUTION LINE



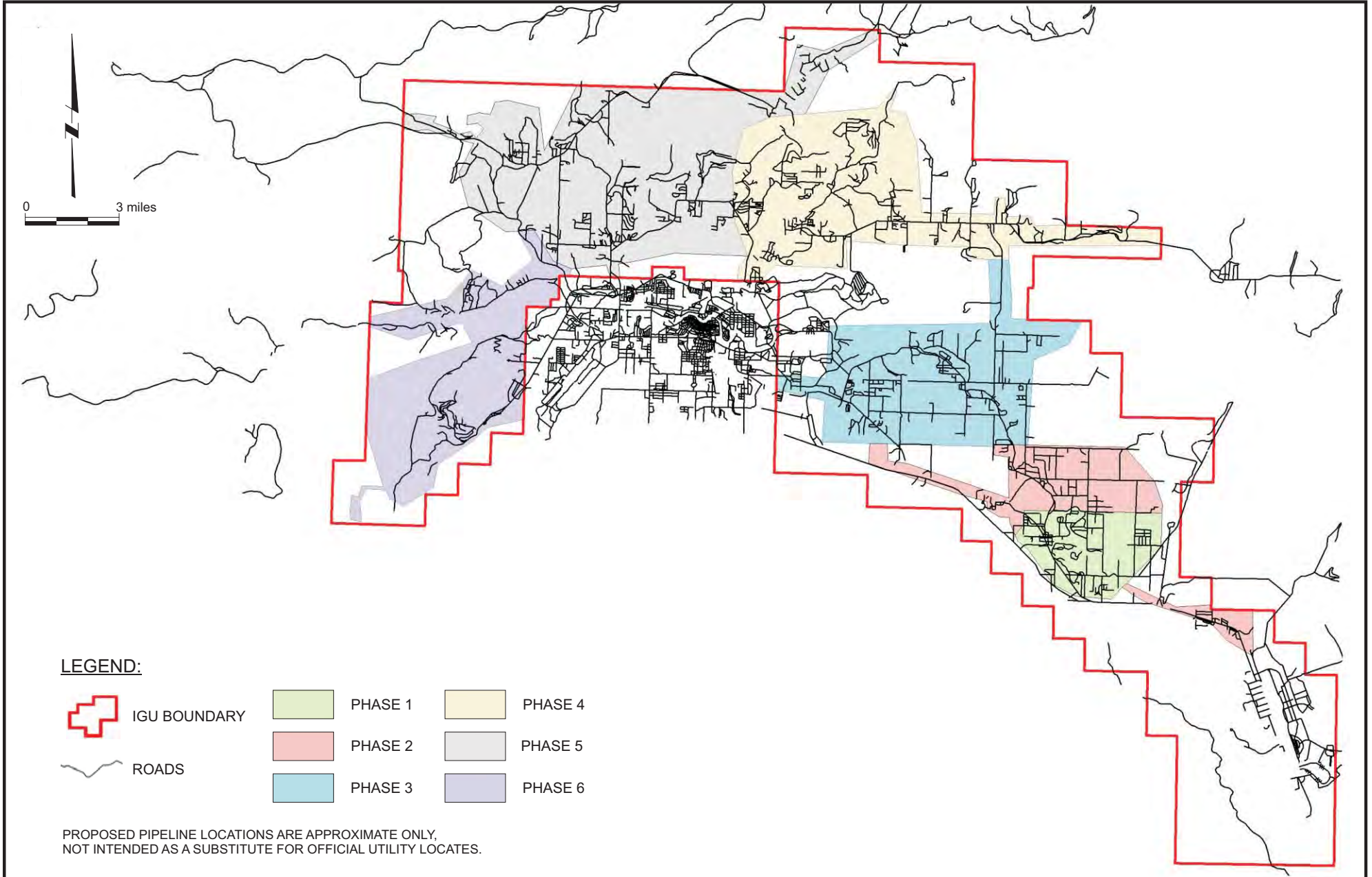
8-INCH TRANSMISSION LINE





IGU PROPOSED GASLINE

PROPOSED PIPELINE LOCATIONS ARE APPROXIMATE ONLY,  
NOT INTENDED AS A SUBSTITUTE FOR OFFICIAL UTILITY LOCATES.

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**LEGEND:**

- |  |   |   |
|--|---|---|
|  IGU BOUNDARY |  PHASE 1 |  PHASE 4 |
|  ROADS        |  PHASE 2 |  PHASE 5 |
|  |  PHASE 3 |  PHASE 6 |

PROPOSED PIPELINE LOCATIONS ARE APPROXIMATE ONLY,  
NOT INTENDED AS A SUBSTITUTE FOR OFFICIAL UTILITY LOCATES.



SIX-YEAR PLAN  
IGU SERVICE AREA BY CONSTRUCTION PHASE

FIGURE

3-5

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### 3.5 Financial Requirements of IGU and Rate Structure

A Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis was done in June 2012 by Northern Economics, Inc. (NEI) to assess the ability of IGU to meet the primary goal of achieving the lowest cost energy to the most people as soon as possible. The NEI study estimated the number of natural gas customers and the timing of gas conversion, as well as the affects, costs, and financial implications of a Fairbanks Gas Distribution System.

Some of the specific aspects considered in the SWOT analysis, based on preliminary system design and costs estimates, include (NEI, 2012):

- Meet a capital investment requirement in the range of \$283 to \$606 million to complete high and medium demand areas, with a median investment requirement of about \$404 million.
- Determine the likelihood that PM 2.5 air quality reduction goals will be achieved. One of the keys to achieving annual PM 2.5 attainment is switching solid fuel (coal/wood) heating systems to natural gas. This requires a cost of service for natural gas near \$15/mcf, depending on current market prices of heating fuel.

The SWOT and estimated costs indicate a state partnership organization – one with the support of grants or loan guarantee arrangements from AIDEA – could substantially improve project returns and end-user affordability. This economic structure benefits end-user costs near the \$15/mcf target to promote switching from solid fuel to natural gas. With the monetary backing and financial support of the State, the partnership is likely to achieve community goals of low cost gas to the broadest service area, within 5 years or less (NEI, 2012).

MWH updated the Class 4 Total Installed Cost estimate provided by the NEI Gas Distribution Analysis (MBJ, 2012) to reflect the costs for the IGU project. A Class 4 estimate is defined, for accuracy and detail, by the Association for the Advancement of Cost Engineering (AACE) as a project where design is 1% to 15% complete, with an expected accuracy range of +50%/-30%. A detailed analysis of the updated IGU area cost estimate is provided in **Appendix B**.

Currently, funding scenarios are being driven based on a target cost to the consumer of near \$15/mcf to meet the demand for lower-priced energy, making conversion attainable and the project economically feasible. Regardless of how the many financial scenarios are modeled, \$15/mcf is the target price where the FNSB residents receive affordable gas that justifies the cost of conversions and provides reasonable space heating savings.

### 3.6 Current Status of IGU

The IGU initially began work on the following tasks with MWH:

1. Project Kickoff
2. Five-Year Plan (now called the Six-Year Plan) for Cost-Effective LNG Supply and Storage, including Gas Transmission, Distribution Customer Gas Conversion (this document)

3. Task Scoping and Project Management
4. AIDEA Financing

### **3.6.1 Project Kickoff**

The Project Kickoff included a Kickoff Meeting with the IGU Board to ensure alignment between MWH and IGU on the scope of work, priorities, and other critical aspects of the project. A working methodology was developed for how the Project Team will function and communicate on a daily, monthly, and quarterly basis with the public, media, and IGU Board, and sets the stage to execute IGU's major goals.

The Six-Year Plan incorporates existing studies using all available information on current cost estimates and schedules for the: LNG supply, trucking, and storage; gas transmission and distribution expansion; and customer gas conversion. These studies include those done by NEI, HDR Inc., and CardnoENTRIX, as well as supporting documents from the FNSB, RCA, AIDEA, and IGU to determine the scope and cost of the project.

The Six-Year Plan recommends a path forward based on these studies and current state of affairs. With IGU Board input, this plan was finalized in May 2014.

### **3.6.2 Task Scoping and Project Management**

As the details of the IEP are evolving, the management of the IGU gas distribution project must respond accordingly. Controlled management of the project determines the success of IGU by meeting the deliverables outlined by the IGU Board and stakeholders.

### **3.6.3 Financing**

The path of this project begins with secure financing. While long-term financing negotiations continue, short-term financing has been authorized by the FNSB and AIDEA.

The IGU Board has been supported by the FEDC with staff assistance and \$9,500 in private equity. The FNSB has also supported IGU with staff assistance and delegated IGU to fulfill a 2012 state appropriation of \$3 million awarded to the FNSB for natural gas distribution. These monies were granted for pre-construction activities that allowed IGU determine the community need for such a project and apply to the RCA for a service area resulting in a CPCN, and were based on tasks authorized by the FNSB under the capital appropriation. The IGU provides quarterly updates to the FNSB Assembly and quarterly written updates to the FNSB demonstrating work that has been done based on the task. These are capital appropriations - or grants - from the state and do not need to be paid back.

On March 27, 2014, the FNSB Assembly approved a \$7.5 million line of credit for the IGU. These funds are intended to be used as bridge funding for anticipated gaps in the deposit of state funds. These funds must be approved by the FSNB Chief Financial Officer and paid back within 3 years of the withdrawal date, with fair market interest.

On April 3, 2014, AIDEA authorized \$8.1 million from the SETS loan program for initial development work on the LNG gas distribution system. The loan terms allow a 0% interest for 20 months and set a term negotiation agreement deadline for December 20, 2015. If final terms are not agreed upon by this date, the loan terms change to 3% for 40 years.

The AIDEA financing component combines the financial strategies in the Six-Year Plan. This task initiates a process to prepare backup materials, and then discuss and negotiate with AIDEA the sources of funds and associated terms and conditions required for the various phases of the project. These tasks will be qualified by past reports and assumptions best known at the time of the request to show the capital outlay, debt service, and cash flow needed to execute IGU's mission to provide low cost gas to the meter to as many people as possible, as quickly as possible within the IGU service area. The IGU finance team has produced a comprehensive cost model that will allow multiple scenarios to be evaluated, including loan terms and conditions. More detail on the cost model is provided in Section 11, Financial Analysis.

### **3.6.4 Keys to Implementation**

The keys to implementing this complex Six-Year Plan is setting up clear communication tools that allow the team to constantly update, evaluate, and demonstrate the project details as they are moving forward. Project management and coordination with all stakeholders is essential to keep the project focused and on schedule. This includes setting up systems to manage risk, infrastructure build out, customer conversion, and finances.

The keys to a successful project are:

- Board involvement and direction.
- Available funding and associated terms and conditions.
- Stakeholder involvement.
- Supply chain liability.
- Project Manager responsiveness.
- Public acceptance.

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## 4.0 PREVIOUS STUDIES

Several studies have been done on a natural gas distribution project to the Interior and this section lists applicable studies in an easy-to-reference format. This includes work completed by NEI (Gas Distribution System Analysis, 2012, and Residential Household Survey) and CardnoENTRIX (Conversion Analysis), which were used extensively to provide the framework for which the Six-Year Plan was written. Costs on trucking were provided mainly from the Prolog Trucking Analysis.

### 4.1 Study Matrix

The studies utilized for the development of the 6-year build out are provided in **Table 4-1**, and four of the main ones are discussed below.

#### 4.1.1 Northern Economics Inc.

NEI delivered to FNSB and IGU work that analyzed various scenarios for an optimized, rapid build-out of a natural gas system to serve the FNSB. This work entailed developing gas demand, determining the potential impact to improving the air quality, and conducting a survey within the community to identify the cost and willingness to convert homes and businesses to natural gas.

NEI gas distribution studies in 2012 and 2013 looked at the development of a gas distribution network and an estimate of cost to build this network out. Assumptions were made for the number of homes and businesses that might convert to natural gas and what impact that would have on the air quality. Additionally, a study was completed on the cost that focused on initially building out the area from Badger Road south to North Pole.

Between August 24 and September 4, 2013, a Residential Household Survey was conducted by telephone to establish home heating systems and willingness to convert. This survey had a margin of error of +/-3.5% on yes/no questions. Twenty-one questions were asked of 800 households in the FNSB and included topics on: heating system type and fuel expenditure (primary and secondary), age of primary system, participation in AHFC loan programs, willingness to convert to natural gas, air quality, age and size of home, and respondent demographics (NEI, 2013).

The survey shows that FNSB homeowners are very interested in heating with natural gas, and this interest level runs across demographic and attitudinal factors. Generally, homeowners believe bringing natural gas to Fairbanks will help the economy, raise property values, and improve air quality; however, conversion costs pose a marked hesitancy to the benefits. The study finds that in order to generate conversion rates above 50%, residential conversion costs should be kept to below \$6,000 per home (NEI, 2013).

**Table 4-1 IGU Studies**

<b>Study Name</b>	<b>Date</b>	<b>Done By</b>	<b>Other Name(s)</b>	<b>Description</b>
IEP Economic Impact Analysis	4/1/14	CardnoENTRIX		Review of IMPLAN modeling data and analysis of the economic impacts of the IEP using assumptions provided in the CardnoENTRIX IEP Conversion Analysis.
LNG Transportation Analysis	2/20/14	Prolog Canada		Assesses the costs and logistics of trucking gas from the NS to FNSB.
Google Earth (GE) Map on Proposed IGU Distribution System	2/14/14	MWH		The GE map is found under 'Maps' on the IGU website: <a href="http://www.interiorgas.com">www.interiorgas.com</a> for download only. Must have GE to view. An interactive map using GE technology allowing a user to closely evaluate proposed transmission lines within each phase of the build-out
AIDEA Project Schedule	1/23/14	AIDEA		Updated graph showing AIDEA's project schedule.
IEP Conversion Analysis	1/14/14	CardnoENTRIX	CardnoENTRIX Study	Fairbanks LNG Distribution System Conversion and Demand Analysis for residential and commercial customers.
IEP Distribution Map	12/20/13	AIDEA		Updated map of FNG and IGU service areas.
IEP Financial Model Analysis (updated)	12/9/13	AIDEA		Updated (from 11/18/13 version) comparison of overall project costs and projected annual residential savings between three bidders (Pentex, Spectrum, and MWH) based on term sheets.
IEP Commercial & Finance Overview	11/19/13	Western Financial Group/ AIDEA Board	OVERVIEW_IEP Commercial Overview_11-18-13 v2	Update and review on IEP Project and Senate Bill 23.
IEP Financial Model Analysis	11/18/13	AIDEA		Compares overall project costs and projected annual residential savings between three bidders (Pentex, Spectrum, and MWH) based on term sheets.
Natural Gas in the FNSB: Results from a Residential Household Survey	11/1/13	NEI	IGU Residential Household Survey Report	An 800-person telephone survey done August/September 2013 conducted to evaluate energy use, customer conversion rates at various \$/mcf, burner tip and hardware costs, and needed financial assistance rates and participation.
LNG Storage Tank Cost Analysis	7/19/13	Michael Baker Jr. Inc.	MBJ Storage Report	This analysis is a Basis of the Cost Estimate for LNG Storage for the IGU Fairbanks Gas Distribution Advancement Project.

**Table 4-1 (Cont.) IGU Studies**

Study Name	Date	Done By	Other Name(s)	Description
IEP Feasibility Report	7/1/13	AIDEA	Feasibility Report	AIDEA's analysis on the feasibility and technicality of the NS project in delivering gas to FNSB economically. The study finds that the NS plant can economically deliver LNG to the FNSB below the current heating fuel costs. The study does not include the costs of regasification, storage, or distribution costs from the NS to the FNSB.
Estimated Natural Gas Demand for North Slope LNG Project	6/21/13	NEI		Memo on residential/commercial demand and conversion estimates. Provided as an attachment to the FNSB modular.
Interior Energy Plan: North Slope / Fairbanks LNG Project Engineering Brief and Consultant Team Recommendations	4/23/13	HDR, Inc.	Final Engineering Brief	Engineering study reviewing the costs and feasibility of the project.
Trucking Prolog	3/27/13	Prolog Canada	LNG Trucking Report; Pro-log study	Transportation costs and trucking needs.
Completed Natural Gas Demand Estimates by Phase	11/20/12	NEI	Estimated Natural Gas Demand	Memo on residential and commercial sectors natural gas demand estimates for the three phases of the initial development of the Fairbanks Natural Gas Distribution System in the FNSB.
Cost Estimate Phases I-III	11/15/12	Michael Baker Jr. Inc.	2 FNSB Gas Study Phase I-III	Cost estimates of entire project from Phases I through III.
Gas Distribution System Analysis	6/29/12	NEI	1. IGU Gas Distribution Study 2. GDSA 3. FNSB GDSA	First inclusive study done on the Gas Distribution System detailing the specifics of the project, outlining the feasibility, and reviewing the economic and environmental factors on its necessity.

Key:

AIDEA – Alaska Industrial Development and Export Authority  
 FNG – Fairbanks Natural Gas  
 FNSB – Fairbanks North Star Borough  
 GDSA – Gas Distribution System Analysis  
 IEP – Interior Energy Project  
 IGU – Interior Gas Utility

IMPLAN – Impact Analysis for Planning  
 LNG – liquefied natural gas  
 mcf – thousand cubic feet  
 MWH – MWH Americas, Inc.  
 NEI – Northern Economics, Inc.  
 NS – North Slope

## **4.1.2 CardnoENTRIX IEP Natural Gas Conversion Analysis**

CardnoENTRIX was hired by AIDEA to provide a conversion analysis that looked at the various ownerships of the housing stock, as well as the gas demand. This study was used to determine the projected demand for gas annually in the IGU service area as the build out for the gas system is constructed.

The *IEP Natural Gas Conversion Analysis* (CE, 2014a) analyzed the need and economic impacts of natural gas conversion in the Fairbanks and North Pole areas. This study reviewed existing consumer heating systems, willingness to convert, demand of natural gas, economic benefits, and overall review of PM 2.5 emissions based on a mock 6-year build out developed by Alaska Energy Authority (AEA). Much of this study was derived from information and experience in the 2013 Homer, Alaska, natural gas conversion project. Although there are significant differences in these projects, the willingness to convert and the outreach mechanisms used to engage the public is able to be applied to this project with a high confidence of compatibility.

The CardnoENTRIX Study reviewed, in depth, conversion rates, heating systems, demographics based on 2010 Census data, air quality, and economics. This study provided much of the information included in this Six-Year Plan.

