CONCEPT DESIGN REPORT AND

CONSTRUCTION COST ESTIMATE

FOR ENERGY INFRASTRUCTURE PROJECTS

IN THE COMMUNITY OF:

TWIN HILLS

PREPARED FOR:

STATE OF ALASKA

ALASKA ENERGY AUTHORITY/ RURAL ENERGY GROUP

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EXECUTIVE SUMMARY

This report has been prepared by Gray Stassel Engineering, Inc. (GSE) for the Alaska Energy Authority / Rural Energy Group (AEA/REG). The purpose of this study is to provide a concept design and construction cost estimate for the following potential energy projects for the community of Twin Hills:

- Twin Hills to Togiak Tie-line
- Twin Hills Electric Distribution Upgrade
- Standby Generator Module at Twin Hills

Participants in the project include the Village of Twin Hills and AVEC.

A site investigation was performed by Clois Versyp, P.E. of Gray Stassel Engineering (GSE) on August 16 & 17, 2012. The purpose of the site visit was to meet with local residents to discuss the scope of potential energy projects as well as to gather field data on existing energy infrastructure.

The Twin Hills Village Council has entered into a Memorandum of Understanding with Alaska Village Electric Cooperative (AVEC) to add Twin Hills electric customers as members of AVEC and receive power from the AVEC Togiak power plant via a new tie-line to Twin Hills. The Twin Hills Tie-Line Project will construct a 4.5-mile long overhead electric tie-line between Togiak and Twin Hills. The project will provide reliable and code compliant electric power that will benefit the entire community. The proposed tie-line will cross 4.5-miles of wetlands and two rivers. The alignment is routed entirely within Togiak Natives Limited and Twin Hills Native Corporation lands. The tie-line will be constructed to Rural Utility Service national standards utilizing direct buried and H-pile supported poles.

The existing Twin Hills distribution system is an above grade, single phase 120/240-volt, non-RUS standard system. The low voltage distribution results in unusually high line losses for the size of the distribution system. The existing antiquated distribution system will be replaced with an underground three phase 7.2/12.47kV system to minimize line losses, improve reliability, and provide for future increase in capacity.

A standby generator module will provide emergency power when power over the tie-line is interrupted. The module will be located at the interconnection of the tie-line and new village underground distribution system, at the west end of the village near the sewage lagoon. The new module will consist of a pre-fabricated steel module with a field installed roof system. The module will contain the standby genset, associated mechanical and electrical equipment, and automatic genset and tie-line vacuum switch controls.

Subject to availability of design and construction funding, the proposed energy projects schedule calls for design, permitting, and bidding to occur in 2014; mobilization and initial construction in 2015 with all projects completed by the summer of 2016.

A summary of the estimated total costs, including all design, supervision, inspection, permitting, and a 15% contingency, are:

- $1,953,653 Twin Hills – Togiak Tieline
- $1,144,133 Electric Distribution System Upgrade
- $488,773 Standby Generator Module
- **$3,586,559 Total Cost Proposed Energy Projects**

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1.0 INTRODUCTION

This report has been prepared by Gray Stassel Engineering, Inc. (GSE) for the Alaska Energy Authority / Rural Energy Group (AEA/REG). The purpose of this study is to provide a concept design and construction cost estimate for the following potential energy projects for the community of Twin Hills:

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- Standby Generator Module at Twin Hills

Participants in the project include the Village of Twin Hills and AVEC.

1.1 Program Overview

The Alaska Energy Authority (AEA), Rural Energy Group is pursuing grant funds to upgrade rural bulk fuel tank farms and electric power systems. All project components are dependent on available funding. Following is a brief outline of the program:

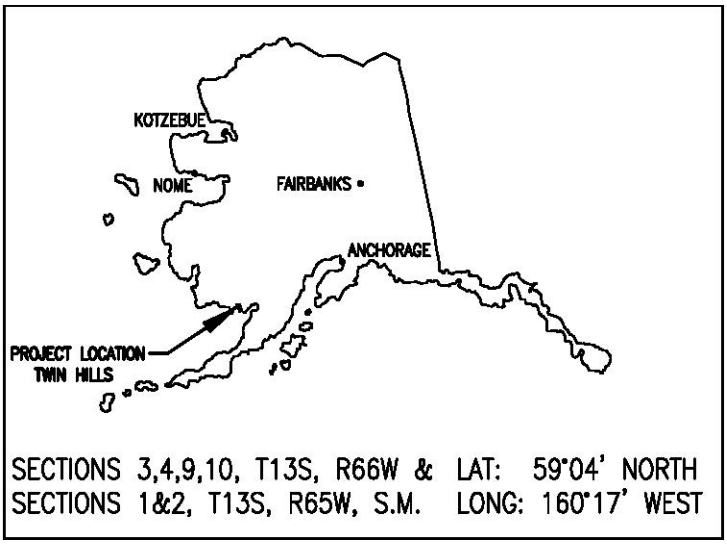
- Project funding is usually a combination of State and Federal grants. Typically, each community must demonstrate that the proposed facility will be sustainable by accepting a business operating plan. However, Twin Hills has entered into an MOU with Alaska Village Electric Cooperative (AVEC) to own and operate the Twin Hills electric utility. Since AVEC is a sustainable utility, a business operating plan is not required.
- New energy projects are funded, designed, and constructed in three phases: Phase 1, Conceptual Design; Phase 2, Final Design and Permitting; and Phase 3, Construction.
- During Phase 1, Conceptual Design, staff from AEA will visit a community, discuss the program, and work with project stakeholders and the local government to select sites for the new facilities.
- At the completion of Phase 1 Conceptual Design, the community will be requested to review and approve the location, capacity, and basic configuration of the facilities as well as a business operating plan.
- During Phase 2, Final Design and Permitting, the design and permitting for the energy projects will be completed. A project level environmental assessment will be prepared and site control documented.
- Each community will be requested to provide “in kind” contributions as available.
- Training Available: AEA has several training programs available for communities.