## **4.1.3 CardnoENTRIX IEP Economic Impact Analysis**

The *IEP Economic Impact Analysis* (CE, 2014b), released in April 2014, reviews the estimated impacts of the IEP within the FNSB. However, the study mostly focuses on the natural gas distribution system build out from both IGU and FNG. This study is based on the assumptions of the CardnoENTRIX IEP Conversion Analysis, which does not account for any conversions from wood-only homes (roughly 5% of the FNSB population). In addition, this study accounts for IGU to begin construction in 2016, although current plans call for construction to begin in the summer of 2015 within Phase 1.

The *IEP Economic Impact Analysis* reviews the potential industries affected (positively or negatively), the methods and data used to derive the information, and the employment and income impacts within the FNSB – including disposable income estimates within the years of anticipated conversion using Impact Analysis for Planning (IMPLAN) software and 2012 IMPLAN data. For this study, those years are 2016 to 2028.

## **4.1.4 Agnew::Beck**

Agnew::Beck conducted a focus group as part of the Fairbanks LNG Demand and Distribution Analysis in October 2013. Participants represented 41 households. The results were favorable to the project, with a high interest in conversion. Responses indicated that 95% of the participants would convert, and 62% said they would convert within 1 year. This number grew to 74% when incentives were discussed. The group provided relevant detail to what a successful conversion program would entail (ease of program, lower monthly bills immediately, and a reasonable payback period) and indicated they generally preferred to pay with cash, not using loans to

convert. This response could be related to the general older age and affluence of the group, all of whom were homeowners, and probably does not accurately reflect the situation of the average FNSB resident (CE, 2014a).

As wood is the second largest primary heating source in the area, it is important to note that this study does not include homes that use wood as their primary fuel source, equating to 11% of the possible conversion population. Residents heating with coal or other sources are nominal and included in the “other”, about 3% of the sample. This reduced the survey sample to 699 households (NEI, 2013).

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## 5.0 FNSB BENEFITS

The FNSB and community stand to benefit greatly from the completion of this project, environmentally and economically. The sections below address the December 2014 U.S. Environmental Protection Agency (EPA) deadline for PM 2.5 air quality attainment and the benefits to the community in terms of general health, health care costs, and quality of life.

### 5.1 Environmental

In December 2009, the EPA formally designated the FNSB as a non-attainment area for federal PM 2.5 air quality standards after exceeding the health-based, 24-hour exposure limit of 35 micrograms/cubic meter for fine particulate matter (ADEC, 2014), and set a deadline of December 31, 2014, for the FNSB to comply with these regulations (Clean Air Act [CAA] Section 110 and 172). **Figure 5-1** shows the non-attainment area for the FNSB.

The atmospheric inversion, high heating costs (wood providing for cheap fuel), and extreme cold weather patterns increase the necessity for this area to be prioritized for PM 2.5 air quality control, most notably in the winter months. While the Interior is subject to poor air quality and PM 2.5 risk in the summer, these conditions are referred to as natural, uncontrollable, and exceptional events (ADEC, 2014).

**Figure 5-2** shows a winter comparison of air quality exceeding the federal level based on the latest data from 2006. A monitor, located in downtown Fairbanks at the State Office Building, collects a 24-hour sample every third day (blue). For a sampling frequency of every third day, the measured concentration on the sampling day represents the 2 days without measurement (red). As a result, one exceedance counts as three for regulatory activities. The data used for this graph has been thoroughly reviewed and validated and, thus, is subject to regulatory activities (ADEC, 2014).

Because the FNSB was deemed a non-attainment area in 2009, the state, along with local governments, were required to submit a State Implementation Plan (SIP) by December 31, 2012, which outlines how attainment would be achieved by the deadline of December 31, 2014. An air quality plan continues to be developed that will improve air quality and address the high cost of space heating. A mix of programs is included, among them expanding natural gas availability within the FNSB. The SIP outlines the following actions to reach attainment by the end of 2014:

- Solid Fuel (Wood and Coal) Heating Device Change Outs, Removal, Repair Programs
- Expanded Solid Fuel Heating Device Change Out Program for Hot Spot Areas
- Expansion of Natural Gas Availability for Space Heating ([InteriorEnergyProject.com](http://InteriorEnergyProject.com))
- Public Education – Benefits of Using Dry Wood, Best Burning Practices, Efficient Heating Devices
- Proposed State Regulations on Wintertime Open Burning, Wood Heater Emission Standards, Appropriate Fuels for Solid-Fuel Heating Devices, and Formal Air Episode Levels Coupled with Flexible Response Program for Wood Heaters

- AHFC Home Energy Rebate and Weatherization Programs
- Expanded Transit and Vanpooling
- Expanded Parking Lot Plug-ins for Motor Vehicles
- Projects to Reduce Diesel Vehicle/Equipment Emissions
- Emission Reductions from Motor Vehicles through the Federal Emission Standards for New Vehicles
- Existing Stationary Source Permit Programs

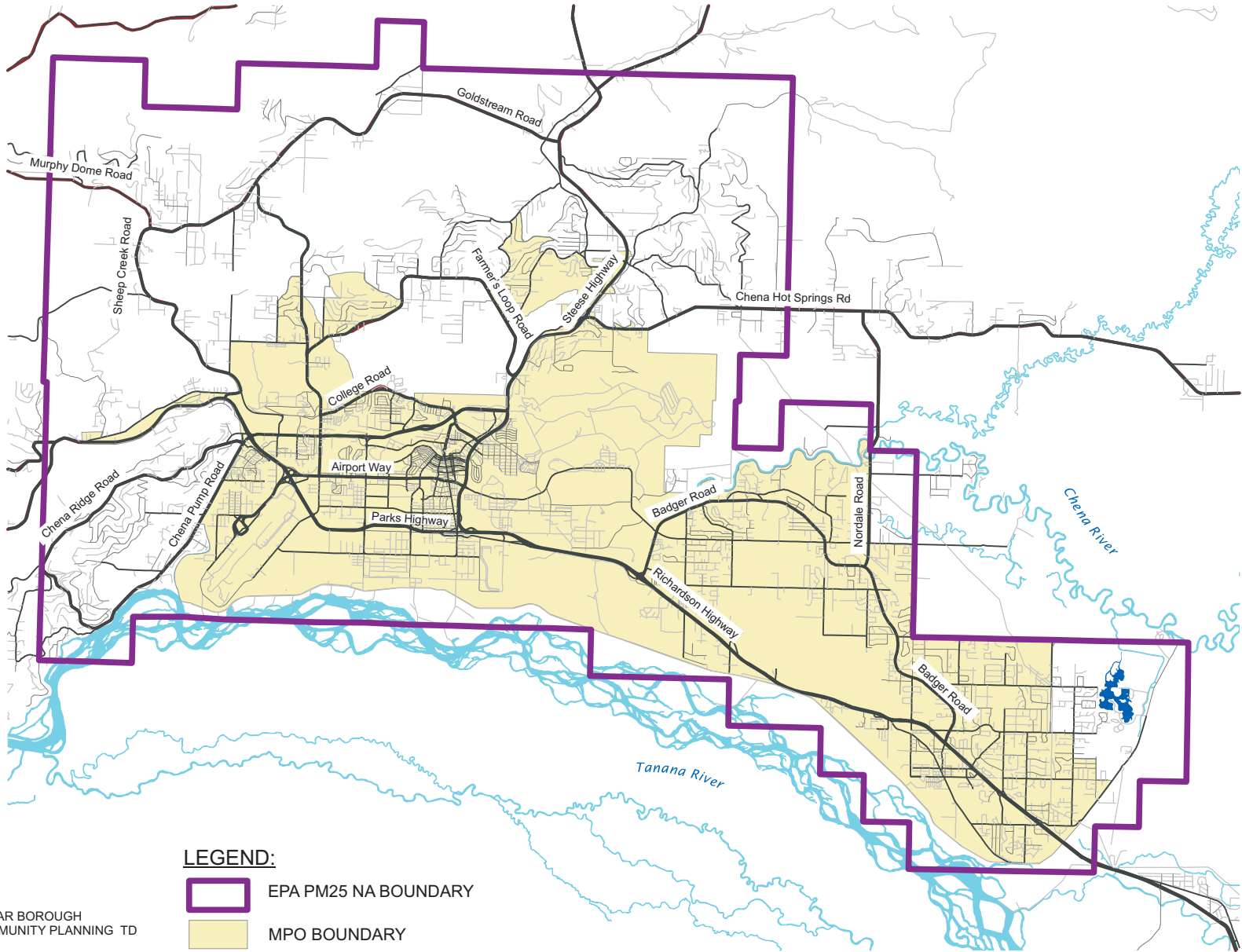
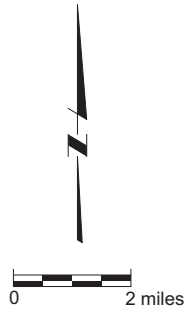
In addition to the natural gas distribution, the plan is reviewing positive effects of the railbelt expansion, which have the potential to deliver other low-cost heating options. These projects include the Susitna-Watana Hydroelectric Project, Healy Power Plant Unit 2, Eva Creek Wind Project, and the development of additional gas from Cook Inlet (ADEC, 2013a).

Based on air quality data from the Alaska Department of Environmental Conservation (ADEC), and estimates of household conversion, providing a lower-cost heating option that would incentivize the use of natural gas could reduce the amount of wood smoke emissions by up to approximately 32%, which is estimated to reduce approximately 234 tons of PM 2.5 emissions (CE, 2014a). The *IEP Natural Gas Conversion Analysis* concluded that health and other benefits from improved air quality could range from \$64 million to \$200 million by 2020, based on a wide range of values found within previous studies (CE, 2014a). While natural gas distribution alone may not completely reduce PM 2.5 to the federally-required standard, it will address the problem significantly, demonstrating to the federal government the community's action to improve poor air quality.



The NEI Gas Distribution Analysis shows an even greater effect from converting wood-fired systems to natural gas (NEI, 2012). The NEI data, based on research done by SLR International Corporation in 2012, shows a 95% PM 2.5 emission reduction. This higher figure is mostly likely due to the inclusion of wood-only burning households in the data. While the real effects will not be fully realized until the completion of the conversion phase (2027), it is reasonable to assume that natural gas conversions will play a significant role in reducing fuel-sourced emissions from residential structures.

If the state fails to implement the SIP by deadline, the EPA has the power to impose sanctions or other penalties on the state, including the loss of federal highway transportation funds, and additional requirements to offset emissions from industrial projects within the non-attainment area. The state must also show willingness to assist the community in attaining or maintain the standard (ADEC, 2013b).

Air quality affects the quality of life and attractiveness of Interior Alaska for everyone who lives and visits the area. Military personnel stationed in Fairbanks often cite poor air quality as a reason to apply for a transfer to a different location (CE, 2014a). The military generates 30% of jobs in the area, equating to \$3.9 billion to the local economy (FEDC, 2014). Reducing PM 2.5 air emissions has far reaching benefits throughout the community and state.



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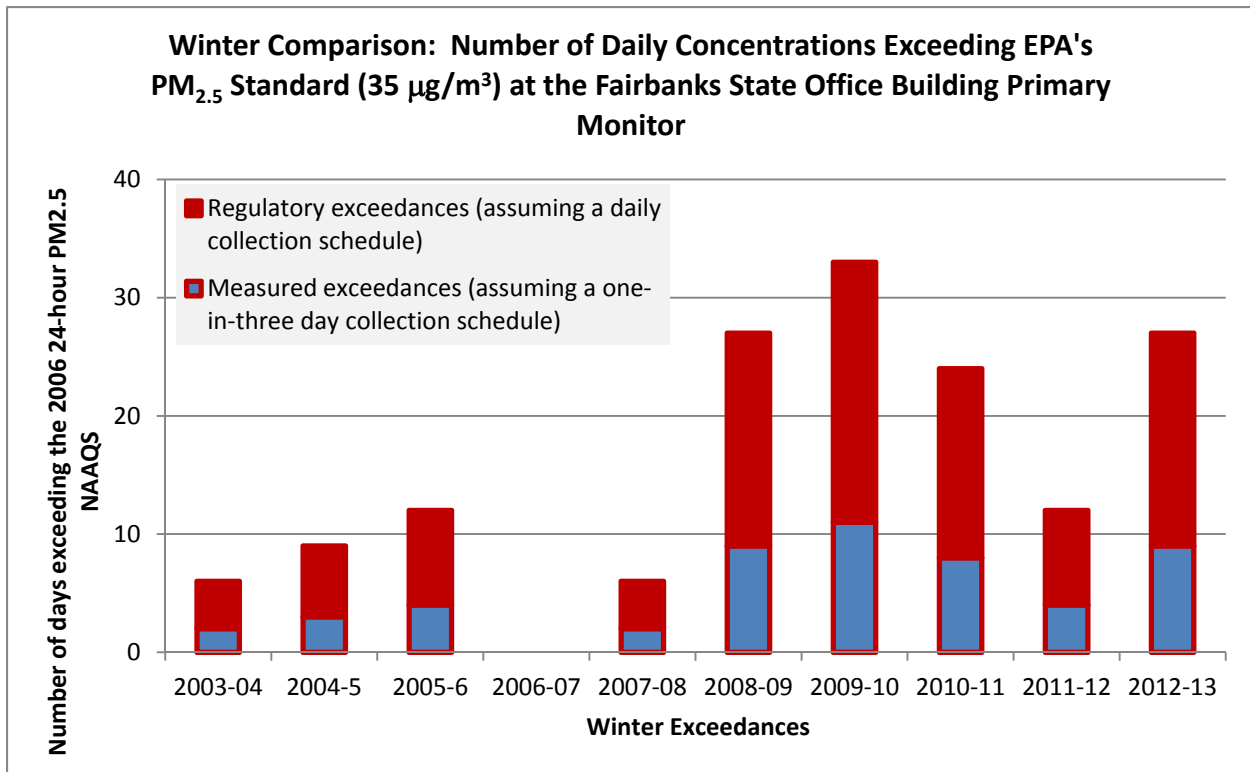
-  EPA PM25 NA BOUNDARY
-  MPO BOUNDARY

SOURCE:  
FAIRBANKS NORTH STAR BOROUGH  
DEPARTMENT OF COMMUNITY PLANNING TD  
JANUARY 6, 2009



SIX-YEAR PLAN  
FNSB PM 2.5 NON-ATTAINMENT BOUNDARY

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**Figure 5-2 Winter Comparison of PM 2.5 Exceedances in Fairbanks**

## 5.2 Economic

The net current value of cost savings for changing from heating fuel to natural gas is estimated at \$835.1 million through 2027, the year final conversions are expected to occur. As the number of household conversions increase, the price of natural gas is likely to decrease – as the costs of LNG plant, storage, regasification and delivery costs are further distributed (CE, 2014a).

In 2012, an economic survey concluded (AIDEA, 2013):

*“Construction and operation of a piped natural gas distribution system in the high-density and medium-density areas of the FNSB, and a propane distribution system in the low-density areas of the borough, has the potential to reduce fuel costs for space heating of residential and commercial structures from approximately \$524 million in 2021, the first full year of operations, to about \$210 million, a savings of roughly \$315 million annually, a savings of 60 percent compared to the status quo using fuel oil and wood. These estimates will change with different assumptions or if capital costs or commodity costs change, but the magnitude of the savings is so large that it is evident that substantial savings will accrue under almost any future scenario that employs natural gas and propane.”*

A reduction of energy costs affords residents the ability to spend more disposable income in the community, improving economic stability, and increasing the quality – and longevity – of life

amongst residents. Increased spending within the FNSB for goods and services are estimated to support an increase of 340 jobs annually, resulting in \$15 million in income from 2014 to 2027 (CE, 2014b).

Jobs and gross income estimates related to both construction and operations in the FNSB are expected to yield an average of 440 direct and indirect jobs relating to construction, with an average labor income of \$29.1 million until 2021. It is important to note when referencing these particular numbers, that they include both FNG and IGU gas distribution project plans (CE, 2014b).

The long term operations predicted from 2014 to 2028 conclude an average of 580 local jobs, with an average labor income of \$23.4 million, is anticipated. The study predicts an indirect economic impact from other FNSB businesses to equate to approximately 520 jobs and \$10.9 million (CE, 2014b).

The Economic Impact Analysis, based on the Conversion Analysis, assumes heating system installation costs will flow to local heating and plumbing contractors, at an average \$4,300 per household (CE, 2014b). While this generates economic impact within the business community, it is also noted that heating oil distribution companies will be adversely affected since the need for heating fuel will be reduced by 47 million gallons from current consumption by 2028 – resulting in a total estimated reduction of \$128.9 million in direct, indirect, and induced income, with an average annual loss of 220 jobs through 2028. These estimates are based on conversion rates assumed in the Conversion Analysis of 77% (CE, 2014a).

The IEP is expected to generate between 250 and 840 jobs, depending on the construction year, resulting in \$16.5 million to \$55.2 million in total income just within the FNSB (CE, 2014b).

This project represents a major milestone for Interior Alaska, one that has eluded the Interior for years. IGU's goal is focused on completing all six phases of this project, as certified to do so by the RCA, using the tools available in SB 23 to meet the IEP target price of approximately \$15/mcf at the customer's meter.

## 6.0 COMMUNITY INVOLVEMENT

In July 2013, the RCA held a public meeting during the CPCN application process and invited public testimony on the community energy crisis. Some participants spoke in favor – or against – a particular applicant, but most people were there to express to the RCA that the community is suffering in many ways under high energy costs and poor air quality.

On February 24, 2014, MWH held a Design Charrette with key state agencies, public utilities, private companies, and governmental officials to discuss the project’s progress and proposed timeline. Topics addressed were:

- The gas distribution system.
- The build out and schedule.
- Coordination of other construction projects.
- ROW permitting needs.
- Review of perceived challenges.
- To establish and build on relationships.

MWH presented the overall, six-phase layout for the Distribution and Transmission system using a Google Earth map (circa 2009-2010), and constructed of maps from NEI and the AEA (August 2013). Participants then had the opportunity to discuss each phase of the project build out and ask questions. Map sets were provided that participants referred to during the Charrette and took with them afterward.

The outcome of this Charrette was the opportunity to reach out to stakeholders to demonstrate the general plan of the project by reviewing each phase together. The group showed enthusiasm about the project and voiced their support for moving forward and working together.

### 6.1 Communication Plan

Effective communication begins by using specific messages that apply to the many stakeholders involved in this project. These stakeholders have been identified as:

- Customers
- Borough and Municipal Governments – FNSB, COF, and CONP
- Governmental Entities – AIDEA, RCA, Alaska Department of Transportation and Public Facilities (ADOT&PF), Alaska Railroad, Alaska Legislature
- Utilities – Golden Valley Electric Association (GVEA) and FNG
- Building Trades and Contractors
- Private Sector
- General Public

Some of these messages may be the same, as everyone could be interested in the distribution plan, for example, but specific groups will be best communicated with using specific messages.

For instance, customers are going to be more interested in conversion costs and cost savings at their meter, while contractors will need to know about construction bid deadlines, the type and size of equipment needed, and the number of jobs that each construction phase forecasts. Further, private businesses who sell natural gas boilers and furnaces need to know what areas will be converting first, and who is most likely to convert during the build out process to educate their customers and meet the demand of hardware sales, materials, and installation requests.

This project is designed to work closely with governmental agencies for: funding; transportation needs; coordination on ROW, easements, and permits; and construction projects. Utilities will be interested to know the specifications of the project, and if any of the product supply can help reduce their operating costs or provide value-added services to their customers. Many other examples apply, and the Communications Plan is designed to provide an avenue of communication that is responsive and sensitive to each stakeholder need.

## **6.2 Toolbox**

Communication tools are meant to be living documents for processes that can be molded to fit a specific situation or outreach method. Establishing early the protocol for excellent communication will be a key factor to smoothly transition from each function of the utility for seamless interaction with stakeholders and the community at large.

The IGU website is the online face of the IGU. It requires constant updating as the project develops and changes. The IGU website will serve as the main component to disseminate the latest information, news, and updates on this project. The website has built-in back-end capabilities that allow data collection, grouping of the data, and the ability to microtarget messages to an audience based on their known identities and interests. This information can be integrated into an IGU database collection to increase our understanding of public interest profiles. The website serves as an interactive tool in day-to-day activities and in the event of an emergency. As IGU develops, the website will grow and include capabilities for customers to pay their bills online, and view their accounts. This effort is ongoing and growing.

Working with the media is an important and particularly useful tool in communications development. Ensuring the media has the correct understanding of the project, and accessibility to the decision makers when necessary, will drive favorable stories and coverage from the news media (provided we are doing favorable things), and can be demonstrated through a media packet describing the project, the people involved and documents that help reporters tell a story with Frequently Asked Questions (FAQs) and other pertinent information. Forging the relationships between press and scheduling regular meetings with the *Fairbanks News Miner* editorial board are ways in which these relationships can be cultivated for a mutually beneficial relationship.

The Communications Plan utilizes a host of technological options to develop an online presence through social media, quarterly e-newsletters (may also be mailed), electronic surveys, and emails. As technology advances, staying up-to-date and in-touch with customers using the latest tools is paramount and should be given attention daily.

Beginning in the summer of 2014, community focus group sessions, or town hall meetings, may become necessary to engage, educate, and gather information on residents within Phases 1 and 2. These focus groups will become refined through the process to be used for further Phase research. These will help in crafting community messages, establishing the IGU brand within the community, and expanding contact distribution lists.

A mail campaign will be used specifically for construction notices, community events, and other pertinent information. These will be administered intentionally and on an “as-needed” basis.

The IGU staff and Board of Directors have begun to address niche communities to update, inform, educate, learn, and build relationships with community groups by using local and state speaker forums. These forums, such as the Chamber of Commerce, FEDC, Rotary and Kiwanis Clubs, and others, will provide essential information and relationships that generate buy-in and a positive feeling about the work of the IGU. Interaction and involvement in the public is necessary to build brand awareness and to expose the mission of the IGU. This will be further explored through local and statewide memberships to community organizations that can help the IGU fulfill their mission as a community partner, and by participating in community events, such as Golden Days and the Midnight Sun Festival, as well as trade shows throughout the year.

There is no better way to make IGU real than to appear at the door. This part of the communication strategy is to personalize the utility with the customer, be approachable, answer questions, and provide information about the project with a face-to-face interaction. This work is anticipated to begin in the Summer of 2014 to introduce IGU and discuss conversion options and construction plans with the residents in the first phase of the project. Door hangers are also an effective way to personalize a mass message, especially regarding upcoming construction.

A Customer Service Handbook will be developed and provided for each IGU leadership and staff; and training opportunities on customer service and media relations best practices adopted by IGU will be offered. This will be a required training component for anyone interacting with the public and/or the media, and may require the assistance of a third-party vendor. Since IGU is in a unique position of literally building an organization from the ground up, leadership may be involved in developing this handbook so that values and practices included truly reflect the personality and brand of the IGU.

A Crisis Communication Plan is imperative to have internally as the organization grows. This will cover how IGU plans on addressing crisis situations – such as natural disasters, public defamation, conspiracy, on-site accidents, gas explosions and leaks, environmental disasters, disruption of service, and disgruntled employees. This plan is to be developed in the summer of 2014, most likely with the assistance of a third-party vendor, and will be subject to annual reviews, and bi-annual crisis drills.

A government relations component will be developed to best work with local, state, and federal elected officials on legislation, events, and information that advocates or advances the mission of IGU. The first and most pressing issue is developing a conversion assistance solution by the next legislative session in 2015.

Finally, all types of communications must be consistent in branding, tone, and messaging. The comprehensive Communications Plan pulls together the above components into a well-packaged public relations and media campaign, with a professional and recognizable look. These messages will be developed by working with a local agency who can help the IGU develop these materials to best reflect and compliment the overall goals of the IEP.

The components of a recommended Communications Plan include:

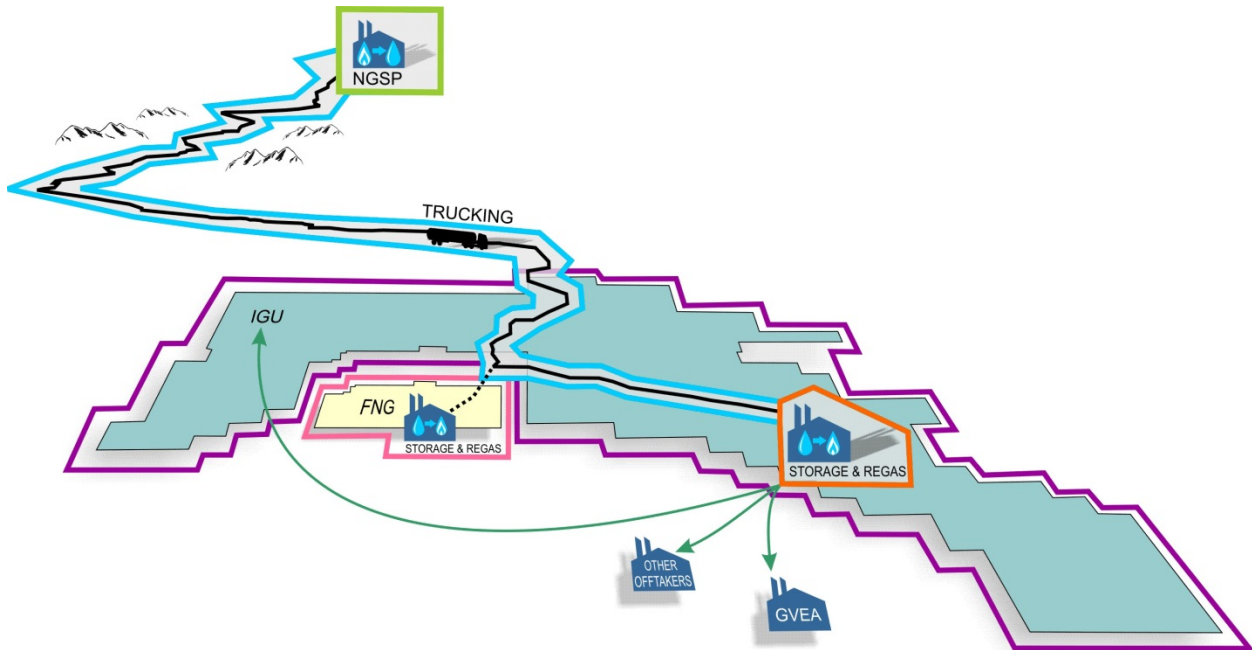
- Website
- Community Focus Groups
- “Town Hall” Meetings
- Mail
- Newsletters (Mail and Email)
- Speakers Forum/Presentations
- Door-to-Door
- Customer Service Handbook
- Crisis Communications Plan
- Government Relations
- Brand Development
- Annual Customer Meetings

## 7.0 STRATEGIC PARTNERSHIPS AND WORKING RELATIONSHIPS

This complex project requires extensive expertise, both professional and institutional, and these relationships are reviewed and carefully defined in this section.

### 7.1 Strategic Partnerships – Supply Chain

The project supply chain is shown on **Figure 7-1**, from the North Slope LNG Plant to the end users.



**Figure 7-1 IGU Project Supply Chain**

The North Slope LNG Plant is currently being pursued with AIDEA financing, along with private equity investors.

Transportation and trucking of the gas will also be an important part of the planning phase. Trucks will haul LNG from the North Slope LNG Plant over 500 miles down the Dalton Highway to a storage and regasification facility. The partnership, location, and storage needs of the regasification and storage facility are undefined at this time, but as the distribution system begins to build out, storage needs will have been developed and permanent location structures should be underway.

Developments are ongoing relating to the North Slope LNG Facility – commercial terms negotiations are underway while permitting and construction procurement proposals are ongoing and under review (AIDEA, 2014).

Additionally, AIDEA has hired a consulting firm to look at a total supply chain management analysis (gas production, trucking, storage, and regasification) to allow for the most efficient and lowest cost of gas FOB Fairbanks.

## **7.2 Working Relationships**

AIDEA is the state Authority administering the funding mechanism to support the entire IEP. This Authority has the ability to award grants and loans at a fixed, low interest rate, as well as the flexibility to negotiate terms and conditions of funding options under SB 23. AIDEA is currently managing the project contract for the LNG plant facility and storage components of the IEP, while overseeing and working toward the gas distribution system expansion of IGU and FNG.

GVEA was a supporter of IGU during the RCA process, and continues to be an important partner on gas storage and regasification. GVEA has expressed an interest in developing a partnership for gas storage with IGU. Currently, GVEA is discussing with IGU to take the lead on financing through AIDEA, engineering design, and construction of a tank situated on land GVEA owns near the North Pole Plant (H and H Road and Old Richardson Highway). GVEA would agree to lease the property and work toward developing a ‘take-or-pay’ contract for gas that covers their share of the cost of the facility. The maximum tank size for this location is anticipated at 2.2 million gallons (MG), where IGU would use 1.2 MG and GVEA would use 1.0 MG. Discussions on ‘take-or-pay’ agreements and storage options are ongoing.

FNG owns the existing natural gas distribution system in the highest density area of the COF. This private company was awarded a CPCN in 1997 to serve this area with over 5,000 potential customers, and currently services 1,100 customers (RCA U-13-103). FNG applied for the same service area to the RCA as IGU on April 8, 2013. In April 2014, FNG was authorized \$15 million from AIDEA to expand their existing gas distribution pipeline in 2014 and 2015 (CE, 2014b). IGU recognizes the importance of a solid working partnership with FNG in order to provide timely, low-cost natural gas to as many people as possible. IGU continues to work toward their commonalities with FNG to provide energy relief to the community.

IGU is the product of a working group focused on energy under the FEDC umbrella. FEDC has played a significant role in coordinating a dedicated group of community leaders committed to providing low cost natural gas to the most people as possible, as soon as possible, and has supported the IGU’s mission through staff, materials, funding, development, and resources. IGU regularly meets in the FEDC conference room, and relies on accounting support from FEDC staff. This relationship has been fundamental to the growth of IGU.

The IGU will maintain a close working relationship with employees, departments, and leadership within the FNSB, CONP, and COF. The IGU depends on these local governments for: financial assistance; administrative and legal support, including coordination in community projects; website updates; institutional knowledge; and community influence.

While the creation of the IGU and LNG gas distribution project is mostly seen positively, there is a population of the community that is not in favor of a public utility. This is a very important

voice in the community which should be handled firmly, yet respectfully. Also, finding ways to work with heating oil distribution companies and coal producers, whose business and income may be jeopardized by the success of this project, should be carefully considered.

IGU recognizes there may be partnerships throughout the state and Canada that are ideal to develop as contingency resources in the event of a disrupted supply of LNG from the primary North Slope source, and will continue to develop these relationships.

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## **8.0 SYSTEM DESIGN AND CONSTRUCTION**

The system design is proposed on an aggressive 6-year build out schedule. This section reviews: the process; technical and safety standards; the proposed transmission line build-out for each phase, along with approximate costs and schedule; and the relationship to other aspects of the project, including permitting considerations.

### **8.1 Design Process**

At least three consultants are expected to be contracted for work pertaining to the design – one each for Phase 1 and Phase 2 and a third consultant for storage development. These consultants are expected to be contracted in 2014 through a competitive proposal process and will be contracted through IGU and managed by MWH. The consultants will begin work on design, ROW, and permitting for the distribution system and will stay with that phase of the project for which they are contracted through construction. In addition, engineering for both temporary and permanent gas storage and regasification is anticipated to occur concurrent with the distribution system design work.

### **8.2 Technical and Safety Standards**

IGU will follow the requirements of the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) and the Office of Pipeline Safety (OPS) Standards. Operator Qualifications and Integrity Management procedures will be developed that meet the requirement of Code of Federal Regulations (CFR) 192, as required for operators of natural gas pipeline systems and LNG facilities.

IGU will create a safe work environment for the construction of their projects, the operation of their facilities, and their integration into the community. MWH will prepare an overall analysis of IGU's and FNG's service areas to ensure that an economical, viable, and sustainable storage and distribution system is constructed. As they are two separate, but adjoining service areas, it is imperative that this analysis be conducted from the stand point of compatibility of common components and also from the standpoint of independent operations. As part of this analysis, IGU will ensure that the design and construction principles to be used will meet all federal, state, and local standards – with emphasis on cold weather construction and operations.

### **8.3 Gas Distribution**

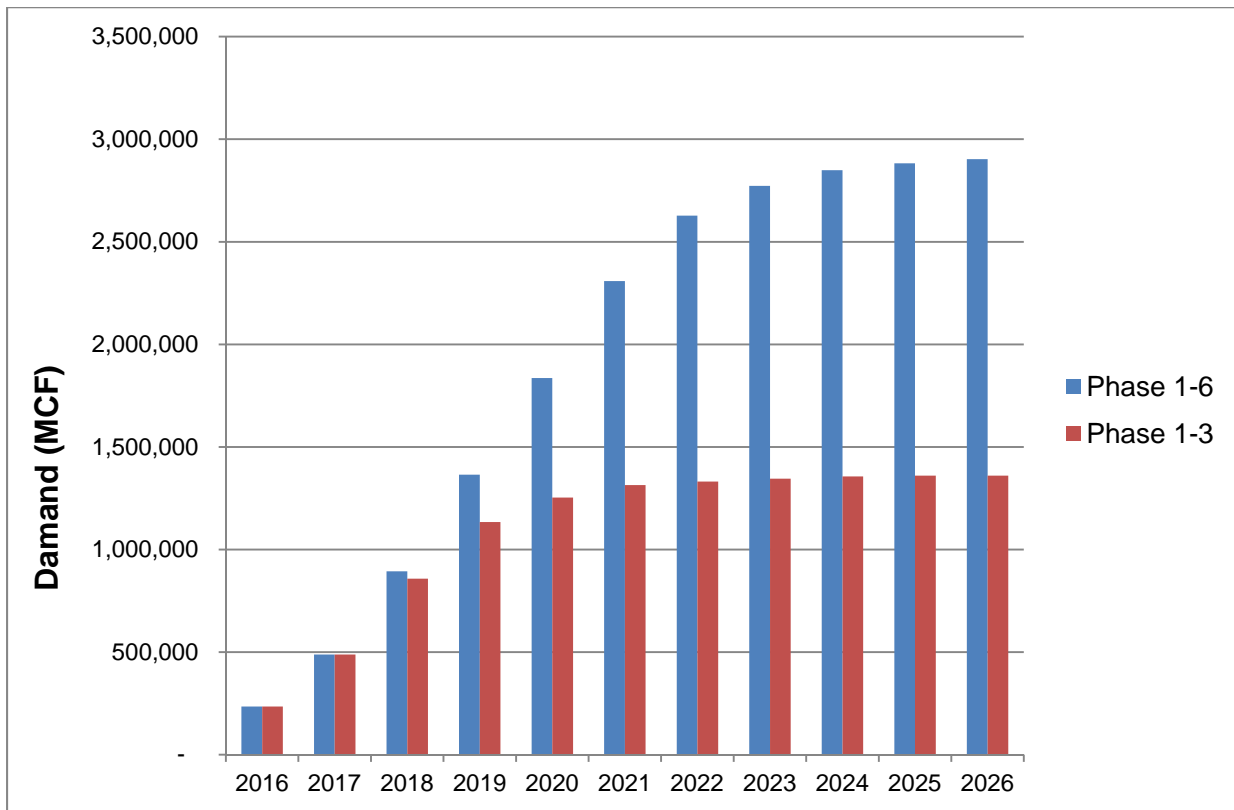
#### **8.3.1 Distribution System Build-out**

The IGU Service Area planning map is the culmination of maps developed by NEI/ Michael Baker, Jr. Inc. (MBJ) and AEA, originally developed to assess the miles of pipe for the project. On the IGU phase maps (Appendix A), the blue, green, and red lines are transmission and distribution feeder lines, provided by NEI/MBJ. The orange lines are distribution lines to neighborhoods and homes, provided by AEA, 2013. These preliminary maps are demonstrated using Google Earth software, which provides the ability to hone into potential service locations.

The system layout will be further refined once hydraulic modeling is performed and layouts optimize the system and further refined by the design consultants based on local constraints permitting and ROW needs.

### 8.3.2 Demand Analysis

The conversion tables used in the Conversion Analysis (CE, 2014a) were modified to only focus on the IGU service area, and to incorporate that first year customers connected include only half of a calendar year of demand. These results are provided in **Table 8-1**, and the annual gas demand is shown on **Figure 8-1**.



**Figure 8-1 IGU Service Area Natural Gas Demand**

The demand analysis accounts for homeowners to use approximately half of their average annual consumption in the year of conversion. This is due to the fact that most homeowners will not convert in the fall/winter months due to risks associated with conversion changes in extreme weather, although if they did, they would still be using half of their average annual consumption because the natural gas would not be available for the entire year. Instead, it is anticipated that most homeowners will convert in the spring/summer months following the completion of the phase in their area.