1.2 Community Description

Twin Hills is located near the mouth of the Twin Hills River, a tributary of the Togiak River, 386 miles southwest of Anchorage. It lies at approximately 59°04’ North Latitude and -160°17’ West Longitude, within Sections 3, 4, 9 & 10, T13S, R65W, Seward Meridian. The area experiences a transitional climate that is primarily maritime, although the arctic climate also affects this region. Average

summer temperatures range from 37 to 66 °F; winter temperatures average 4 to 30 °F. Annual precipitation ranges from 20 to 26 inches. Fog and high winds are prevalent during winter months. The Togiak River is ice-free from June through mid-November. The population was estimated at 83 residents in 2012. The village of Twin Hills is located in the Bristol Bay Recording District, the Southwest Region School District and the Bristol Bay Native Corporation. It is not within an organized borough.

LOCATION MAP



1.3 Site Investigation

A site investigation was performed by Clois Versyp, P.E. of Gray Stassel Engineering (GSE) on August 16 & 17, 2012. The purpose of the site visit was to meet with local residents to discuss the scope of potential energy projects as well as to gather field data on existing energy infrastructure. In addition to the data gathered during the site visit, available information was obtained and analyzed from the following sources:

- Twin Hills Cost Equalization (PCE) Data, 2013
- State of Alaska, Department of Transportation, Twin Hills Airport Layout Plan, 2009
- State of Alaska, Dept. of Commerce, Community, and Economic Development, Community and Regional Affairs Community Profile & Mapping
- Bristol Bay Housing Authority
- Twin Hills, various survey plats
- Corps of Engineers wetlands and flood information
- Alaska Dept. of Environmental Conservation Contaminated Site Data Base

- Other relevant data.

Additional information and input was obtained from the following individuals:

- John Sharp, President, Twin Hills Village Council, 525-4821
- William Ilutsik, Vice President, Twin Hills Village Council, 525-4821
- Diane Abraham, Community Liaison, Twin Hills Village Council, 525-4821
- Bob Hansen, Power Plant Operator
- Guy Snyder, Accountant, Southwest Region School District
- Bob Dubey, Togiak Plant Manager, North Pacific Seafoods, 493-5331
- Bill Stamm, Manager Engineering, Alaska Village Electric Coop, 561-1818
- Rick Elliot, Land Consultant, 868-4043

1.4 Code Analysis & Deficiencies

The following is a summary of existing power plant code analysis and deficiencies observed during the site investigations.

- The power plant building encroaches into Aurora Street.
- Inefficient diesel genset #1 – expensive to operate.
- Genset #2 is three-phase, wired for single phase
- Power is generated and distributed single phase 120/240 volt, resulting in high line loss
- Power plant has no ventilation – doors are left open and unsecured
- Power plant – No door locks and no security fencing
- Automatic Transfer Switch does not support genset paralleling.
- Interior walls are unfinished gypsum board, difficult to clean and absorbs oil.
- No fire suppression system
- Power plant site is a waste oil storage area containing multiple barrels and buckets of used and waste oil, DEC reports leaking oil

The concept design for all energy projects have been prepared to meet current code and regulatory requirements, which include:

- The 2009 Edition of the International Building Code (IBC).
- The 2009 Edition of the International Fire Code (IFC) and currently adopted Alaska State Fire Marshal Fire and Safety Regulations.
- The 2011 Edition of the National Electrical Code (NEC, NFPA 70-211).
- The 2007 Edition of the National Electrical Safety Code (NESC).
- 40 CFR, Part 112.1-12, U.S. Environmental Protection Agency Spill Prevention Requirements

2.0 EXISTING FACILITIES

The existing power plant and electric distribution system were visually examined to determine suitability for re-use. The following paragraphs summarize findings for the community.

2.1 Power Plant

The existing diesel power plant is located at the center of the village at the intersection of Twin Hills Road and Aurora Street, about 170-feet west of the village office. The power plant was constructed circa 1990's, and is a pre-engineered metal building with a concrete slab on-grade foundation. The exterior building dimensions are approximately 16-feet by 20-feet. The building exterior is metal siding and the interior walls are covered with unfinished gypsum board. The power plant facility encroaches into the Aurora Street right of way. Power is generated and distributed at 120/240-volt single phase. The village power generation and distribution system is inadequate, inefficient, and in need of complete replacement to improve efficiency, reduce operating costs, and to meet the long term electric power needs of the community.

The existing power plant is located on Lot 9, Block 8 of USS 5580, Twin Hills Townsite. The site has been identified by the Alaska Department of Conservation as a used oil collection point with leaking oil drums. Therefore this site is deemed not suitable for locating a power system upgrade project.

There are two John Deere generators installed in the power plant. Unit #1 is a 6068HF285, wired double-delta single phase, with a capacity of 128kW at 1,800RPM. Unit #2 is a 6068TF001. The generator is labeled 208V with a prime capacity of 92kW at 1,800RPM, but is also wired single phase. Total engine hours for each unit is unknown. Unit #2 genset was repowered at some point with the existing 6068TF001. Unit #1 appears to be an original John Deere OEM 6068HF285. The gensets either are, or will be, beyond their usable life by the time the proposed energy project is completed and not suitable for reuse. The new 1000-gallon double wall intermediate tank installed at the power plant in 2010 as part of the community bulk fuel upgrade project will be retained for future village diesel fuel use.

2.2 Electric Distribution

The electric distribution system consists of single phase 120/240-volt overhead distribution. There are no transformers in the system. Distribution system poles are mostly 30-feet tall with some 35 foot tall poles. The poles are stamp-dated 1991. All poles (except one out near the airport) were straight with no evidence of jacking and were buried approximate seven feet deep. The existing system is built using insulated tri-plex conductors. The actual size of the conductors is unknown as there was no way to access the conductors. In the main village area, near the Village Corporation building between locations A1A-1 and A1A-2, there are some low hanging conductors that appear to have broken from their supports. There are a total of 50 services and 8 street lights. The majority of the service meter bases were in poor condition with moderate to severe rust. The

AEA Village Power System Assessment recorded an imbalance between 10% and 25% during Sept 2012.

The existing telephone system shares the poles with the power system. The telephone company will be contacted to determine if they would be interested in converting the existing telephone system to underground.