**Table 8-1 IGU Area Customer and Gas Demand/Growth**

Item	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
<b>Volumes (mcf)</b>										
Single Family Residence	112,363	247,350	457,749	729,985	1,033,139	1,310,654	1,490,888	1,584,398	1,635,678	1,664,335
Multi-Family Residence	25,000	40,000	70,000	105,000	150,000	235,000	305,000	330,000	345,000	350,000
Commercial – Small	10,530	26,033	50,066	75,319	101,936	142,903	176,264	190,060	196,300	196,300
Commercial – Medium	65,500	147,100	273,800	396,300	480,800	543,300	575,800	587,800	592,000	592,000
Commercial – Large	8,000	14,200	25,600	38,600	47,800	53,600	55,400	56,000	56,000	56,000
Industrial	13,600	13,600	16,600	19,400	22,200	23,400	24,000	24,000	24,000	24,000
<b>Totals</b>	<b>234,993</b>	<b>488,283</b>	<b>893,815</b>	<b>1,364,603</b>	<b>1,835,876</b>	<b>2,308,857</b>	<b>2,627,352</b>	<b>2,772,258</b>	<b>2,848,978</b>	<b>2,882,635</b>
<b>Calculated Customers (Number)</b>										
Single Family Residence	745	1,640	3,035	4,840	6,850	8,690	9,885	10,505	10,845	11,035
Multi-Family Residence	25	40	70	105	150	235	305	330	345	350
Commercial – Small	16	40	77	116	157	220	271	292	302	302
Commercial – Medium	16	37	69	99	120	136	144	147	148	148
Commercial – Large	1	2	3	5	6	7	7	7	7	7
Industrial	2	2	2	2	3	3	3	3	3	3
<b>Totals</b>	<b>805</b>	<b>1,761</b>	<b>3,256</b>	<b>5,167</b>	<b>7,286</b>	<b>9,291</b>	<b>10,615</b>	<b>11,284</b>	<b>11,650</b>	<b>11,845</b>

Key:

mcf – thousand cubic feet

Source: CardnoENTRIX, 2014 (modified showing only IGU Customers)

### 8.3.3 Prioritization of Construction Areas for Demand

The Six-Year Plan is prioritized by serving the densest service area of downtown North Pole, in combination with the highest known levels of PM 2.5, affecting the air quality and quality of life.

The potential gas storage site (GVEA) also is adjacent to this area, so it provides for a logical starting point. The subsequent phases are mapped out based on similar criteria, serving the highest density areas first and their proximity to the starting point, as well as the ability to expand what would then be an existing distribution line to outlying neighborhoods.

### 8.3.4 Relationship to Storage and Interties

The RCA required IGU to provide for a 5-day security gas storage back-up as part of granting IGU its CPCN. The permanent storage is not anticipated to be on line until late in the third quarter of 2017. Until then, temporary storage will need to be provided in the range of 25,000 to 30,000 gallons. Since the demands will be low in the first years of operation, it is anticipated that smaller-style tanks or mobile units will be provided.

### 8.3.5 Cost Assumptions

The distribution system is anticipated to cost \$251 million, and storage/regasification is currently estimated at \$30 million for permanent and \$6 million for temporary facilities for the 2016 and 2017 heating season while the permanent tank is being constructed. This is demonstrated in **Table 8-2**.

**Table 8-2 Final Cost Estimate Summary – Pipeline Layout Network**

Estimated Cost	Total Cost	Cost per Mile
<b>Pipelines</b>		
2015	\$ 25,969,000	\$ 284,000
2016	\$ 37,016,000	\$ 326,000
2017	\$ 48,356,000	\$ 298,000
2018	\$ 57,933,000	\$ 301,000
2019	\$ 49,748,000	\$ 263,000
2020	\$ 32,650,000	\$ 254,000
<b>Total</b>	<b>\$ 251,672,000</b>	<b>\$ 287,000</b>
<b>Storage</b>		
Permanent	\$ 30,000,000	NA
Temporary	\$ 6,000,000	NA

Key:  
NA – not applicable

## 8.4 Permitting/Right-of Way

Permitting the construction and operation of the gas distribution lines in the IGU service area could take a year if the preparation of a National Environmental Policy Act (NEPA) document is required. Federally-funded, or permitted, projects require completion of a NEPA document. For this project, an Environmental Assessment is likely sufficient, given current understanding of the work to be completed. The design consultant will be asked to prepare the environmental documentation and permits for the project using their in-house environmental resources, or a sub-consultant.

The design consultant team will also be asked to prepare a permitting plan that includes a list of the permits required, the issuing agency, the timeframe for securing the permit, and the associating activities needed to get approvals. An overall permitting schedule will be prepared and updated as the project progresses. A similar ROW plan will be developed by the design consultant using in-house resources, or a ROW sub-consultant. A ROW schedule will be prepared and updated as the ROW work progresses.

The BLM is the federal land owner and will issue permits for construction through Eielson Air Force Base and Fort Wainwright Army Post. Military Base and Post Commanders must approve project construction, and a change of command during permitting could significantly impact the schedule.

The BIA Revocable Use Permit must be obtained prior to conducting field work on Native allotments. This permit, and the ROW across allotments, requires input from the original allottee or all of their heirs if the allottee has passed away. Locating heirs can be time-consuming and these should be considered long lead time permits.

Wetland, raptor, fisheries, and cultural resources studies may be required if information on potential effects on those resources does not exist for the project area. These studies must be conducted during the growing season. If winter construction is proposed, then a winter fisheries study may be required. These usually occur in February or March. Generally, field studies will require land owner permits or permission. Surveys using a drill rig or loader usually take longer to permit than surveys conducted with hand-held equipment.

Permits will be needed for work within the ROW of the ADOT&PF and Alaska Railroad, along with the FNSB, CONP and, to some extent, the COF. Close coordination with the planning and engineering group within each of these entities will be needed. Because several of the corridors along the highways have controlled accesses, additional permit time will be needed to work through these issues with ADOT&PF. The Alaska Railroad has indicated that at least 9 months should be allowed for the submittal of an application before approval will be considered.

ROW activities are estimated to last about 9 months. This duration assumes that the new pipeline will follow existing roads and can be placed within existing utility easements, or within new easements of existing road ROWs. The only new ROW required will be for the regulator stations. The siting of the stations is somewhat flexible and, consequently, they can be located to minimize ROW acquisition efforts. The schedule for this activity could be adversely impacted if

any new ROW requires an eminent domain or condemnation process where ROW is acquired from an unwilling landowner. Condemnation could extend the duration of this effort to 2 years or longer (NEI, 2012).

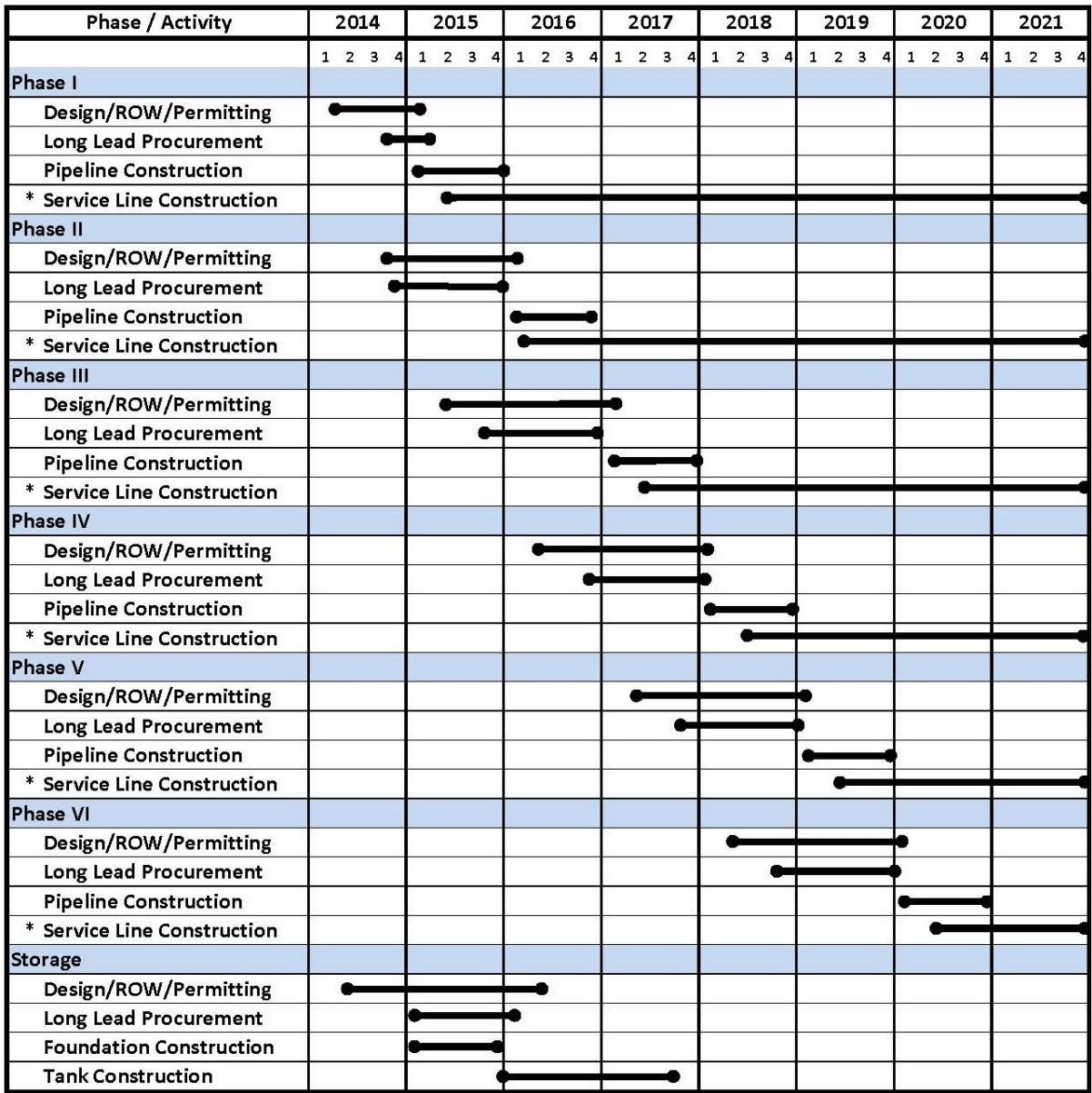
As the preliminary designs proceed during 2014, preliminary gas distribution line layouts will allow for formal identification of permit and ROW requirements and, at such time, permitting and ROW activities will be initiated. The permitting and ROW activities will be part of the design consultant's scope of work.

NOTE – it is the goal of IGU to start a field program the summer of 2014.

## **8.5 Construction Schedule**

IGU plans to begin construction of pipelines in 2015 to meet the 6-year build-out timeframe. A previous study (NEI, 2012) recommended an 18-month period for design and permitting, along with an 18-month construction time frame. To meet the 6-year timeframe, construction would have to begin in 2015. This has some risk in having the time to optimize a planned out system, fully develop design standards, and allow time to negotiate ROW agreements or respond to additional requests of information from permitting agencies. Since design work of Phase 1 will not be able to be completed until January 2015, IGU will need to secure funding, bid, and contract for the purchase pipe materials by October 2014 so the pipe material is available for spring construction in 2015. The schedule for other phases of design, ROW, and permitting work will have additional time to be completed; however, contracting for the purchase of pipe materials for each phase of the work should be anticipated in order to ensure the pipe is on hand by the time construction contracts are bid.

The schedule for the six phases is shown on **Figure 8-2**. With the exception of the first year, gas is expected to be provided to each phase area in the beginning of the fourth quarter of the same year as construction. Conversion in a phase will likely start slowly in the first year of constructing gas lines in an area, and then ramp up after the entire build out is completed, based on indications that residents' willingness to convert is higher after the first year.



\* NOTE: Service line installations will occur for 6 years after they begin in each phase of the work.

**Figure 8-2 Proposed IGU Project Schedule**

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## **9.0 OPERATIONS**

It is IGU's intent to contract out the operations of the gas distribution system. The IGU anticipates that a Statement of Qualification will be developed and qualified companies will be requested to submit and respond to a RFP. IGU expects that services provided will include: the operation and maintenance of the system, PHMSA response, the customer service components of responding to requests for new connections, billing, and collections.

IGU currently anticipates maintaining a small staff consisting of a General Manager, Chief Operating Officer, and a Procurement Officer to be hired in 2014.

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## **10.0 CONVERSION**

The conversion issues considered in this section review the details and assumptions using known public perspectives, willingness to convert, and historical information from existing and similar programs and projects to determine the best possible conversion plan to attain a goal of converting 75% of the potential customer base to natural gas.

### **10.1 Conversion Requirements**

In order for customers to convert, they require three main things (Agnew::Beck, 2013):

1. Lower Cost of Gas – A lower cost of gas than what they are paying to heat their home now. At current costs of heating fuel and wood, this equates to a cost of gas at the customers meter in the range of \$15/mcf for this to be feasible.
2. Return on Investment – Most homeowners expect a 3- to 5-year return on investment.
3. Incentives – Incentives to pay for the up-front costs either in a rebate program or in an on-bill financing (OBF) program will need to be easy to access and apply for, as well as ready to put into place.

In a focus group led by Agnew::Beck Consulting in October 2013, most homeowners responded that they would prefer an OBF option, where the costs were paid for by the utility and added to their billing system for repayment. They indicated a higher rate of conversion after being presented with several different options to aide in the conversion.

### **10.2 Efficiency**

During the Conversion Analysis, six heating and plumbing businesses, five in Fairbanks and one in Homer, were interviewed to better understand the efficiency of natural gas conversions (CE, 2014a). Efficiencies of converting to natural gas boilers, water heaters, and burners are based on the types of heating systems each home has. Based on these responses, data collected showed 80% of homes in Fairbanks heat with baseboard systems and 10% with forced air units. Some small businesses do convert burners, but it is generally agreed that the efficiency of the system does not justify the costs, and replacing the system is a better use of time and money. Generally, the higher the cost of a natural gas boiler the better the quality of the unit – providing a higher rate of efficiency (CE, 2014a).

### **10.3 Cost Analysis of Conversions**

The Conversion Analysis shows that capital costs for conversions can cost on average \$2,300 to \$10,700 and depends on conversion needs – including the efficiency and quality of each model (CE, 2014a). Other than totally replacing the heating unit, options include converting the burner (\$1,000 to \$4,000) or installing a space heating unit (\$2,000 to \$3,500). Costs include the cost of heating systems, piping and valves, and labor for full installation. The costs do not include boiler installation permit fees of \$120 for COF and \$50 for CONP residents. There is no fee for installation within the FNSB (CE, 2014a).

The Economic Impact Analysis, based on the Conversion Analysis, assumes heating system installation costs will flow to local heating and plumbing contractors, at an average \$4,300 per household (CE, 2014b).

IGU plans to include the cost of the distribution lines within 100 feet of a property in the project costs. A decision regarding the IGU charge for a meter is still to be determined and is expected within 3 months. In Homer, the utility charged \$1,290 for the first 100 feet and \$2 per foot of additional line needed to be installed. Meters for the homes cost approximately \$200 (CE, 2014a).

There are several options to convert based on a homeowner's current heating system. Factors include (CE, 2014a):

- Existing Heating Systems
- Heating System Specifics
- Conversion Options
- Heating System Installation Process

## **10.4 Consumer Participation**

Studies conclude that barriers exist for customers converting to natural gas, and the ability to pay for the upgrades is considered the number one biggest obstacle to overcome. To address the issue of financial assistance is to understand how a program can be successful by offering solutions to income restrictions, consumer mobility, and perception of a complicated process.

Currently, the state, through the AHFC energy programs, offers residents incentives to improve their home heating systems and energy efficiency; however, no conversion-specific programs exist. While AHFC programs have been successful throughout the state, paying for upfront costs for reimbursement and long waiting periods to participate may deter applicable residents. While the weatherization program addresses the income restrictions by providing a program for low-income residents, long waiting periods can be a deterrent, especially in this situation where the conversion timeline is limited. Historically, the program mandates a 2-year waiting period before a homeowner can participate in the program, which could also be problematic for the IGU customer base. While the AHFC programs can be used for this project, they should be used in tandem with a program specifically designed for IGU customers.

One solution found to be favorable among focus group participants is the ease and accessibility of an OBF program. The OBF allows for someone other than the customer (usually the utility) to pay for the upfront energy conversion costs, adding them to the consumer's monthly bill. This only works if the conversion costs plus the cost of the service is lower than the current customer's monthly energy bill. There are two primary ways to administer an OBF program: as a loan to the customer that will need to be repaid when the customer moves, or a tariff on the property meter in which the loan would stay with the home (CE, 2014a).

There is a concern for IGU's ability to take on such debt in the first 2 years of operation; financial implications and concepts are still being reviewed.

## 11.0 FINANCIAL ANALYSIS

The financial analysis includes a year-by-year consideration of rates, revenues, cost of gas, operating expenses, capital funding requirements, debt service, cash flow, and other financial elements of the IGU proposed build-out. Distribution system costs for 4,630,854 linear feet (877 miles) of pipeline (including service lines), based on the build out plan of:

Construction Cost	\$178,442,000
Materials	\$60,557,000
Engineering	\$12,146,000
<u>Permitting</u>	<u>\$527,000</u>
<b>Total Cost</b>	<b>\$251,672,000</b>

LNG storage costs are based upon the *LNG Storage Tank Cost Analysis* (MBJ, 2013), and the cost estimate provided to AIDEA by FNG in their loan application for a 5 million gallon (MG) storage tank.

North Slope supply and trucking costs to Fairbanks are based upon figures given to IGU by AIDEA, currently shown as \$11.89/mcf. The basis provided is \$3.30 for the supply, \$3.00 for liquefaction, and \$5.59 for trucking (all per mcf). The trucking cost is based upon the *LNG Transportation Analysis* by HDR dated February 2014.

The key element here is that the cost of gas to IGU represents about 70% of overall costs; IGU does not control the primary cost component to make economics work at \$15/mcf. This is essentially a flow-through of actual costs.

The financial model includes tools to examine financing options (grants, low-interest loans, etc.) and to test the sensitivity of alternative repayment terms and conditions. Meeting the goal of a \$15/mcf rate is a key success factor.

### 11.1 Current Sources and Use of Funding

Currently, IGU has established multiple sources of funding, as discussed below.

#### 11.1.1 FEDC Funding

FEDC made a \$9,500 donation to IGU in July 2014. This was funding from private business owners that FEDC provided to IGU for initial startup operations and allow for flexibility as to use of these funds.

### **11.1.2 FNSB Firm Fixed Price Contract**

This is a firm fixed price contract with the FNSB for \$2,142,700. This contract is in the form of an original contract with the FNSB in the amount of \$319,000 and associated amendments totaling \$1,823,700.

This contract is funded by a \$3 million grant from the state of Alaska to the FNSB. IGU has the ability to add task to this contract with the FNSB up to that \$3M total. As of April 18, 2014, IGU has used \$1,331,710 of this source of funding for work on the:

- CPCN application and hearing.
- NEI work on financing and demand.
- FEDC support through January 1, 2014.
- MWH support from January 18, 2014.

### **11.1.3 FNSB Letter of Credit**

This is a \$7.5M letter of credit from FNSB. This financing will serve to provide contingency funding in concert with AIDEA funding. It will also cover unanticipated increases in item costs to maintain cash flow. The terms and conditions are outlined in FNSB Ordinance 2014-18, as follows:

- Interest – Interest will accrue on the unpaid principal amounts from the date of each withdrawal was actually paid to IGU, using a 365-day year and the actual number of 126 days outstanding. The interest rate will be the federal funds rate on the date of the withdrawal, adjusted annually on January 1 to the annual rate for the preceding year.
- Repayment – Each withdrawal amount, along with its accrued interest, will be repaid within three (3) years following the date the withdrawal was actually paid to IGU. Payments will be applied first to accrued unpaid interest, if any, and then to principal. The specifics of the repayment schedule will be determined by the Chief Financial Officer of FNSB and approved by the Mayor. However, payment of unpaid balances may be accelerated without penalty.

As of April 1, 2014, no draws against this line of credit have been made.

### **11.1.4 AIDEA Development Loan**

This is an \$8.1 million development loan from AIDEA. This loan has been authorized by the AIDEA Board as authorized financing under SETS financing under SB 23. As of May 1, 2014, a loan agreement has yet to be executed.

This loan is to be used to fund IGU's initial work needed to develop IGU's distribution system and affiliated infrastructure. To date, there have been no requests for reimbursable costs to AIDEA. The general terms and conditions in the term sheet presented to the AIDEA Board on

April 3, 2014, are that financing will be a 20-month fixed line of credit at 0% interest that will convert into a long term note on December 30, 2015, in conjunction with the financing of IGU's 2015 build out. The final terms of the note will be negotiated based on the parameters of SB 23. If the negotiations do not reach agreement, the note will be paid back over 40 years at 3% interest, commencing on January 1, 2018.

## **11.2 Potential Sources of Future Funding**

IGU has three sources of future funding for this project: funding through authorizations contained in SB 23 through AIDEA, Revenue Bonds through IGU, and General Obligation Bonds through the FNSB. A mix of SB 23 funding sources and Revenue Bonds are the most likely sources, with SB 23 sources being used as initial funding sources followed by Revenue Bond sales.

### **11.2.1 SB 23 through AIDEA**

SB 23 contained three funding mechanisms for the IEP that are available to IGU through AIDEA:

- Capital Funding – The legislature authorized \$57.5 million in capital funding for the entire IEP project. To date, AIDEA has not allocated any of the capital funding to the gas distribution system. The appropriation left the use of the capital flexible between the supply chain of gas (gas plant, trucking, and storage) and gas distribution. Currently, AIDEA has focused on financing the gas plant first.
- SETS Funding – SB23 authorized \$125 million in low cost loan funding to the project, with the terms and conditions of SETS funding to be determined by AIDEA. AIDEA has released \$8.1 million to IGU and \$15 million to FNG for the initial distribution loans. At this time, it is unclear how much of the remaining funding will be made available to distribution – or how that will be allocated between IGU and FNG. This source of funding is the most attractive source to IGU, given the fact that AIDEA can set terms and conditions that are below market rates.
- Bond Authority – SB23 authorized \$150 million in market rate bonds to be sold to finance the IEP project. Currently, it is anticipated that this financing will be at, or above, 5% over 30 to 40 years, and will reflect market rates at the time of the sale.

### **11.2.2 Revenue Bonds**

Revenue Bonds can be sold by IGU to meet distribution capital expenses. These bonds are municipal bonds and will be secured by IGU's revenue source. It is anticipated that this source of funds will be the used once the SB 23 funds are exhausted and will be at market rate at the time of the sale.

### **11.2.3 General Obligation Bonds**

General Obligation Bonds can be authorized by the FNSB voters specific to the capital needs of IGU, and would be secured by FNSB's pledge to repay the bond holders. It is anticipated that General Obligation Bonds will not be used as a funding source for this project.

### **11.3 Financial Modeling**

Best available information was used to create a financial model of IGU's operational and capital costs over the next 30 years to analyze various financial conditions based on the sources of capital funds and associated terms and conditions. Multiple scenarios were developed, which ranged from maximizing the use of SB 23 SETS funding, to meet the IEP and IGU goal of \$15/mcf at the customers meter to only using IGU's revenue bonding capacity. Based upon this analysis, the project can meet IGU's goals.

## **12.0 PATH FORWARD**

In conclusion, the Six-Year Plan has evaluated and calculated the known risks, costs, and communications needed to complete an aggressive and complex natural gas project. As the project develops, the path to success will become clearer, especially in terms of financing, permitting, and public natural gas conversion. As such, these components are based on information that is available and has been obtained to date, some of which will change as the project moves forward. Due diligence, with respect to financial analyses, have been reviewed in depth, and continue to be adjusted based on the scope of work and funding allowances.

A challenge early in the project will be the timeframe to prepare plans, negotiate ROWs and permits, purchase pipe, and contract for the construction of the Phase 1 (2015) work. Phases 2 through 6 will have the benefit of time, but the accelerated schedule for Phase 1 will need to be carefully developed and managed, as it will affect the municipal governments, regulatory agencies, contractors, homeowners, and others – as well as set the stage for furthering the project.

Supply and trucking make up over 70% of the cost, storage and distribution make up the remainder. For the project to be successful in delivering gas near \$15/mcf, it is imperative to secure AIDEA funds with terms and conditions that will allow this to occur.

The financial sensitivity analysis shows that the project is feasible given current cost estimates and using the flexible funding alternatives available to AIDEA under SB 23.

### **Vision of IGU in 5 Years**

In 5 years, IGU will have in place an operator and a dedicated staff, including organizational leadership comprised of a full-time General Manager, Chief Financial Officer, and Procurement Officer.

The gas distribution build-out will be entering into the fifth phase of the project, and programs to aide in conversions and educational material will have been refined in previous years to appropriately recognize and answer each community's needs.

The cost of gas and the critical need to evaluate various factors impacting the cost will have been addressed, and IGU will be repaying their debts to the state and bond holders while generating revenue for the organization.

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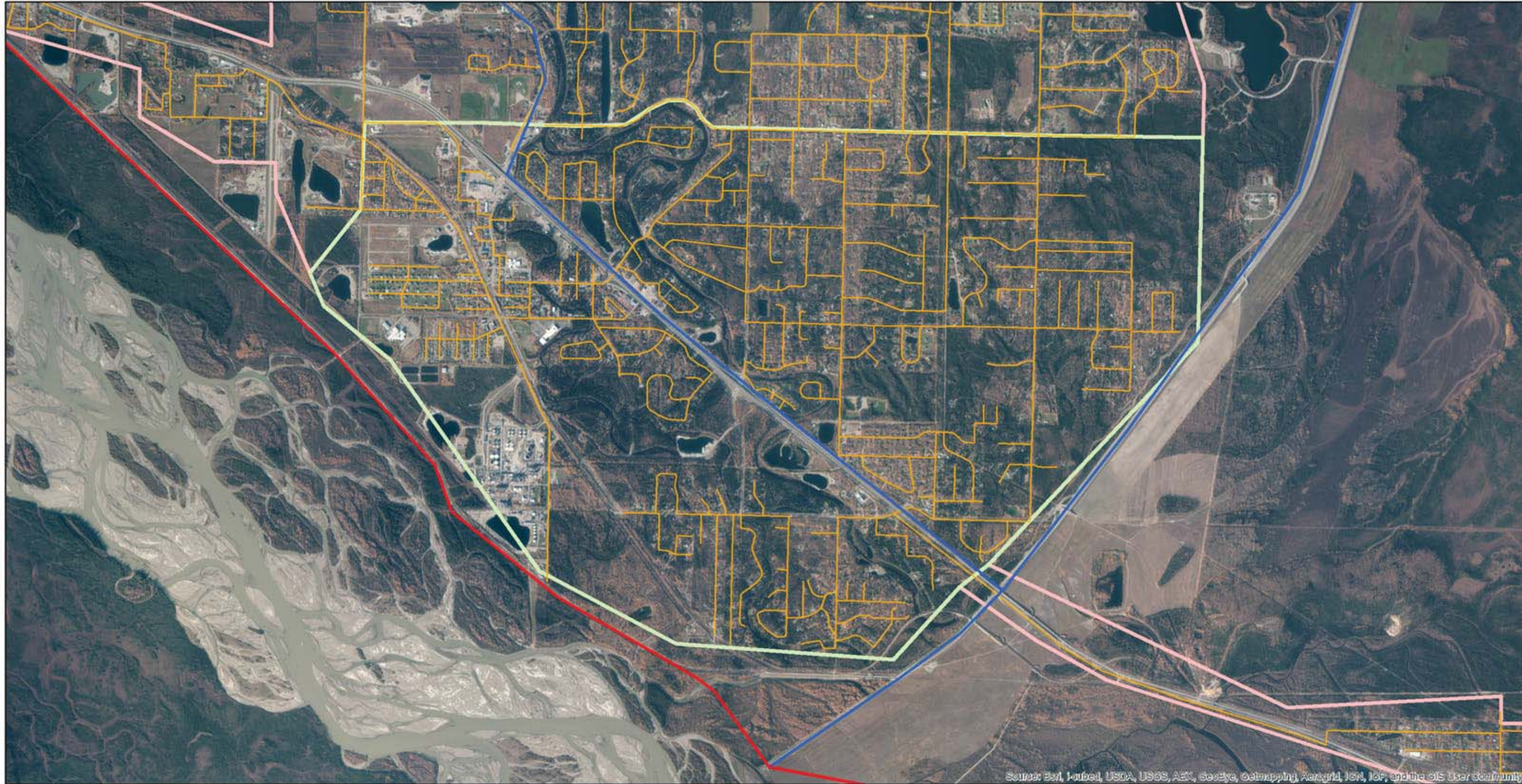
## **APPENDIX A**

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*IGU Project Phases 1 through 6*

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Source: Esri, Imaged, USDA, USGS, AEM, GeoEye, Getmapping, Aergrid, IGN, IGN, and the GIS User community

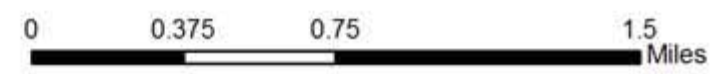
# Preliminary Gasline Layout IGU

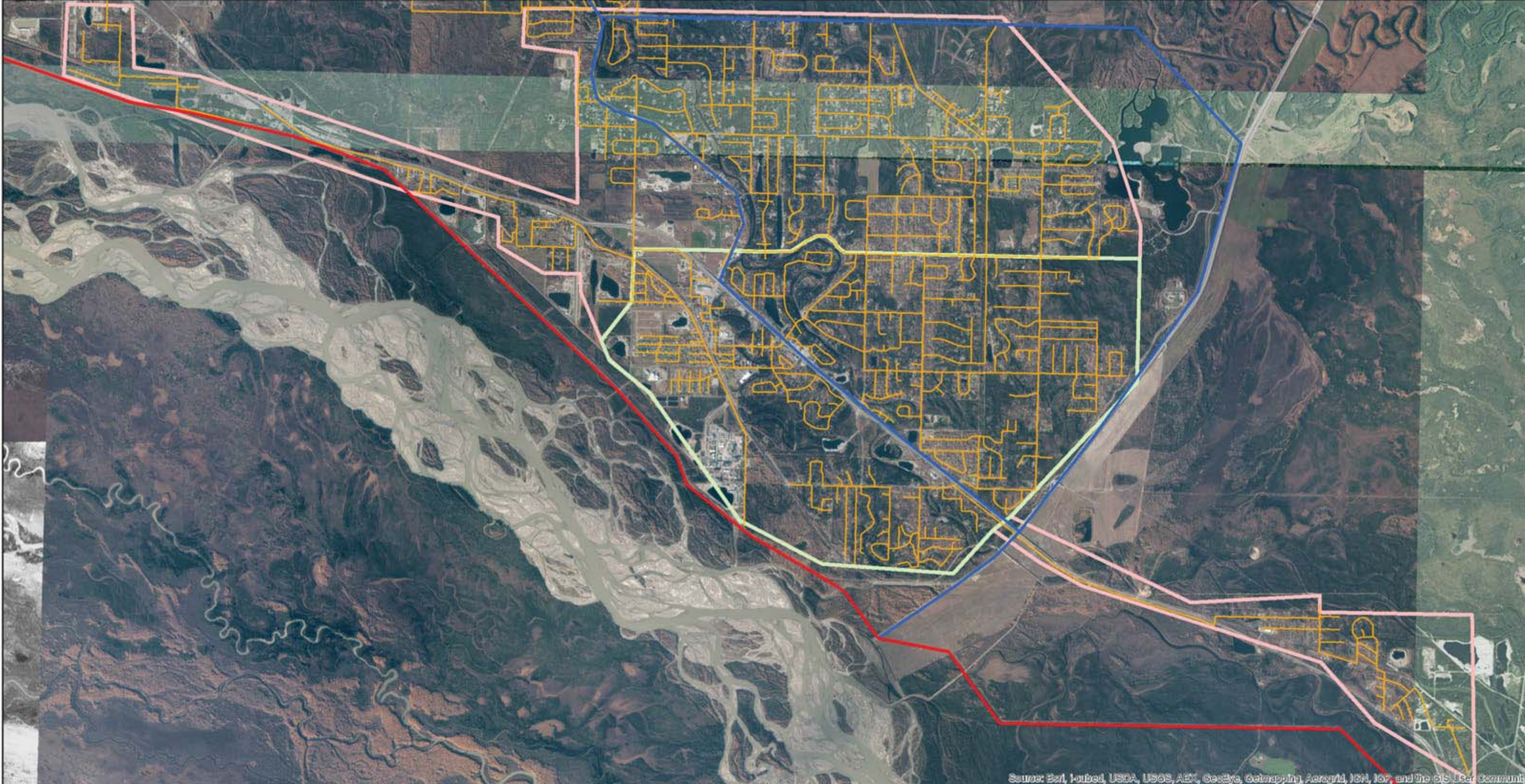
-  8 inch Transmission Line
-  6 inch Distribution Lines
-  Phase 1
-  10 inch Transmission Lines
-  IGU Proposed Gaslines
-  Phase 2



Proposed pipeline locations are approximate only, not intended as a substitute for official utility locates

Effective Date: Feb. 24th, 2014





Source: Esri, Imaged, USDA, USGS, Aero, GeoEye, GeoMapping, AeroGrid, IGN, IGN, and the GIS User community

# Preliminary Gasline Layout IGU

-  8 inch Transmission Line
-  6 inch Distribution Lines
-  Phase 1
-  10 inch Transmission Lines
-  IGU Proposed Gaslines
-  Phase 2

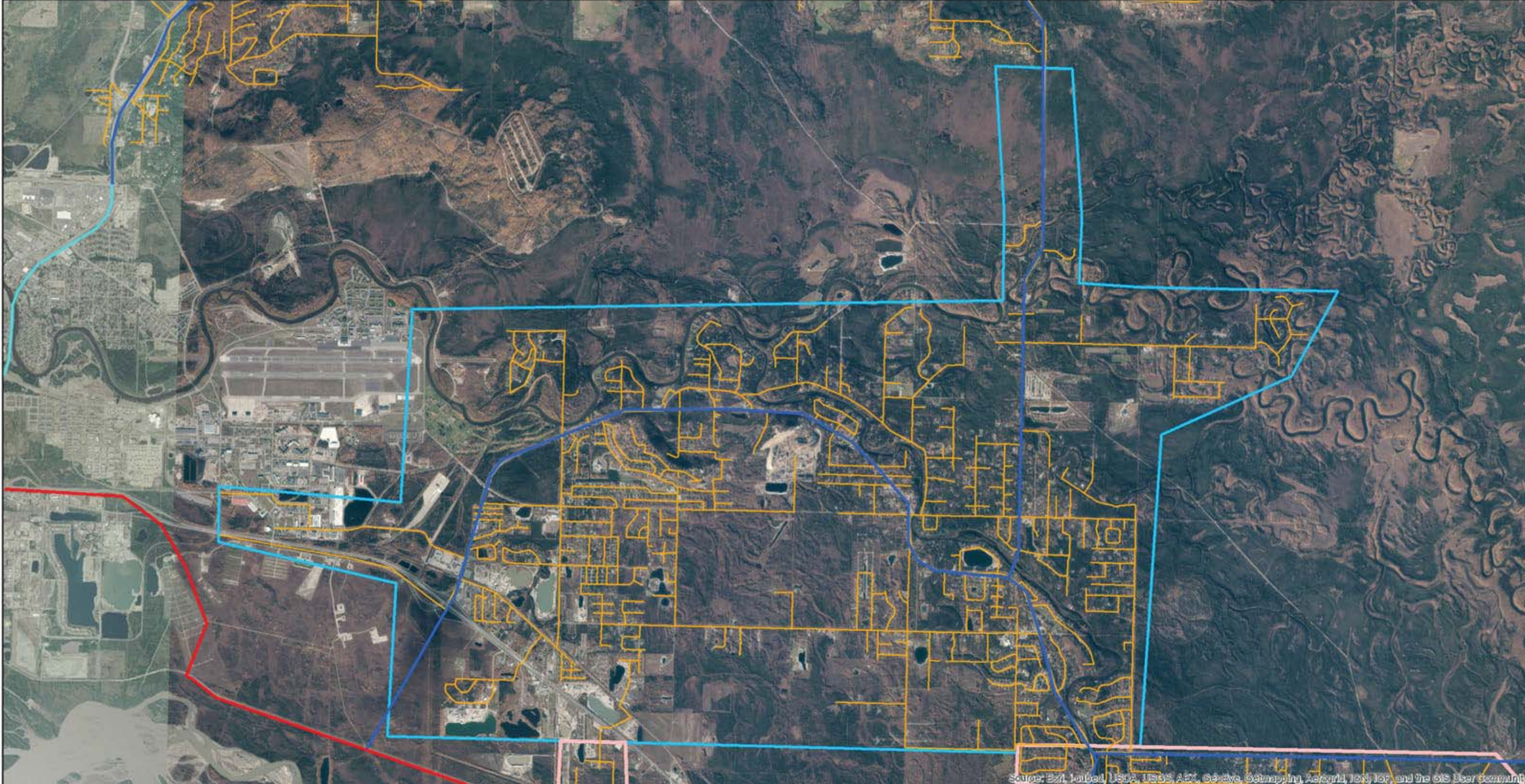


Proposed pipeline locations are approximate only, not intended as a substitute for official utility locates



Effective Date: Feb. 24th, 2014





Source: Esri, Imagery, USA, USGS, AEX, Geocode, Getmapping, AerGRID, IGN, JPL, and the GIS User Community

# Preliminary Gasline Layout IGU

-  8 inch Transmission Line
-  6 inch Distribution Lines
-  Phase 2
-  10 inch Transmission Lines
-  IGU Proposed Gaslines
-  Phase 3