2.3 Fuel Storage

The community fuel storage and dispensing tank farm is located at the south end of the village about 400-feet east of the boat ramp, and 900-feet southwest of the school. The facility provides bulk storage for village gasoline and diesel fuel, including community power generation. The tank farm was constructed in 2010 and appears to be in good condition and code compliant. It consists of two 25,000-gallon, double wall, skid mounted, bulk diesel storage tanks, and one 6,000-gallon, skid mounted, protected gasoline dispensing tank with integral dispenser. The diesel and gasoline tanks are located adjacent to each other, but fenced in separate chain-link enclosures with barbed wire top. Gasoline is dispensed for motor vehicle use. Diesel fuel is transferred in bulk, via a 500-gallon mobile refueler, to the village power plant, water plant, and other community facilities. The SWRSD School has a 20,000-gallon, double wall, skid mounted, bulk diesel storage tank at the school site. The power plant is equipped with a 1000-gallon, double wall, skid mounted intermediary tank that feeds an autofill 100-gallon daytank inside the power plant.

2.4 Heat Recovery System

The existing power plant is not equipped with a heat recovery system. A heat recovery study was completed in August 2011. The study identified two potential heat recovery projects: one that would serve the Village office/Water Plant, the other that would serve the Old Clinic/Post Office/New Clinic. The first project had a simple payback of 30-years, while the second project had a simple payback of over 20-years. A fuel price of $6.38 was used in the study. Since then, the cost of fuel has decreased, which further increases the heat recovery project simple payback.

3.0 COMMUNITY POWER DEMAND

An examination of recent Twin Hills PCE load data for FY12 and FY13 shows several months of missing generation data. Extrapolating kWh generated from average annual fuel economy and reported fuel consumption for months with missing generation data, reveals the annual electric production in FY12 & FY13 was approximately 295,000 to 310,000 kWh. This corresponds well with the 299,744 kWh generated in FY11 – the most recent year with complete PCE generation data. The peak demand varies by month between about 40 and 60kW, with the highest demand occurring during the cold winter months. The power plant consumes between 30,000 and 35,000-gallons/year. Recorded line losses have varied over the past five years, but average about 20% line loss.

PCE data for FY09 through FY13 is included in Appendix D.

3.1 Estimated Future Load Growth

It is important to evaluate the impact of planned infrastructure improvement projects on an existing power generation system. New construction and other community improvements can adversely impact the adequacy of existing facilities.

The population has increased from 74 in 2000 to 83 in 2012, an average annual increase of about 1%/year, which is close to the long term average population increase since 1990, so it is likely that annual residential power consumption will also increase slightly annually.

The Togiak Fisheries fish plant, located about 2.5-miles southwest of Twin Hills, processes salmon from May through early August. Bob Dubey, Plant Manager, was contacted via phone and in person during the site visit. The plant is equipped with a prime power generation power plant consisting of two large CAT 3512 diesel gensets, and multiple smaller gensets, with total generation capacity in excess of 4 mW. During the site visit, the electric load was approximately 100 to 130 kW. Mr. Dubey indicated the winter electric loads vary around 20 to 30 kW, that the fish plant uses recovered heat, and that Togiak Fisheries could generate power cheaper than buying it from Togiak, so was not interested in the project.

Based on communications with the Department of Transportation, Aviation Division; Bristol Bay Housing Authority, and the Alaska Native Tribal Health Consortium Health Services, there are no near-term planned infrastructure upgrade projects that are expected to cause a large increase in electric load. However, Southwest Region School District has indicated that it is planning on upgrading its kitchen and installing a fire suppression system at the school, which will include a 30 HP water pump. This pump will not increase the annual electric generation needs of the village, but will impart a high instantaneous load in the event of a fire. The school is also planning on upgrading its own emergency generation capacity to be able to meet the additional demand incurred by the fire pump. Based on the historic trend and available infrastructure upgrade information, it is expected the electric loads will see minimal increases in annual usage and peak loads.

Without the addition of the Togiak Fisheries load, the peak load is not expected to exceed 70 kW over the next five years.

3.2 Alternative Energy – Heat Recovery

Based on the 2011 heat recovery study, and the community's intent to purchase electric power from AVEC via a tie-line to Togiak, Twin Hills is not considered a good candidate for a heat recovery project.

3.3 Alternative Energy – Wind Generation

According to the U.S. Department of Energy, Wind Energy Resource Atlas, Twin Hills has little resource for wind energy potential. The Alaska High Resolution wind map, as provided by AEA, shows a Class 1-3 wind resource. Discussion with AEA confirmed that wind energy is not a likely resource for Twin Hills.

3.4 Alternative Energy - Efficiency Improvements

The Southwest Region School District had an energy efficiency assessment performed for the Twin Hills School in 2011. The District is in the process of implementing some of the recommended improvements, which is expected to decrease the school peak kW consumption slightly. No information on any other energy efficiency assessments was discovered during this study.

3.5 Alternative Energy – Hydroelectric and Geothermal

A review of the August 2011 Renewable Energy Atlas of Alaska did not identify any potential biomass, geothermal, or hydroelectric power resources (RISEC, conventional storage, or run-of-river) in the vicinity of Twin Hills. An unnamed volcano is shown located approximately 15-miles northeast of Twin Hills, but is too far from the village to provide any cost effective geothermal energy.

With the exception of the proposed Twin Hills – Togiak tie-line, or end-use conservation within the village, there are no other known practical energy options currently available at Twin Hills.

4.0 PROPOSED ENERGY INFRASTRUCTURE PROJECT DESCRIPTIONS

The proposed Twin Hills energy infrastructure projects are described in the following three sections:

- Section 4.1, "Twin Hills - Togiak Tie-line", describes the proposed construction of a new tie-line to provide electric power from the Togiak AVEC power plant to Twin Hills
- Section 4.2, "Electric Distribution System Upgrade", describes proposed upgrades and replacement of the existing electric distribution system.
- Section 4.3, “Standby Generator Module”, describes a diesel standby power modular including new generator, switchgear, controls, and fuel storage.

4.1 Twin Hills - Togiak Tie-line

This Twin Hills – Togiak Tie-line project will provide prime three-phase electric service from the AVEC power plant in Togiak to the village of Twin Hills. Several routes were investigated, including a submarine cable route across Togiak Bay. The submarine route was dismissed due to the high cost of construction, risk of damage by the marine fleet and storms, as well as the difficulty of implementing a repair using local electrical line crews, in the event of damage. Several overland routes were also investigated, and the preferred route selected based on a combination of aerial photo and topographic review, and based on consultation with geotechnical engineers familiar with soils in the Togiak/Twin Hills area. A detailed geotechnical investigation of the tie-line route will be conducted during the final design phase to confirm the concept design assumptions and verify the optimum route selection.