Proposed pipeline locations are approximate only, not intended as a substitute for official utility locates

Effective Date: Feb. 24th, 2014





Source: Esri, DeLorme, USA, USGS, AEX, GeoEye, Geomapping, Aeregrid, IGN, IGP, and the GIS user community

## Preliminary Gasline Layout IGU

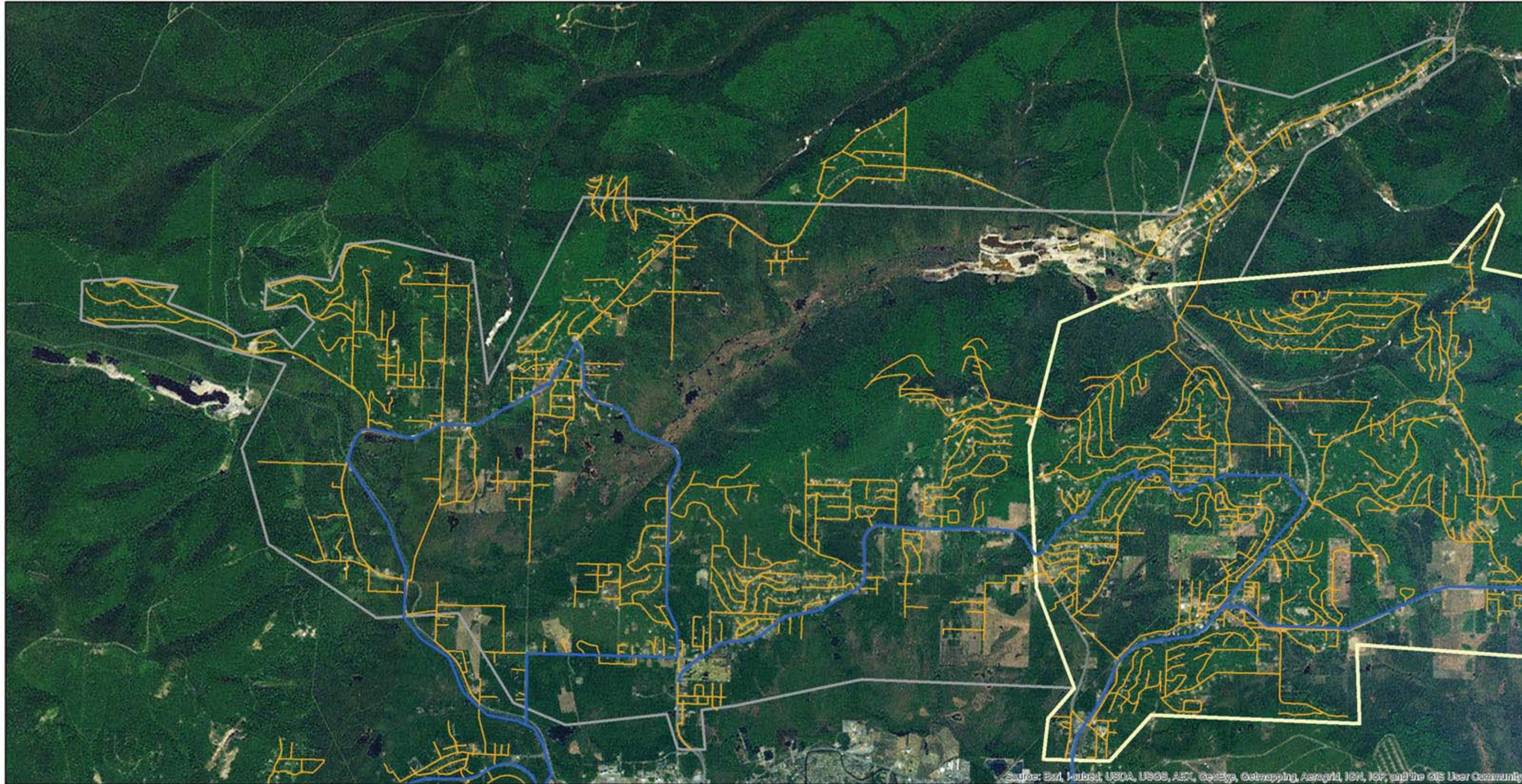
- ~ 8 inch Transmission Line
- ~ 6 inch Distribution Lines
- Phase 3
- ~ 10 inch Transmission Lines
- ~ IGU Proposed Gaslines
- Phase 4



Proposed pipeline locations are approximate only, not intended as a substitute for official utility locates

Effective Date: Feb. 24th, 2014





Source: Esri, DeLorme, USA, USGS, AEX, GeoEye, GeoMapping, AeroGrid, IGN, IGN, and the GIS User Community

# Preliminary Gasline Layout IGU

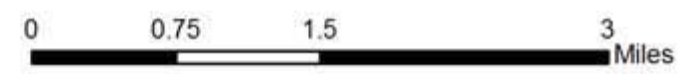
-  10 inch Transmission Lines
-  6 inch Distribution Lines
-  IGU Proposed Gaslines
-  Phase 4
-  Phase 5

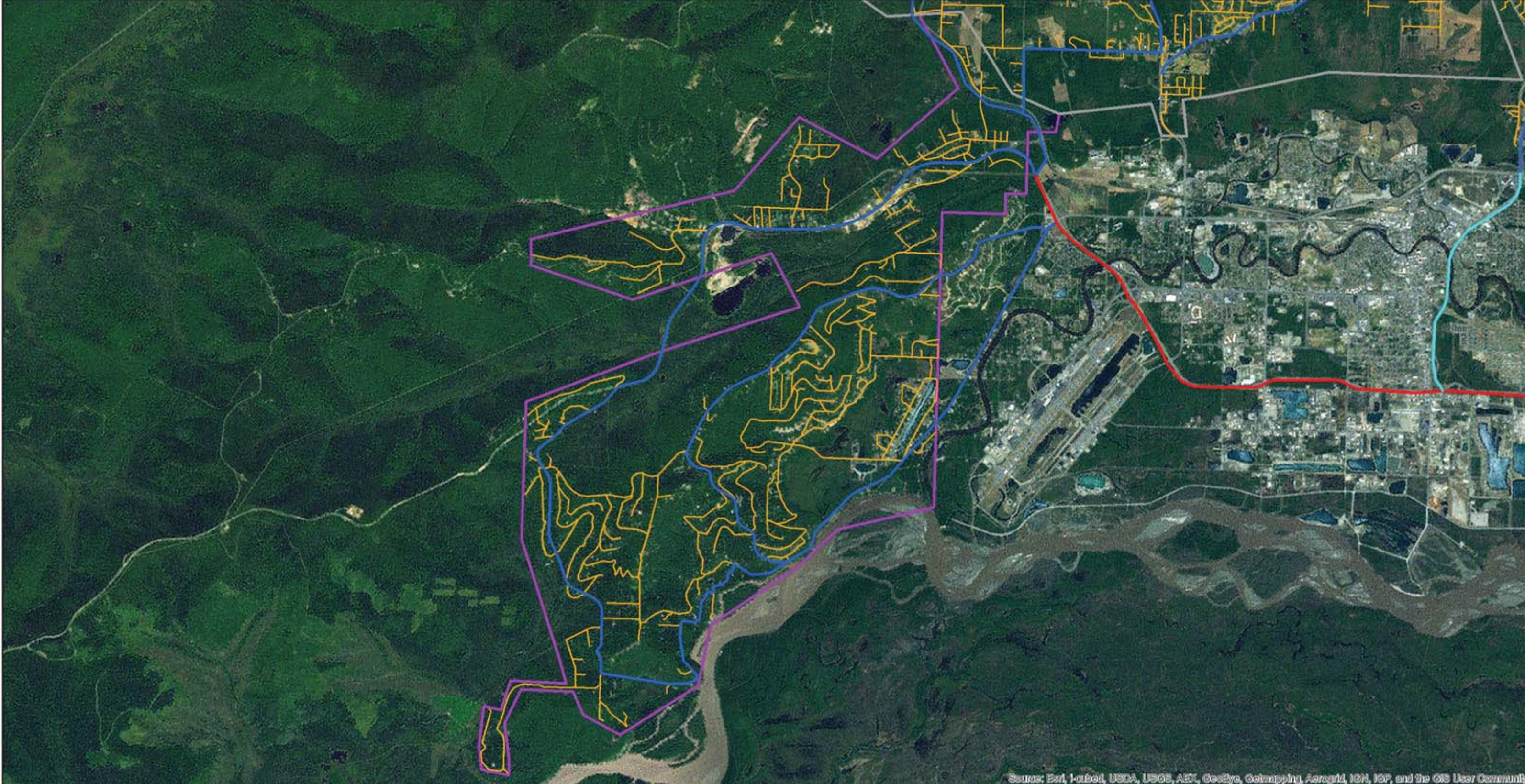


Proposed pipeline locations are approximate only, not intended as a substitute for official utility locates

Page 5 of 6

Effective Date: Feb. 24th, 2014





Source: Esri, Imaged, USDA, USGS, AEX, GeoEye, Geomapping, Aeregrid, IGN, IGP, and the GIS User Community

# Preliminary Gasline Layout IGU

- ~ 8 inch Transmission Line
 ~ 6 inch Distribution Lines
  Phase 5
- ~ 10 inch Transmission Lines
 ~ IGU Proposed Gaslines
  Phase 6



Proposed pipeline locations are approximate only, not intended as a substitute for official utility locates



Effective Date: Feb. 24th, 2014



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## **APPENDIX B**

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*IGU Project Class 4 (+50%/-30%) Cost Estimate*

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FINAL COST ESTIMATE SUMMARY: PIPELINE LAYOUT NETWORK									
HIGH DEMAND AREA									
	Length [LF]	Length [Miles]	Construction Cost	Materials	Engineering	Permitting	Total Cost	Cost/Foot	Cost/Mile
<b>Transmission Lines</b>	<b>121,449</b>	<b>23</b>	<b>12,115,000</b>	<b>7,355,000</b>	<b>973,000</b>	<b>68,000</b>	<b>20,511,000</b>	<b>\$ 169</b>	<b>\$ 892,000</b>
Transmission lines 2015	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Transmission lines 2016	56,300	11	\$ 5,327,000	\$ 3,471,000	\$ 440,000	\$ 31,000	\$ 9,269,000	\$ 165	\$ 869,000
Transmission lines 2017	32,649	6	\$ 3,351,000	\$ 1,875,000	\$ 261,000	\$ 18,000	\$ 5,505,000	\$ 169	\$ 890,000
Transmission lines 2018	32,500	6	\$ 3,437,000	\$ 2,009,000	\$ 272,000	\$ 19,000	\$ 5,737,000	\$ 177	\$ 932,000
Transmission lines 2019	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Transmission lines 2020	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Distribution feeder lines</b>	<b>137,000</b>	<b>26</b>	<b>8,450,000</b>	<b>1,918,000</b>	<b>519,000</b>	<b>26,000</b>	<b>10,913,000</b>	<b>\$ 80</b>	<b>\$ 421,000</b>
Distribution feeder lines 2015	57,000	11	\$ 4,050,000	\$ 803,000	\$ 243,000	\$ 12,000	\$ 5,108,000	\$ 90	\$ 473,000
Distribution feeder lines 2016	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Distribution feeder lines 2017	80,000	15	\$ 4,400,000	\$ 1,115,000	\$ 276,000	\$ 14,000	\$ 5,805,000	\$ 73	\$ 383,000
Distribution feeder lines 2018	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Distribution feeder lines 2019	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Distribution feeder lines 2020	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Distribution Lines</b>	<b>1,410,560</b>	<b>267</b>	<b>35,264,000</b>	<b>9,746,000</b>	<b>2,251,000</b>	<b>112,000</b>	<b>47,373,000</b>	<b>\$ 34</b>	<b>\$ 177,000</b>
Distribution Lines 2015	340,720	65	\$ 8,518,000	\$ 2,373,000	\$ 545,000	\$ 27,000	\$ 11,463,000	\$ 34	\$ 178,000
Distribution Lines 2016	454,080	86	\$ 11,352,000	\$ 3,092,000	\$ 722,000	\$ 36,000	\$ 15,202,000	\$ 33	\$ 177,000
Distribution Lines 2017	615,760	117	\$ 15,394,000	\$ 4,281,000	\$ 984,000	\$ 49,000	\$ 20,708,000	\$ 34	\$ 178,000
Distribution Lines 2018	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Distribution Lines 2019	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Distribution Lines 2020	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Service lines</b>	<b>303,075</b>	<b>57</b>	<b>7,578,000</b>	<b>4,009,000</b>	<b>580,000</b>	<b>29,000</b>	<b>12,196,000</b>	<b>\$ 40</b>	<b>\$ 212,000</b>
Service Lines 2015	84,675	16	\$ 2,117,000	\$ 1,118,000	\$ 162,000	\$ 8,000	\$ 3,405,000	\$ 40	\$ 212,000
Service Lines 2016	89,550	17	\$ 2,239,000	\$ 1,192,000	\$ 172,000	\$ 9,000	\$ 3,612,000	\$ 40	\$ 213,000
Service Lines 2017	128,850	24	\$ 3,222,000	\$ 1,699,000	\$ 246,000	\$ 12,000	\$ 5,179,000	\$ 40	\$ 212,000
Service Lines 2018	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Service Lines 2019	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Service Lines 2020	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Pig Launcher and Receiver</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>600,000</b>	<b>180,000</b>	<b>2,000</b>	<b>782,000</b>	<b>\$ -</b>	<b>\$ -</b>
Pig Launcher and Receiver 2015	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Pig Launcher and Receiver 2016	-	-	\$ -	\$ 300,000	\$ 90,000	\$ 1,000	\$ 391,000	\$ -	\$ -
Pig Launcher and Receiver 2017	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Pig Launcher and Receiver 2018	-	-	\$ -	\$ 300,000	\$ 90,000	\$ 1,000	\$ 391,000	\$ -	\$ -
Pig Launcher and Receiver 2019	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Pig Launcher and Receiver 2020	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Unknown Costs (30%)</b>	<b>-</b>	<b>-</b>	<b>19,022,000</b>	<b>7,089,000</b>	<b>1,351,000</b>	<b>71,000</b>	<b>27,532,000</b>	<b>\$ -</b>	<b>\$ -</b>
Unknown Costs (30%) 2015	-	-	\$ 4,406,000	\$ 1,288,000	\$ 285,000	\$ 14,000	\$ 5,993,000	\$ -	\$ -
Unknown Costs (30%) 2016	-	-	\$ 5,675,000	\$ 2,417,000	\$ 427,000	\$ 23,000	\$ 8,542,000	\$ -	\$ -
Unknown Costs (30%) 2017	-	-	\$ 7,910,000	\$ 2,691,000	\$ 530,000	\$ 28,000	\$ 11,159,000	\$ -	\$ -
Unknown Costs (30%) 2018	-	-	\$ 1,031,000	\$ 693,000	\$ 109,000	\$ 6,000	\$ 1,838,000	\$ -	\$ -
Unknown Costs (30%) 2019	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Unknown Costs (30%) 2020	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Subtotal</b>	<b>1,972,084</b>	<b>374</b>	<b>82,429,000</b>	<b>30,717,000</b>	<b>5,854,000</b>	<b>308,000</b>	<b>119,307,000</b>	<b>\$ 60</b>	<b>\$ 319,000</b>
Subtotal 2015	482,395	91	\$ 19,091,000	\$ 5,582,000	\$ 1,235,000	\$ 61,000	\$ 25,969,000	\$ 54	\$ 284,000
Subtotal 2016	599,930	114	\$ 24,593,000	\$ 10,472,000	\$ 1,851,000	\$ 100,000	\$ 37,016,000	\$ 62	\$ 326,000
Subtotal 2017	857,259	162	\$ 34,277,000	\$ 11,661,000	\$ 2,297,000	\$ 121,000	\$ 48,356,000	\$ 56	\$ 298,000
Subtotal 2018	32,500	6	\$ 4,468,000	\$ 3,002,000	\$ 471,000	\$ 26,000	\$ 7,966,000	\$ 245	\$ 1,294,000
Subtotal 2019	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Subtotal 2020	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>SUBTOTAL COST RANGE (-30% to +50%):</b>							<b>\$83,500,000 to \$179,000,000</b>		