Design Standards:

The following standards will be used in the design of the new tie-line.

RUS Bulletin 1724E-151: Mechanical Loading of Distribution Crossarms.

RUS Bulletin 1724E-152:	The Mechanics of Overhead Distribution Line Conductors.
RUS Bulletin 1724E-153:	Electrical Distribution Line Guys and Anchors.
RUS Bulletin 1724E-154:	Distribution Conductor Clearances and Span Limitations.
RUS Bulletin 1728F-804:	Specifications and Drawings for 12.5/7.2 kV Line Construction.

2007 National Electrical Safety Code.

Description of Preliminary Design:

The new tie-line will be a three-phase, 4-wire overhead distribution line constructed in accordance with RUS Bulletin 1728F-804. The new tie-line will be designed as follows:

Line Voltage:	7.2/12.47 k V, 3-phase, 4-wire.
Conductor Size (phase):	#1/0 Aluminum Conductor, Steel Reinforced. (Code Name Raven) (River Crossings: #4/0 ACSR, Penguin)
Conductor Size (neutral):	#1/0 Aluminum Conductor, Steel Reinforced. (Code Name Raven) (River Crossings: #4/0 ACSR, Penguin)
Approximate Line Length:	4.5 miles
Minimum Height Over Land:	18.5 feet (NESC Table 232-1.)
Minimum Height Over Water Along Route:	18.5 feet (NESC Table 232-1.)
Minimum Height Over River Crossings:	26.5 feet (NESC Table 232-1, over 20 to 200 acres.)
Minimum Voltage Level at Twin Hills (%) Under Maximum Loading Conditions:	98%.

The new tie-line one-line diagram is shown on drawing E2 in Appendix A.

The new tie-line construction will utilize RUS approved, minimum Class 3, wooden poles, predrilled and gained, and will be comprised of #1/0 ACSR conductor, except at river crossings where #4/0 conductor will be used for additional strength. Poles will be installed either direct buried or on driven H-piles, depending on soil conditions. Poles installed in areas where the soil is suitable for direct burial will be installed at sufficient burial depth to prevent pile jacking due to freeze-thaw cycling. Poles installed in wet, swampy areas, and areas subject to flooding, will be installed on H-piles. HP10x57 H-piles will be driven to a depth of 34-feet, and the pole butt will be located approximately 1-foot above grade. River crossings will utilize H-structures and horizontal construction

to maximize clearance over the water. Anchors will consist of either screw-in helical anchors or driven H-piles, to resist frost jacking and provide long-term stability.

The new tie-line will be connected to the AVEC Togiak 7.2/12.47 kV, three-phase distribution system at Pole 9-5 of the AVEC North Village feeder. The take-off point will consist of a three-phase automatic vacuum recloser with a recloser controller to allow automatic disconnection in the event of a fault on the tie-line and a three-phase, manual gang-operated, air-break disconnect switch, with provisions for lockout, to allow AVEC to visually disconnect and lock out the AVEC system from the tie-line for maintenance purposes. The AVEC North Village feeder pad-mount step-up transformers, consisting of three 100 kVA, single phase, 480V delta to 7.2/12.47 kV wye transformers, may need to be upgraded to carry the additional Twin Hills electric load. The existing Togiak generation capacity should be sufficient, as the Twin Hills load is expected to result in less than a 10% increase in peak load, from about 590 kW to 640 kW, as shown in Appendix D.

The termination of the tie-line will be at the new standby generator module in Twin Hills. The termination point will include a three-phase vacuum switch to allow automatic disconnection, and reconnection, from the tie-line, a three-phase, manual gang-operated, air-break disconnect switch, with provisions for lockout, for positive disconnection of the line during maintenance, and primary potential transformers for voltage sensing and synchronization of the new standby generator with the tie-line. A red LED indicator light will be included at the Twin Hills end of the tie-line to indicate when the tie-line is energized.

4.2 Electric Distribution System Upgrade

The new primary electric distribution system will provide three-phase electric service for the village of Twin Hills. Due to the Twin Hills soils conditions, which are predominantly sandy/gravelly soils, the village has the option of converting from the existing overhead to underground distribution. After reviewing the options and benefits, the Twin Hills Village Council selected an underground distribution system.

Design Standards:

The following standards will be used in the design and construction of the new underground distribution system.

RUS Bulletin 1728F-806: Specifications and Drawings for Underground Electrical Distribution.

2007 National Electrical Safety Code.

A new 7.2/12.47 kV, underground, three-phase electric distribution system will replace the existing antiquated 120/240-volt single phase distribution system in Twin Hills and will be constructed to current RUS standards. The new distribution system will reduce line losses, fully utilize the benefits of the new three-phase tie-line, as well as allow the Twin Hills School to receive reliable three-phase power. The new standby power generator module will interface with the new three-phase

tie-line and distribution system, and will provide emergency power to the village in the event that power is not available from Togiak.

Following are major features of the proposed distribution system upgrades:

- The standby generator module step-up transformer and the distribution step down transformers will be new, amorphous core, high efficiency transformers. All new equipment will be dead front.
- All new transformers will be provided with stainless steel enclosures and all new junction boxes will be fiberglass construction. In a marine environment, standard metal enclosures for pad-mounted transformers and sectionalizing cabinets do not withstand the salt laden air. The stainless steel and fiberglass enclosures will provide long term maintenance free service.
- All transformers and sectionalizing cabinets will be provided with a fiberglass ground sleeve for support of the equipment.
- All new primary and secondary cable will be installed in 2” HDPE conduit. This will better protect the conductors from damage and allow easy future replacement of the cable in the case of a failure.
- All new primary cable will be Polyethylene jacketed concentric neutral with ethylene propylene (EPR) insulation, 133% MV105, and all primary terminations will be through load break elbows. All connections will be above grade in sectionalizing cabinets. No buried or below grade connections or in-line splices will be made in the cables.
- Sectionalizing cabinets will be located to provide ease of access to the distribution cable for future load connections and increased reliability of the distribution system. All primary cable connections will be made using 200 amp load break elbows.
- All load break elbows and other connectors will be provided with seals and covers to provide a long lasting and reliable distribution system.
- All secondary transformer connections will be provided with compression connectors with boots.
- Street light service will be converted to underground and all street lights will be replaced with new LED lights. One meter will be provided for street light metering at a convenient location.
- All meter bases will be replaced with new meter bases suitable for underground service.
- All existing meters will be replaced with new Elster automatic meter reading meters of the type used in the AVEC system.
- The Twin Hills school power plant is currently wired for single phase service although the electrical equipment and generators in the power plant are three-

phase. The school generators will be rewired three-phase, and the existing conductors between the school generators and electrical equipment, including the manual transfer switch and main electrical panel, will be replaced and rewired for three-phase service. After the three-phase conversion of the school, the school electric panel loads will be rebalanced across all three phases.

4.3 Standby Generator Module

The Twin Hills diesel power plant is currently the sole source of prime power generation for the community; however, with a new code compliant electric tie-line between Twin Hills and Togiak, the village will no longer require a prime power plant. A standby generator module will be located at the interconnection of the tie-line and new underground distribution system.

The proposed location for the new standby generator module at the west end of the village, just west of Sharp Street and north of the sewage lagoon access road, is shown on drawing E1.1 in Appendix A. The structure will be an insulated steel structure approximately 8' x 20', with a field installed roof system. The module will contain the standby genset, associated mechanical and electrical equipment, and automatic genset and tie-line vacuum switch controls. The module will also be equipped with a fire suppression system, critical grade exhaust silencers, and fuel system. All systems will be operationally complete and shop-tested in Anchorage prior to shipment.

4.3.1 Generator Selection

Since Twin Hills will receive prime power via the new tie-line, the sole purpose of the generator will be to provide emergency power in the event the AVEC Togiak power plant is offline, or power over the tie-line is interrupted. The standby generator module will be equipped with a single John Deere 6068 Tier 3 marine diesel generator, rated 150 kW prime power. The 6068 has a jacketwater cooled aftercooler, which supports a single-radiator cooling system, and has the capacity to cold-start the village even after a prolonged winter outage.

4.3.2 Generator and Tie-line Controls

The module will include a SCADA system for remote monitoring. The interconnection between the tie-line and Twin Hills distribution system will be equipped with a three-phase, pole mounted, manual gang operated, air break isolation switch for visual isolation and lock out of the tie-line. Also provided at the tie-line/distribution system interconnection will be a three-phase automatic vacuum switch to prevent the standby generator from energizing the tie-line. The vacuum switch relaying and controls will be located in the standby generator module. A Woodward easYgen genset controller will monitor the tie-line voltage, manual isolation switch position, and the vacuum switch status. On loss of power (voltage) over the tie-line, the easYgen will open the vacuum switch, start the genset, bring it up to speed and close a contactor inside the module control panel to energize the Twin Hills distribution system. Once power (voltage) has been restored on the tie-line, the easYgen controller will synchronize the Twin Hills generator to the tie-line, close the vacuum switch, soft-transfer the Twin Hills

electric load to the tie-line, open the genset contactor, and allow the engine to cool down before shutdown. Generator controls and relaying will provide complete protection and monitoring of the standby module genset and village feeder.

4.3.3 Module Fuel System

The peak monthly electric generation is about 33,000 kWh/month. Based on an average genset fuel efficiency of 11 kWh/gallon, this equates to a peak daily fuel use of 100 gallons/day. To provide adequate standby generator fuel capacity, a 1,200 gallon double wall tank will be located adjacent to the module. This will provide nearly a 10-day fuel supply at peak operating load. Due to the capacity being less than 1,320 gallons the tank will not be subject to EPA regulation. It will be equipped with a quick connect, spill catch basin, fill limiter, clock gauge, gauge hatch, pressure/vacuum whistle vent, and emergency venting. The tank will be top filled from the village tank farm via a 500-gallon mobile refueler. The tank will be filled. A welded steel pipeline will be used to provide fuel to the generator and heater..

5.0 SITE SELECTION & CONTROL

Site Control is required for work in the three areas described in the following sections: (5.1) “Twin Hills–Togiak Tie-line”, (5.2) “Electric Distribution System Upgrade”, and (5.3) “Standby Generator Module”. There are two river crossings along the tie-line route. The Togiak River crossing is located in a low lying area prone to seasonal flooding. The Togiak East Fork crossing, at the west side of Twin Hills, transitions from a high bluff to the Twin Hills uplands, and is not subject to flooding.

According to the U.S. Army Corps of Engineers, Flood Plain Management, Alaskan Communities Flood Hazard Data, October 2011, there is no known flooding in Twin Hills.

5.1 Twin Hills – Togiak Tie-line right-of-way

The tie-line route is located within Sections 1 & 12 of T13S, R67W and Sections 4, 5 & 6 of T13S, R66W, Seward Meridian. The tie-line will be routed within a new tie-line right-of-way located within Togiak Natives Limited and Twin Hills Village Corporation lands. These lands also part of the Togiak National Wildlife Refuge.

5.2 Electric Distribution System Upgrade Areas

The village electric distribution upgrades are located within Sections 3, 4, 9 & 10, T13S, R66W, Seward Meridian, primarily within USS 5580, Twin Hills Townsite. All primary electric distribution upgrades will occur within existing road rights-of-ways. Twin Hills contains several restricted native Townsite lots. Secondary electric services, only, will be routed within restricted lots.

5.3 Standby Generator Module

The standby generator module is located within Tract B, USS 5580, Twin Hills Townsite. The proposed new standby generator module will be located on a new

gravel pad at the west side of the village, at the inter-connection of the new tie-line and new underground distribution system. The proposed site is located on the north side of the sewage lagoon access road, west of Sharp Street and south of Block 6, approximately 1000-feet west of the existing power plant.

5.4 Site Control

A site control opinion letter was prepared for the project dated December 12, 2013. A copy of the letter is included in Appendix C.

The proposed tie-line right-of-way within Township 13, R67W is vested in Togiak Natives Limited (TNL). The proposed tie-line right-of-way within Township 13, R66W is vested in Twin Hills Native Corporation.

The proposed electric distribution system upgrade area is vested in the Village of Twin Hills.

The proposed standby generator module site is vested in the Village of Twin Hills.

Easements with TNL and Twin Hills Native Corporation for the tie-line will be secured prior to construction.