MEDIUM DEMAND AREA									
	Length [LF]	Length [Miles]	Construction Cost	Materials	Engineering	Permitting	Total Cost	Cost/Foot	Cost/Mile
<b>Pipelines</b>									
<b>Transmission Lines</b>	-	-	-	-	-	-	-	\$ -	\$ -
Transmission lines 2015	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Transmission lines 2016	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Transmission lines 2017	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Transmission lines 2018	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Transmission lines 2019	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Transmission lines 2020	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Distribution feeder lines</b>	<b>263,360</b>	<b>50</b>	<b>13,969,000</b>	<b>3,692,000</b>	<b>883,000</b>	<b>31,000</b>	<b>18,575,000</b>	<b>\$ 71</b>	<b>\$ 372,000</b>
Distribution feeder lines 2015	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Distribution feeder lines 2016	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Distribution feeder lines 2017	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Distribution feeder lines 2018	120,470	23	\$ 6,424,000	\$ 1,679,000	\$ 405,000	\$ 14,000	\$ 8,522,000	\$ 71	\$ 374,000
Distribution feeder lines 2019	97,890	19	\$ 5,295,000	\$ 1,373,000	\$ 333,000	\$ 12,000	\$ 7,013,000	\$ 72	\$ 378,000
Distribution feeder lines 2020	45,000	9	\$ 2,250,000	\$ 640,000	\$ 145,000	\$ 5,000	\$ 3,040,000	\$ 68	\$ 357,000
<b>Distribution Lines</b>	<b>1,795,910</b>	<b>340</b>	<b>44,898,000</b>	<b>12,484,000</b>	<b>2,869,000</b>	<b>100,000</b>	<b>60,351,000</b>	<b>\$ 34</b>	<b>\$ 177,000</b>
Distribution Lines 2015	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Distribution Lines 2016	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Distribution Lines 2017	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Distribution Lines 2018	659,600	125	\$ 16,490,000	\$ 4,584,000	\$ 1,054,000	\$ 37,000	\$ 22,165,000	\$ 34	\$ 177,000
Distribution Lines 2019	684,310	130	\$ 17,108,000	\$ 4,758,000	\$ 1,093,000	\$ 38,000	\$ 22,997,000	\$ 34	\$ 177,000
Distribution Lines 2020	452,000	86	\$ 11,300,000	\$ 3,142,000	\$ 722,000	\$ 25,000	\$ 15,189,000	\$ 34	\$ 177,000
<b>Service lines</b>	<b>599,500</b>	<b>114</b>	<b>14,989,000</b>	<b>6,778,000</b>	<b>1,088,000</b>	<b>38,000</b>	<b>22,893,000</b>	<b>\$ 38</b>	<b>\$ 202,000</b>
Service Lines 2015	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Service Lines 2016	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Service Lines 2017	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Service Lines 2018	202,900	38	\$ 5,073,000	\$ 2,295,000	\$ 368,000	\$ 13,000	\$ 7,749,000	\$ 38	\$ 202,000
Service Lines 2019	216,200	41	\$ 5,406,000	\$ 2,445,000	\$ 393,000	\$ 14,000	\$ 8,258,000	\$ 38	\$ 202,000
Service Lines 2020	180,400	34	\$ 4,510,000	\$ 2,038,000	\$ 327,000	\$ 11,000	\$ 6,886,000	\$ 38	\$ 202,000
<b>Pig Launcher and Receiver</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>\$ -</b>	<b>\$ -</b>
Pig Launcher and Receiver 2015	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Pig Launcher and Receiver 2016	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Pig Launcher and Receiver 2017	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Pig Launcher and Receiver 2018	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Pig Launcher and Receiver 2019	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Pig Launcher and Receiver 2020	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Unknown Costs (30%)</b>	<b>-</b>	<b>-</b>	<b>22,157,000</b>	<b>6,886,000</b>	<b>1,452,000</b>	<b>50,000</b>	<b>30,546,000</b>	<b>\$ -</b>	<b>\$ -</b>
Unknown Costs (30%) 2015	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Unknown Costs (30%) 2016	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Unknown Costs (30%) 2017	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Unknown Costs (30%) 2018	-	-	\$ 8,396,000	\$ 2,567,000	\$ 548,000	\$ 19,000	\$ 11,531,000	\$ -	\$ -
Unknown Costs (30%) 2019	-	-	\$ 8,343,000	\$ 2,573,000	\$ 546,000	\$ 19,000	\$ 11,480,000	\$ -	\$ -
Unknown Costs (30%) 2020	-	-	\$ 5,418,000	\$ 1,746,000	\$ 358,000	\$ 12,000	\$ 7,535,000	\$ -	\$ -
<b>Subtotal</b>	<b>2,658,770</b>	<b>504</b>	<b>96,013,000</b>	<b>29,840,000</b>	<b>6,292,000</b>	<b>219,000</b>	<b>132,365,000</b>	<b>\$ 50</b>	<b>\$ 263,000</b>
Subtotal 2015	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Subtotal 2016	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Subtotal 2017	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Subtotal 2018	982,970	186	\$ 36,383,000	\$ 11,125,000	\$ 2,375,000	\$ 83,000	\$ 49,967,000	\$ 51	\$ 268,000
Subtotal 2019	998,400	189	\$ 36,152,000	\$ 11,149,000	\$ 2,365,000	\$ 83,000	\$ 49,748,000	\$ 50	\$ 263,000
Subtotal 2020	677,400	128	\$ 23,478,000	\$ 7,566,000	\$ 1,552,000	\$ 53,000	\$ 32,650,000	\$ 48	\$ 254,000
<b>SUBTOTAL COST RANGE (-30% to +50%):</b>							<b>\$92,700,000 to \$198,500,000</b>		

COMBINED HIGH AND MEDIUM DEMAND AREAS									
<b>Total</b>	<b>4,630,854</b>	<b>877</b>	<b>178,442,000</b>	<b>60,557,000</b>	<b>12,146,000</b>	<b>527,000</b>	<b>251,672,000</b>	<b>\$ 54</b>	<b>\$ 287,000</b>
<b>TOTAL COST RANGE (-30% to +50%):</b>							<b>\$176,200,000 to \$377,500,000</b>		

HIGH POPULATION DENSITY AREA							
Description	Class	Dia [in]	Quantity	Unit	Unit Cost	Total Cost	
<b>1. TRANSMISSION LINES: Provides natural gas to distribution feeder lines and industrial users</b>							
<b>Construction</b>							
Installation Fairbanks to Eielson	ANSI 600	10	-	LF	\$ 90	\$ -	
Installation Fairbanks towards Fox	ANSI 300	8	-	LF	\$ 90	\$ -	
Cathodic Protection			-	miles	\$ 15,000	\$ -	
HDD Chena river	varies	varies	-	LF	\$ 400	\$ -	
Gate Station	ANSI 600	10	-	EA	\$ 1,250,000	\$ -	
Pigging connection	ANSI 600	10	-	EA	\$ 50,000	\$ -	
Pigging connection	ANSI 300	8	-	EA	\$ 50,000	\$ -	
<i>Subtotal-construction</i>						\$ -	
<b>Materials</b>							
Materials- Steel pipe, FBE coated	ANSI 600	10	-	LF	\$ 53	\$ -	
Materials- Steel pipe, FBE coated	ANSI 300	8	-	LF	\$ 44	\$ -	
Materials- Valves	ANSI 600	10	-	EA	\$ 34,000	\$ -	
Materials- Valves	ANSI 300	8	-	EA	\$ 20,000	\$ -	
Materials- Design allowance	varies	10 & 8	5%	EA	\$ -	\$ -	
Materials- Misc. Freight			2%	EA	\$ -	\$ -	
Materials- Procurement			4%	EA	\$ -	\$ -	
Materials- SQS			2%	EA	\$ -	\$ -	
<i>Subtotal-materials</i>						\$ -	
<b>Launcher/Receiver</b>							
Pig Barrels- mobile	ANSI 600	12	-	EA	\$ 300,000	\$ -	
<i>Subtotal- Transmission Lines</i>				LF		\$ -	
<b>2. DISTRIBUTION FEEDER LINES: Provides natural gas to local distribution lines</b>							
<b>Construction</b>							
Installation	60psig	6	57,000	LF	\$ 50	\$ 2,850,000	
HDD Chena river	60psig	6	0	LF	\$ 300	\$ -	
Regulator stations	60psig	6	3	EA	\$ 400,000	\$ 1,200,000	
<i>Subtotal-construction</i>						\$ 4,050,000	
<b>Materials</b>							
Materials- Plastic	60psig	6	57,000	LF	\$ 12	\$ 684,000	
Materials- Valves	60psig	6	2	EA	\$ 13,300	\$ 27,000	
Materials- Design allowance	varies	varies	5%	EA	\$ 35,550	\$ 36,000	
Materials- Misc. Freight			2%	EA	\$ 14,220	\$ 14,000	
Materials- Procurement			4%	EA	\$ 28,440	\$ 28,000	
Materials- SQS			2%	EA	\$ 14,220	\$ 14,000	
<i>Subtotal-materials</i>						\$ 803,000	
<i>Subtotal- Distribution Feeder Lines</i>			57,000	LF		\$ 4,853,000	
<b>3. DISTRIBUTION LINES: Provides natural gas to service lines</b>							
<b>Construction</b>							
Residential lines	60 psig	2	340,720	LF	\$ 25	\$ 8,518,000	
<i>Subtotal-construction</i>						\$ 8,518,000	
<b>Materials</b>							
Materials- Pipe HDPE	60 psig	2	340,720	LF	\$ 6	\$ 2,044,000	
Materials- Valves	60 psig	2	9	EA	\$ 6,200	\$ 56,000	
Materials- Design allowance	varies	varies	5%	EA	\$ 105,000	\$ 105,000	
Materials- Misc. Freight			2%	EA	\$ 42,000	\$ 42,000	
Materials- Procurement			4%	EA	\$ 84,000	\$ 84,000	
Materials- SQS			2%	EA	\$ 42,000	\$ 42,000	
<i>Subtotal-materials</i>						\$ 2,373,000	
<i>Subtotal- Distribution Lines</i>			340,720	LF		\$ 10,891,000	
<b>4. SERVICE LINES: Provides natural gas to individual users</b>							
<b>Construction</b>							
Residential lines- high density	60 psig	0.625	1,101	82,575	LF	\$ 25	\$ 2,064,000
Commercial lines- high density	60 psig	1	28	2,100	LF	\$ 25	\$ 53,000
<i>Subtotal-construction</i>							\$ 2,117,000
<b>Materials</b>							
Materials- Pipe HDPE	60 psig	0.625	1,071	82,575	LF	\$ 5	\$ 413,000
Materials- Pipe HDPE	60 psig	1	57	2,100	LF	\$ 5	\$ 11,000
Materials- Excess Flow Valves	60 psig	0.625	1,071		EA	\$ 500	\$ 536,000
Materials- Excess Flow Valves	60 psig	1	57			\$ 500	\$ 29,000
Materials- Design allowance			5%	LF	\$ 49,450	\$ 49,000	
Materials- Misc. Freight			2%	LF	\$ 19,780	\$ 20,000	
Materials- Procurement			4%	LF	\$ 39,560	\$ 40,000	
Materials- SQS			2%	LF	\$ 19,780	\$ 20,000	
<i>Subtotal-materials</i>							\$ 1,118,000
<i>Subtotal- Service Lines</i>			84,675	LF			\$ 3,235,000

HIGH POPULATION DENSITY AREA							
Description	Class	Dia [in]	Quantity	Unit	Unit Cost	Total Cost	
<b>1. TRANSMISSION LINES: Provides natural gas to distribution feeder lines and industrial users</b>							
<b>Construction</b>							
Installation Fairbanks to Elelson	ANSI 600	10	56,300	LF	\$ 90	\$ 5,067,000	
Installation Fairbanks towards Fox	ANSI 300	8	-	LF	\$ 90	\$ -	
Cathodic Protection			11	miles	\$ 15,000	\$ 160,000	
HDD Chena river	varies	varies	-	LF	\$ 400	\$ -	
Gate Station	ANSI 600	10	-	EA	\$ 1,250,000	\$ -	
Pigging connection	ANSI 600	10	1	EA	\$ 50,000	\$ 50,000	
Pigging connection	ANSI 300	8	1	EA	\$ 50,000	\$ 50,000	
<i>Subtotal-construction</i>						\$ 5,327,000	
<b>Materials</b>							
Materials- Steel pipe, FBE coated	ANSI 600	10	56,300	LF	\$ 53	\$ 2,984,000	
Materials- Steel pipe, FBE coated	ANSI 300	8	-	LF	\$ 44	\$ -	
Materials- Valves	ANSI 600	10	2	EA	\$ 34,000	\$ 68,000	
Materials- Valves	ANSI 300	8	1	EA	\$ 20,000	\$ 20,000	
Materials- Design allowance	varies	10 & 8	5%	EA	\$ 153,600	\$ 154,000	
Materials- Misc. Freight			2%	EA	\$ 61,440	\$ 61,000	
Materials- Procurement			4%	EA	\$ 122,880	\$ 123,000	
Materials- SQS			2%	EA	\$ 61,440	\$ 61,000	
<i>Subtotal-materials</i>						\$ 3,471,000	
<b>Launcher/Receiver</b>							
Pig Barrels- mobile	ANSI 600	12	1	EA	\$ 300,000	\$ 300,000	
<i>Subtotal- Transmission Lines</i>			56,300	LF		\$ 9,098,000	
<b>2. DISTRIBUTION FEEDER LINES: Provides natural gas to local distribution lines</b>							
<b>Construction</b>							
Installation	60psig	6	-	LF	\$ 50	\$ -	
HDD Chena river	60psig	6	0	LF	\$ 300	\$ -	
Regulator stations	60psig	6	-	EA	\$ 400,000	\$ -	
<i>Subtotal-construction</i>						\$ -	
<b>Materials</b>							
Materials- Plastic	60psig	6	-	LF	\$ 12	\$ -	
Materials- Valves	60psig	6	-	EA	\$ 13,300	\$ -	
Materials- Design allowance	varies	varies	5%	EA	\$ -	\$ -	
Materials- Misc. Freight			2%	EA	\$ -	\$ -	
Materials- Procurement			4%	EA	\$ -	\$ -	
Materials- SQS			2%	EA	\$ -	\$ -	
<i>Subtotal-materials</i>						\$ -	
<i>Subtotal- Distribution Feeder Lines</i>			-	LF		\$ -	
<b>3. DISTRIBUTION LINES: Provides natural gas to service lines</b>							
<b>Construction</b>							
Residential lines	60 psig	2	454,080	LF	\$ 25	\$ 11,352,000	
<i>Subtotal-construction</i>						\$ 11,352,000	
<b>Materials</b>							
Materials- Pipe HDPE	60 psig	2	454,080	LF	\$ 6	\$ 2,724,000	
Materials- Valves	60 psig	2	2	EA	\$ 6,200	\$ 12,000	
Materials- Design allowance	varies	varies	5%	EA	\$ 136,800	\$ 137,000	
Materials- Misc. Freight			2%		\$ 54,720	\$ 55,000	
Materials- Procurement			4%		\$ 109,440	\$ 109,000	
Materials- SQS			2%	EA	\$ 54,720	\$ 55,000	
<i>Subtotal-materials</i>						\$ 3,092,000	
<i>Subtotal- Distribution Lines</i>			454,080	LF		\$ 14,444,000	
<b>4. SERVICE LINES: Provides natural gas to individual users</b>							
<b>Construction</b>							
Residential lines- high density	60 psig	0.625	1,162	87,150	LF	\$ 25	\$ 2,179,000
Commercial lines- high density	60 psig	1	32	2,400	LF	\$ 25	\$ 60,000
<i>Subtotal-construction</i>							\$ 2,239,000
<b>Materials</b>							
Materials- Pipe HDPE	60 psig	0.625	1,140	87,150	LF	\$ 5	\$ 436,000
Materials- Pipe HDPE	60 psig	1	74	2,400	LF	\$ 5	\$ 12,000
Materials- Valves	60 psig	0.625	1,140		EA	\$ 500	\$ 570,000
Materials- Valves	60 psig	1	74			\$ 500	\$ 37,000
Materials- Design allowance			5%		LF	\$ 52,750	\$ 53,000
Materials- Misc. Freight			2%		LF	\$ 21,100	\$ 21,000
Materials- Procurement			4%		LF	\$ 42,200	\$ 42,000
Materials- SQS			2%		LF	\$ 21,100	\$ 21,000
<i>Subtotal-materials</i>							\$ 1,192,000
<i>Subtotal- Service Lines</i>			89,550	LF			\$ 3,431,000

HIGH POPULATION DENSITY AREA							
Description	Class	Dia [in]	Quantity	Unit	Unit Cost	Total Cost	
<b>1. TRANSMISSION LINES: Provides natural gas to distribution feeder lines and industrial users</b>							
<b>Construction</b>							
Installation Fairbanks to Eielson	ANSI 600	10	16,500	LF	\$ 90	\$ 1,485,000	
Installation Fairbanks towards Fox	ANSI 300	8	16,149	LF	\$ 90	\$ 1,453,000	
Cathodic Protection			6	miles	\$ 15,000	\$ 93,000	
HDD Chena river	varies	varies	800	LF	\$ 400	\$ 320,000	
Gate Station	ANSI 600	10	-	EA	\$ 1,250,000	\$ -	
Pigging connection	ANSI 600	10	-	EA	\$ 50,000	\$ -	
Pigging connection	ANSI 300	8	-	EA	\$ 50,000	\$ -	
<i>Subtotal-construction</i>						\$ 3,351,000	
<b>Materials</b>							
Materials- Steel pipe, FBE coated	ANSI 600	10	16,500	LF	\$ 53	\$ 875,000	
Materials- Steel pipe, FBE coated	ANSI 300	8	16,149	LF	\$ 44	\$ 711,000	
Materials- Valves	ANSI 600	10	1	EA	\$ 34,000	\$ 34,000	
Materials- Valves	ANSI 300	8	2	EA	\$ 20,000	\$ 40,000	
Materials- Design allowance	varies	10 & 8	5%	EA	\$ 83,000	\$ 83,000	
Materials- Misc. Freight			2%	EA	\$ 33,200	\$ 33,000	
Materials- Procurement			4%	EA	\$ 66,400	\$ 66,000	
Materials- SQS			2%	EA	\$ 33,200	\$ 33,000	
<i>Subtotal-materials</i>						\$ 1,875,000	
<b>Launcher/Receiver</b>							
Pig Barrels- mobile	ANSI 600	12	-	EA	\$ 300,000	\$ -	
<i>Subtotal- Transmission Lines</i>						\$ 5,226,000	
<b>2. DISTRIBUTION FEEDER LINES: Provides natural gas to local distribution lines</b>							
<b>Construction</b>							
Installation	60psig	6	80,000	LF	\$ 50	\$ 4,000,000	
HDD Chena river	60psig	6	0	LF	\$ 300	\$ -	
Regulator stations	60psig	6	1	EA	\$ 400,000	\$ 400,000	
<i>Subtotal-construction</i>						\$ 4,400,000	
<b>Materials</b>							
Materials- Plastic	60psig	6	80,000	LF	\$ 12	\$ 960,000	
Materials- Valves	60psig	6	2	EA	\$ 13,300	\$ 27,000	
Materials- Design allowance	varies	varies	5%	EA	\$ 49,350	\$ 49,000	
Materials- Misc. Freight			2%	EA	\$ 19,740	\$ 20,000	
Materials- Procurement			4%	EA	\$ 39,480	\$ 39,000	
Materials- SQS			2%	EA	\$ 19,740	\$ 20,000	
<i>Subtotal-materials</i>						\$ 1,115,000	
<i>Subtotal- Distribution Feeder Lines</i>						\$ 5,515,000	
<b>3. DISTRIBUTION LINES: Provides natural gas to service lines</b>							
<b>Construction</b>							
Residential lines	60 psig	2	615,760	LF	\$ 25	\$ 15,394,000	
<i>Subtotal-construction</i>						\$ 15,394,000	
<b>Materials</b>							
Materials- Pipe HDPE	60 psig	2	615,760	LF	\$ 6	\$ 3,695,000	
Materials- Valves	60 psig	2	15	EA	\$ 6,200	\$ 93,000	
Materials- Design allowance	varies	varies	5%	EA	\$ 189,400	\$ 189,000	
Materials- Misc. Freight			2%	EA	\$ 75,760	\$ 76,000	
Materials- Procurement			4%	EA	\$ 151,520	\$ 152,000	
Materials- SQS			2%	EA	\$ 75,760	\$ 76,000	
<i>Subtotal-materials</i>						\$ 4,281,000	
<i>Subtotal- Distribution Lines</i>						\$ 19,675,000	
<b>4. SERVICE LINES: Provides natural gas to individual users</b>							
<b>Construction</b>							
Residential lines- high density	60 psig	0.625	1,676	125,700	LF	\$ 25	\$ 3,143,000
Commercial lines- high density	60 psig	1	42	3,150	LF	\$ 25	\$ 79,000
<i>Subtotal-construction</i>						\$ 3,222,000	
<b>Materials</b>							
Materials- Pipe HDPE	60 psig	0.625	1,643	125,700	LF	\$ 5	\$ 629,000
Materials- Pipe HDPE	60 psig	1	74	3,150	LF	\$ 5	\$ 16,000
Materials- Valves	60 psig	0.625	1,643		EA	\$ 500	\$ 822,000
Materials- Valves	60 psig	1	74		EA	\$ 500	\$ 37,000
Materials- Design allowance			5%		LF	\$ 75,200	\$ 75,000
Materials- Misc. Freight			2%		LF	\$ 30,080	\$ 30,000
Materials- Procurement			4%		LF	\$ 60,160	\$ 60,000
Materials- SQS			2%		LF	\$ 30,080	\$ 30,000
<i>Subtotal-materials</i>						\$ 1,699,000	
<i>Subtotal- Service Lines</i>						\$ 4,921,000	

DETAILS: FINAL COST ESTIMATE, PIPELINE LAYOUT NETWORK

HIGH POPULATION DENSITY AREA						
Description	Class	Dia (in)	Quantity	Unit	Unit Cost	Total Cost
<b>1. TRANSMISSION LINES: Provides natural gas to distribution feeder lines and industrial users</b>						
<b>Construction</b>						
Installation Fairbanks to Eielson	ANSI 600	10	32,500	LF	\$ 90	\$ 2,925,000
Installation Fairbanks towards Fox	ANSI 300	8	-	LF	\$ 90	\$ -
Cathodic Protection			6	miles	\$ 15,000	\$ 92,000
HDD Chena river	varies	varies	800	LF	\$ 400	\$ 320,000
Gate Station	ANSI 600	10	-	EA	\$ 1,250,000	\$ -
Pigging connection	ANSI 600	10	1	EA	\$ 50,000	\$ 50,000
Pigging connection	ANSI 300	8	1	EA	\$ 50,000	\$ 50,000
<b>Subtotal-construction</b>						<b>\$ 3,437,000</b>
<b>Materials</b>						
Materials- Steel pipe, FBE coated	ANSI 600	10	32,500	LF	\$ 53	\$ 1,723,000
Materials- Steel pipe, FBE coated	ANSI 300	8	-	LF	\$ 44	\$ -
Materials- Valves	ANSI 600	10	1	EA	\$ 34,000	\$ 34,000
Materials- Valves	ANSI 300	8	1	EA	\$ 20,000	\$ 20,000
Materials- Design allowance	varies	10 & 8	5%	EA	\$ 88,850	\$ 89,000
Materials- Misc. Freight			2%	EA	\$ 35,540	\$ 36,000
Materials- Procurement			4%	EA	\$ 71,080	\$ 71,000
Materials- SQS			2%	EA	\$ 35,540	\$ 36,000
<b>Subtotal-materials</b>						<b>\$ 2,009,000</b>
<b>Launcher/Receiver</b>						
Pig Barrels- mobile	ANSI 600	12	1	EA	\$ 300,000	\$ 300,000
<b>Subtotal-Transmission Lines</b>			<b>32,500</b>	<b>LF</b>		<b>\$ 5,746,000</b>
MEDIUM POPULATION DENSITY AREA						
Description	Class	Dia (in)	Quantity	Unit	Unit Cost	Total Cost
<b>1. TRANSMISSION LINES: Provides natural gas to distribution feeder lines and industrial users</b>						
<b>Construction</b>						
Installation	ANSI 600	10	-	LF	\$ 90	\$ -
Cathodic Protection			-	miles	\$ 15,000	\$ -
HDD Chena river	varies	varies	-	LF	\$ 400	\$ -
Gate Station	ANSI 600	10	-	EA	\$ 1,250,000	\$ -
Pigging connection	ANSI 600	10	-	EA	\$ 50,000	\$ -
Pigging connection	ANSI 300	8	-	EA	\$ 50,000	\$ -
<b>Subtotal-construction</b>						<b>\$ -</b>
<b>Materials</b>						
Materials- Steel pipe, FBE coated	ANSI 600	10	-	LF	\$ 53	\$ -
Materials- Steel pipe, FBE coated	ANSI 300	8	-	LF	\$ 44	\$ -
Materials- Valves	ANSI 600	10	-	EA	\$ 34,000	\$ -
Materials- Valves	ANSI 300	8	-	EA	\$ 20,000	\$ -
Materials- Design allowance	varies	10 & 8	5%	EA	\$ -	\$ -
Materials- Misc. Freight			2%	EA	\$ -	\$ -
Materials- Procurement			4%	EA	\$ -	\$ -
Materials- SQS			2%	EA	\$ -	\$ -
<b>Subtotal-materials</b>						<b>\$ -</b>
<b>Launcher/Receiver</b>						
Pig Barrels- mobile	ANSI 600	12	-	EA	\$ 300,000	\$ -
<b>Subtotal-Transmission Lines</b>				<b>LF</b>		<b>\$ -</b>
<b>2. DISTRIBUTION FEEDER LINES: Provides natural gas to local distribution lines</b>						
<b>Construction</b>						
Installation	60psig	6	120,470	LF	\$ 50	\$ 6,024,000
HDD Chena River	60psig	6	0	LF	\$ 300	\$ -
Regulator stations	60psig	6	1	EA	\$ 400,000	\$ 400,000
<b>Subtotal-construction</b>						<b>\$ 6,424,000</b>
<b>Materials</b>						
Materials- Plastic	60psig	6	120,470	LF	\$ 12	\$ 1,446,000
Materials- Valves	60psig	6	3	EA	\$ 13,300	\$ 40,000
Materials- Design allowance	varies	varies	5%	EA	\$ 74,300	\$ 74,000
Materials- Misc. Freight			2%	EA	\$ 29,720	\$ 30,000
Materials- Procurement			4%	EA	\$ 59,440	\$ 59,000
Materials- SQS			2%	EA	\$ 29,720	\$ 30,000
<b>Subtotal-materials</b>						<b>\$ 1,679,000</b>
<b>Subtotal- Distribution Feeder Lines</b>			<b>120,470</b>	<b>LF</b>		<b>\$ 8,103,000</b>
<b>3. DISTRIBUTION LINES: Provides natural gas to service lines</b>						
<b>Construction</b>						
Residential lines	60 psig	2	659,600	LF	\$ 25	\$ 16,490,000
<b>Subtotal-construction</b>						<b>\$ 16,490,000</b>
<b>Materials</b>						
Materials- Pipe HDPE	60 psig	2	659,600	LF	\$ 6	\$ 3,958,000
Materials- Valves	60 psig	2	16	EA	\$ 6,200	\$ 99,000
Materials- Design allowance	varies	varies	5%	EA	\$ 202,850	\$ 203,000
Materials- Misc. Freight			2%	EA	\$ 81,140	\$ 81,000
Materials- Procurement			4%	EA	\$ 162,280	\$ 162,000
Materials- SQS			2%	EA	\$ 81,140	\$ 81,000
<b>Subtotal-materials</b>						<b>\$ 4,584,000</b>
<b>Subtotal- Distribution Lines</b>			<b>659,600</b>	<b>LF</b>		<b>\$ 21,074,000</b>
<b>4. SERVICE LINES: Provides natural gas to individual users</b>						
<b>Construction</b>						
Residential lines- medium density	60 psig	0.625	1,966	196,600 LF	\$ 25	\$ 4,915,000
Commercial lines- medium density	60 psig	1	63	6,300 LF	\$ 25	\$ 158,000
<b>Subtotal-construction</b>						<b>\$ 5,073,000</b>
<b>Materials</b>						
Materials- Pipe HDPE	60 psig	0.625	1,966	196,600 LF	\$ 5	\$ 983,000
Materials- Pipe HDPE	60 psig	1	63	6,300 LF	\$ 5	\$ 32,000
Materials- Valves	60 psig	0.625	1,966	EA	\$ 500	\$ 983,000
Materials- Valves	60 psig	1	63	EA	\$ 500	\$ 32,000
Materials- Design allowance			5%	LF	\$ 101,500	\$ 102,000
Materials- Misc. Freight			2%	LF	\$ 40,600	\$ 41,000
Materials- Procurement			4%	LF	\$ 81,200	\$ 81,000
Materials- SQS			2%	LF	\$ 40,600	\$ 41,000
<b>Subtotal-materials</b>						<b>\$ 2,295,000</b>
<b>Subtotal- Service Lines</b>			<b>202,900</b>	<b>LF</b>		<b>\$ 7,368,000</b>

DETAILS: FINAL COST ESTIMATE, PIPELINE LAYOUT NETWORK

MEDIUM POPULATION DENSITY AREA							
Description	Class	Dia [in]	Quantity	Unit	Unit Cost	Total Cost	
<b>1. TRANSMISSION LINES: Provides natural gas to distribution feeder lines and industrial users</b>							
<b>Construction</b>							
Installation	ANSI 600	10	-	LF	\$ 90	\$ -	
Cathodic Protection			-	miles	\$ 15,000	\$ -	
HDD Chena river	varies	varies	-	LF	\$ 400	\$ -	
Gate Station	ANSI 600	10	-	EA	\$ 1,250,000	\$ -	
Pigging connection	ANSI 600	10	-	EA	\$ 50,000	\$ -	
Pigging connection	ANSI 300	8	-	EA	\$ 50,000	\$ -	
<i>Subtotal-construction</i>						\$ -	
<b>Materials</b>							
Materials- Steel pipe, FBE coated	ANSI 600	10	-	LF	\$ 53	\$ -	
Materials- Steel pipe, FBE coated	ANSI 300	8	-	LF	\$ 44	\$ -	
Materials- Valves	ANSI 600	10	-	EA	\$ 34,000	\$ -	
Materials- Valves	ANSI 300	8	-	EA	\$ 20,000	\$ -	
Materials- Design allowance	varies	10 & 8	5%	EA	\$ -	\$ -	
Materials- Misc. Freight			2%	EA	\$ -	\$ -	
Materials- Procurement			4%	EA	\$ -	\$ -	
Materials- SQS			2%	EA	\$ -	\$ -	
<i>Subtotal-materials</i>						\$ -	
<b>Launcher/Receiver</b>							
Pig Barrels- mobile	ANSI 600	12	-	EA	\$ 300,000	\$ -	
<i>Subtotal- Transmission Lines</i>						\$ -	
<b>2. DISTRIBUTION FEEDER LINES: Provides natural gas to local distribution lines</b>							
<b>Construction</b>							
Installation	60psig	6	97,890	LF	\$ 50	\$ 4,895,000	
HDD Chena River	60psig	6	0	LF	\$ 300	\$ -	
Regulator stations	60psig	6	1	EA	\$ 400,000	\$ 400,000	
<i>Subtotal-construction</i>						\$ 5,295,000	
<b>Materials</b>							
Materials- Plastic	60psig	6	97,890	LF	\$ 12	\$ 1,175,000	
Materials- Valves	60psig	6	3	EA	\$ 13,300	\$ 40,000	
Materials- Design allowance	varies	varies	5%	EA	\$ 60,750	\$ 61,000	
Materials- Misc. Freight			2%	EA	\$ 24,300	\$ 24,000	
Materials- Procurement			4%	EA	\$ 48,600	\$ 49,000	
Materials- SQS			2%	EA	\$ 24,300	\$ 24,000	
<i>Subtotal-materials</i>						\$ 1,373,000	
<i>Subtotal- Distribution Feeder Lines</i>						\$ 6,668,000	
<b>3. DISTRIBUTION LINES: Provides natural gas to service lines</b>							
<b>Construction</b>							
Residential lines	60 psig	2	684,310	LF	\$ 25	\$ 17,108,000	
<i>Subtotal-construction</i>						\$ 17,108,000	
<b>Materials</b>							
Materials- Pipe HDPE	60 psig	2	684,310	LF	\$ 6	\$ 4,106,000	
Materials- Valves	60 psig	2	17	EA	\$ 6,200	\$ 105,000	
Materials- Design allowance	varies	varies	5%	EA	\$ 210,550	\$ 211,000	
Materials- Misc. Freight			2%	EA	\$ 84,220	\$ 84,000	
Materials- Procurement			4%	EA	\$ 168,440	\$ 168,000	
Materials- SQS			2%	EA	\$ 84,220	\$ 84,000	
<i>Subtotal-materials</i>						\$ 4,758,000	
<i>Subtotal- Distribution Lines</i>						\$ 21,866,000	
<b>4. SERVICE LINES: Provides natural gas to individual users</b>							
<b>Construction</b>							
Residential lines- medium density	60 psig	0.625	2,057	205,700	LF	\$ 25	\$ 5,143,000
Commercial lines- medium density	60 psig	1	105	10,500	LF	\$ 25	\$ 263,000
<i>Subtotal-construction</i>						\$ 5,406,000	
<b>Materials</b>							
Materials- Pipe HDPE	60 psig	0.625	2,057	205,700	LF	\$ 5	\$ 1,029,000
Materials- Pipe HDPE	60 psig	1	105	10,500	LF	\$ 5	\$ 53,000
Materials- Valves	60 psig	0.625	2,057		EA	\$ 500	\$ 1,029,000
Materials- Valves	60 psig	1	105		EA	\$ 500	\$ 53,000
Materials- Design allowance			5%		LF	\$ 108,200	\$ 108,000
Materials- Misc. Freight			2%		LF	\$ 43,280	\$ 43,000
Materials- Procurement			4%		LF	\$ 86,560	\$ 87,000
Materials- SQS			2%		LF	\$ 43,280	\$ 43,000
<i>Subtotal-materials</i>						\$ 2,445,000	
<i>Subtotal- Service Lines</i>						\$ 7,851,000	

DETAILS: FINAL COST ESTIMATE, PIPELINE LAYOUT NETWORK

MEDIUM POPULATION DENSITY AREA							
Description	Class	Dia [In]	Quantity	Unit	Unit Cost	Total Cost	
<b>1. TRANSMISSION LINES: Provides natural gas to distribution feeder lines and industrial users</b>							
<b>Construction</b>							
Installation	ANSI 600	10	-	LF	\$ 90	\$ -	
Cathodic Protection			-	miles	\$ 15,000	\$ -	
HDD Chena river	varies	varies	-	LF	\$ 400	\$ -	
Gate Station	ANSI 600	10	-	EA	\$ 1,250,000	\$ -	
Pigging connection	ANSI 600	10	-	EA	\$ 50,000	\$ -	
Pigging connection	ANSI 300	8	-	EA	\$ 50,000	\$ -	
<i>Subtotal-construction</i>						\$ -	
<b>Materials</b>							
Materials- Steel pipe, FBE coated	ANSI 600	10	-	LF	\$ 53	\$ -	
Materials- Steel pipe, FBE coated	ANSI 300	8	-	LF	\$ 44	\$ -	
Materials- Valves	ANSI 600	10	-	EA	\$ 34,000	\$ -	
Materials- Valves	ANSI 300	8	-	EA	\$ 20,000	\$ -	
Materials- Design allowance	varies	10 & 8	5%	EA	\$ -	\$ -	
Materials- Misc. Freight			2%	EA	\$ -	\$ -	
Materials- Procurement			4%	EA	\$ -	\$ -	
Materials- SQS			2%	EA	\$ -	\$ -	
<i>Subtotal-materials</i>						\$ -	
<b>Launcher/Receiver</b>							
Pig Barrels- mobile	ANSI 600	12	-	EA	\$ 300,000	\$ -	
<i>Subtotal- Transmission Lines</i>						\$ -	
<b>2. DISTRIBUTION FEEDER LINES: Provides natural gas to local distribution lines</b>							
<b>Construction</b>							
Installation	60psig	6	45,000	LF	\$ 50	\$ 2,250,000	
HDD Chena River	60psig	6	0	LF	\$ 300	\$ -	
Regulator stations	60psig	6	-	EA	\$ 400,000	\$ -	
<i>Subtotal-construction</i>						\$ 2,250,000	
<b>Materials</b>							
Materials- Plastic	60psig	6	45,000	LF	\$ 12	\$ 540,000	
Materials- Valves	60psig	6	2	EA	\$ 13,300	\$ 27,000	
Materials- Design allowance	varies	varies	5%	EA	\$ 28,350	\$ 28,000	
Materials- Misc. Freight			2%	EA	\$ 11,340	\$ 11,000	
Materials- Procurement			4%	EA	\$ 22,680	\$ 23,000	
Materials- SQS			2%	EA	\$ 11,340	\$ 11,000	
<i>Subtotal-materials</i>						\$ 640,000	
<i>Subtotal- Distribution Feeder Lines</i>						\$ 2,890,000	
<b>3. DISTRIBUTION LINES: Provides natural gas to service lines</b>							
<b>Construction</b>							
Residential lines	60 psig	2	452,000	LF	\$ 25	\$ 11,300,000	
<i>Subtotal-construction</i>						\$ 11,300,000	
<b>Materials</b>							
Materials- Pipe HDPE	60 psig	2	452,000	LF	\$ 6	\$ 2,712,000	
Materials- Valves	60 psig	2	11	EA	\$ 6,200	\$ 68,000	
Materials- Design allowance	varies	varies	5%	EA	\$ 139,000	\$ 139,000	
Materials- Misc. Freight			2%	EA	\$ 55,600	\$ 56,000	
Materials- Procurement			4%	EA	\$ 111,200	\$ 111,000	
Materials- SQS			2%	EA	\$ 55,600	\$ 56,000	
<i>Subtotal-materials</i>						\$ 3,142,000	
<i>Subtotal- Distribution Lines</i>						\$ 14,442,000	
<b>4. SERVICE LINES: Provides natural gas to individual users</b>							
<b>Construction</b>							
Residential lines- medium density	60 psig	0.625	1,724	172,400	LF	\$ 25	\$ 4,310,000
Commercial lines- medium density	60 psig	1	80	8,000	LF	\$ 25	\$ 200,000
<i>Subtotal-construction</i>						\$ 4,510,000	
<b>Materials</b>							
Materials- Pipe HDPE	60 psig	0.625	1,608	172,400	LF	\$ 5	\$ 862,000
Materials- Pipe HDPE	60 psig	1	196	8,000	LF	\$ 5	\$ 40,000
Materials- Valves	60 psig	0.625	1,608		EA	\$ 500	\$ 804,000
Materials- Valves	60 psig	1	196		EA	\$ 500	\$ 98,000
Materials- Design allowance			5%	LF	\$ 90,200	\$ 90,000	
Materials- Misc. Freight			2%	LF	\$ 36,080	\$ 36,000	
Materials- Procurement			4%	LF	\$ 72,160	\$ 72,000	
Materials- SQS			2%	LF	\$ 36,080	\$ 36,000	
<i>Subtotal-materials</i>						\$ 2,038,000	
<i>Subtotal- Service Lines</i>						\$ 6,548,000	