6.0 PERMITTING

The proposed projects are subject to regulations of State and Federal agencies including the Alaska Department of Environmental Conservation (ADEC), the Division of Fire Prevention, Department of Fish and Game, Federal Aviation Administration, U.S. Fish and Wildlife Service, the U.S. Environmental Protection Agency, and the Corps of Engineers.

6.1 Environmental Assessment

An Environmental Assessment (EA) will be completed prior to construction of the proposed projects. An EA is required for all projects that are federally funded or require a federal permit (such as a Corps of Engineers Wetlands Permit). The EA determines whether there is a significant impact to the environment caused by the project. As part of the EA, a Project Questionnaire will be completed to identify state or federal permits that may be required.

6.2 Fire Code

A Plan Review permit from the State Fire Marshal is required for the proposed standby generator module. Final stamped design drawings will be submitted to the Fire Marshal for review prior to construction. Plans will be reviewed for conformance with the International Fire Code and related codes including the International Building Code and the National Electrical Code. The review process typically takes 3 to 6 weeks.

6.3 Spill Response

A U.S. Environmental Protection Agency, Spill Prevention Control and Countermeasures (SPCC) plan is not required, as the standby generator module will not have oil storage capacity in excess of 1,320-gallons.

6.4 Air Quality Permit

The ADEC requires diesel-electric power generation facilities to comply with 18AAC50 air quality control requirements. An air quality permit is required for facilities that have the potential to emit in excess of 100 tons/year of NOx. ADEC regulations, 18 AAC 50.230 (c), stipulate that a facility has the potential to emit 100-tons of NOx per year if the total installed diesel engine capacity exceeds 736 horsepower. The standby generator module engine capacity is less than 736 horsepower; therefore, an air quality permit is not required under ADEC regulations.

6.5 Tie-line Permitting

The tie-line portion of this project requires approval by the Federal Aviation Administration (FAA), review by the U.S. Fish and Wildlife Service (USFW), and a Corps of Engineers Wetland Permit. An FAA Aeronautical Study will be completed that notifies air traffic of the new tie-line, as well as authorizes construction. The Alaska State Historic Preservation Officer (SHPO) and the USFW will be consulted. Based on preliminary review of the state of Alaska historical archive records, the SHPO is expected to issue a finding of No Historic Properties Affected for the project. The USFW was contacted regarding concerns with migratory birds and eiders, as well as any specific requirements pertaining to constructing and operating an electric tie-line within the Togiak National Wildlife Refuge. Initial contacts have concurred that the project is Not Likely to Adversely Affect listed Steller's and spectacled eiders. It is expected the tie-line project will be permitted under the Corps of Engineers, Nationwide Permit No. 12. NWP 12 authorizes utility line activities that do not result in the loss of greater than ½-acre of waters of the United States. The tie-line project will not result in a loss of greater than ½-acre of waters of the U.S. Further consultation with the agencies will be conducted during Phase 2, Final Design and Permitting, to ensure the project secures all necessary permits and complies with state and federal requirements.

7.0 CONSTRUCTION PLAN

Based on historic AEA project administration it is assumed that the tie line and distribution work will be performed by a contractor through a formal invitation to bid process and the standby power module will be constructed and installed on a "modified" force-account basis.

Shipping project construction materials and equipment for the Twin Hills energy projects will utilize a combination of scheduled and chartered summer/fall barge service, and over-ice winter transport. The module and tie-line and distribution components will be shipped to Togiak/Twin Hills. Construction of the tie-line, and transportation of equipment and materials between Togiak and Twin Hills, will occur during the winter over frozen ground. Construction of the new three-phase underground distribution system, and installation of the standby generator module, will occur during the summer months.

7.1 Local Job Skills

The Standby Generator Module will be constructed in Anchorage and the Tie-line and Distribution system will be constructed by contractors; therefore, use of local labor for the project is expected to be minimal.

7.2 Local Equipment

The Village has a variety of heavy equipment, some of which the contractor(s) may opt to use on the project. However, it is expected the contractor(s) will likely bring their own equipment into the community for the project

7.3 Material Sources

Gravel will be required for pad development, finish grading and concrete at the standby generator module site. Screened gravel or sand is needed for bedding electric distribution conduit. Duane Miller Associates conducted a series of test pits in the Village of Twin Hills in 1999 for a water and sewer project. No evidence of permafrost was discovered. The soils in most of the village consist of 2 to 4 feet of organic overburden underlain with sands and gravels, which should be suitable bedding for much of the underground distribution work. The Village has access to a borrow pit for imported material, located approximately two road miles south of Twin Hills. The borrow pit is located on Bristol Bay Native Corporation lands. The royalty for access to the borrow pit is on the order of $3 to $4/cubic yard. Should aggregate for concrete be unavailable from the borrow site, it will need to be imported for the project.

8.0 SCHEDULE

The following schedule has been developed on the basis of performing the tie-line work during the winter of 2015/16, with the village standby generator module installation and underground distribution work constructed during the summer/fall of 2016. The project has secured funding for final design and permitting. The following proposed construction schedule is contingent upon construction funding available the beginning of FY15.

- Feb - Aug 2014: Design, permitting, and site control.
- Sep - Dec 2014: Fabrication of module structure and procure materials.
- Oct - Nov 2014: Bid out tie line and distribution work.
- Dec 2014: Submittal review for tie line and distribution.
- Feb - Apr 2015: Module equipment installation and testing.
- Summer/Fall 2015: Mobilize materials and equipment, set up standby generator, begin distribution work (rough in).
- Spring 2016: Tie line construction, complete distribution (service conversions), commission system.
- Summer 2016: Punchlist completion and project close out.

9.0 COST ESTIMATE

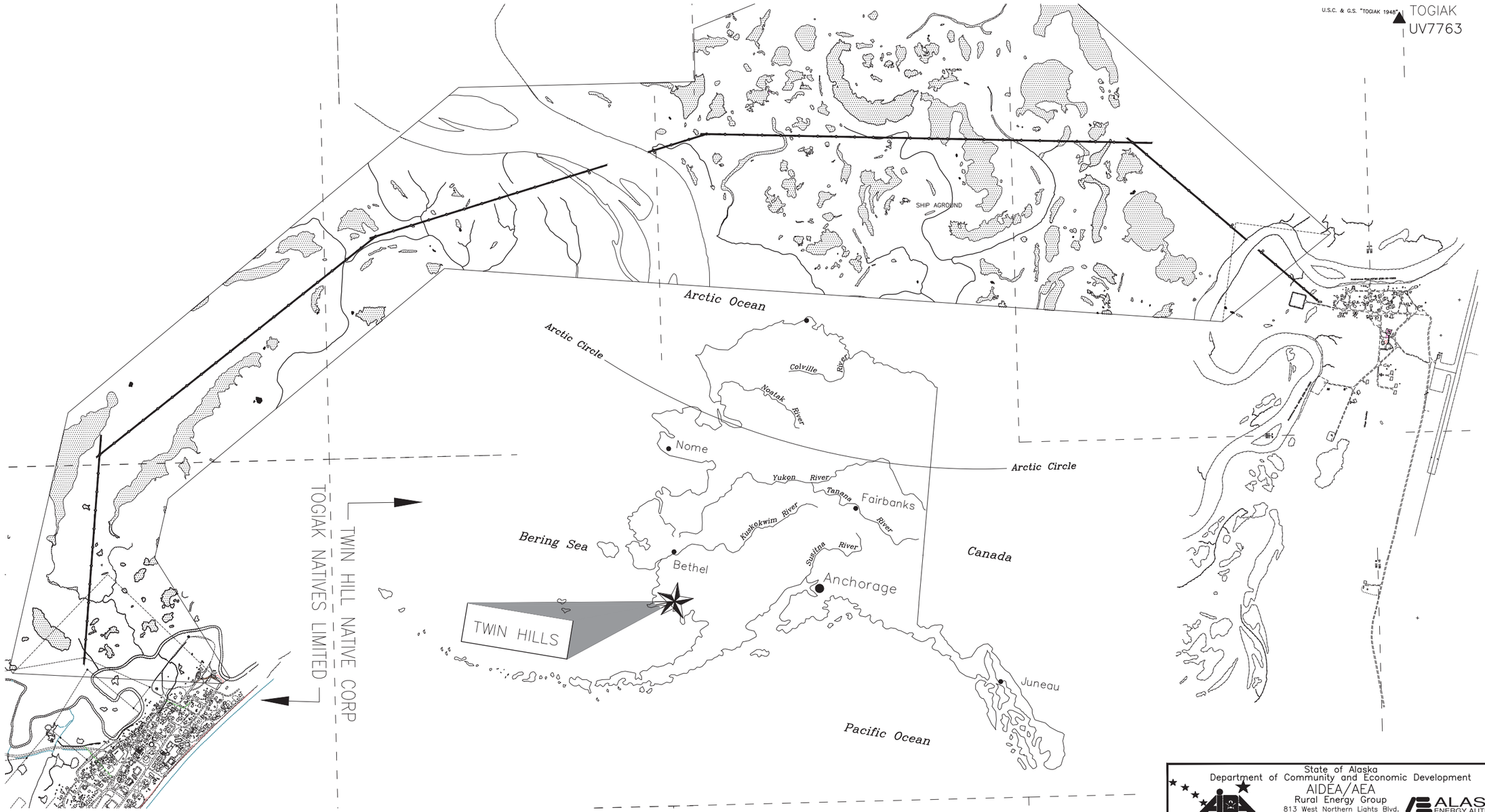
The construction cost estimates have been developed based on construction of the tie line and distribution system by a contractor and construction of the standby module on a "modified" force-account approach. Detailed cost estimates are included in Appendix B. Separate estimates have been prepared for the Tie Line, Distribution, and Standby Generator Module. A summary of the estimated total costs, including all design, supervision, inspection, permitting, and a 15% contingency, are:

- $1,953,653 Twin Hills – Togiak Tieline
- $1,144,133 Electric Distribution System Upgrade
- $488,773 Standby Generator Module

$3,586,559 Total Cost Proposed Energy Projects

APPENDIX A

CONCEPT DESIGN DRAWINGS



1 E1.1 OVERALL SITE PLAN
1" = 700'

PRELIMINARY – NOT FOR CONSTRUCTION

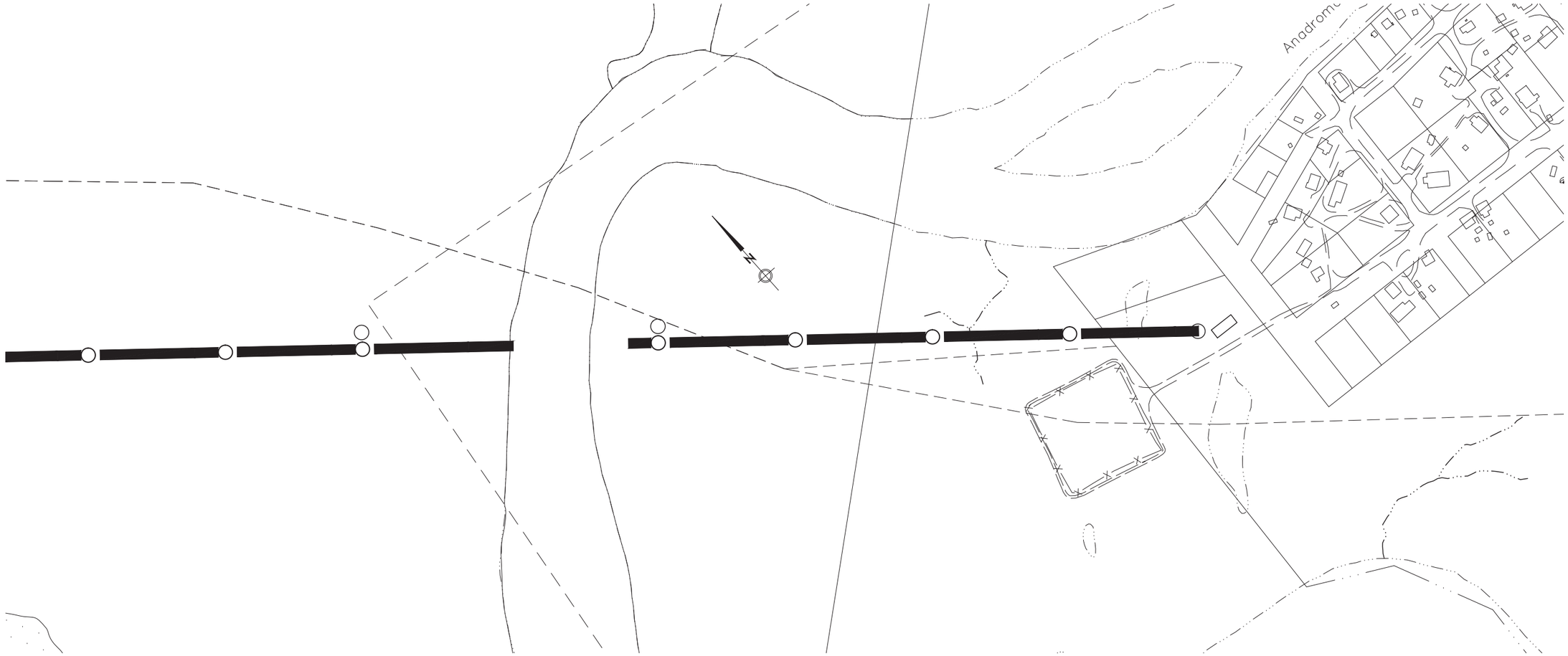
State of Alaska
Department of Community and Economic Development
AIDEA/AEA
Rural Energy Group
813 West Northern Lights Blvd.
Anchorage, Alaska 99503
ALASKA ENERGY AUTHORITY

PROJECT: TWIN HILLS ENERGY PROJECTS

TITLE: TWIN HILLS TO TOGIAK TIE–LINE SITE PLAN

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: SJS	SCALE: AS NOTED
DESIGNED BY: CWV	DATE: 12/12/13
FILE NAME: THILLE1	SHEET: E1.1 OF ##
PROJECT NUMBER:	



1 E1.2 TIE-LINE PLAN – SHEET 1
1" =100'

PRELIMINARY – NOT FOR CONSTRUCTION

State of Alaska
Department of Community and Economic Development
AIDEA/AEA
Rural Energy Group
813 West Northern Lights Blvd.
Anchorage, Alaska 99503
ALASKA ENERGY AUTHORITY

PROJECT: TWIN HILLS ENERGY PROJECTS

TITLE: TWIN HILLS TO TOGIAK TIE-LINE PLAN AND PROFILE

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

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DESIGNED BY: CWV	DATE: 12/12/13
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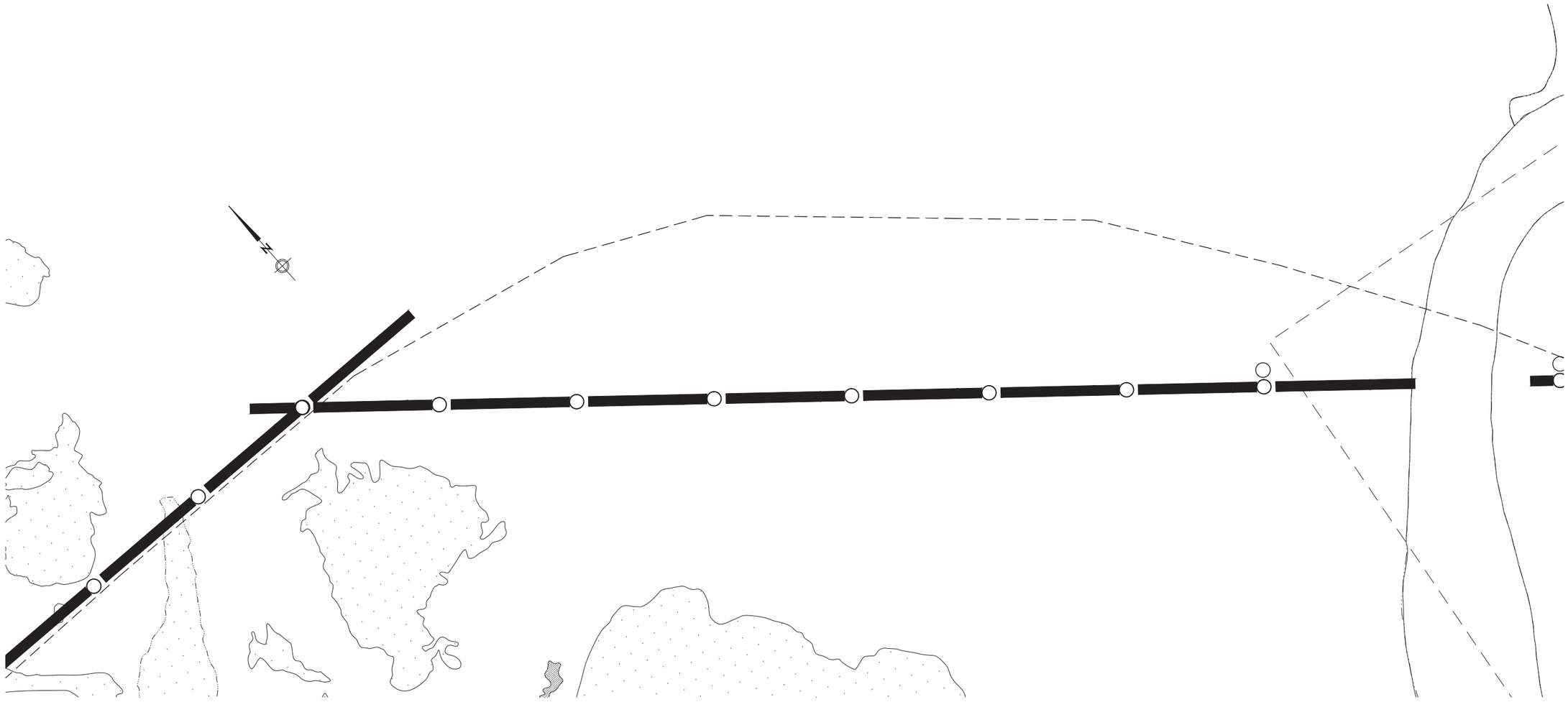
PROJECT NUMBER:	



1 E1.3 TIE-LINE PLAN – SHEET 2
1" =100'

PRELIMINARY – NOT FOR CONSTRUCTION

State of Alaska
Department of Community and Economic Development
AIDEA/AEA
Rural Energy Group
813 West Northern Lights Blvd.
Anchorage, Alaska 99503
ALASKA ENERGY AUTHORITY

PROJECT: TWIN HILLS ENERGY PROJECTS

TITLE: TWIN HILLS TO TOGIAK TIE-LINE PLAN AND PROFILE

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: SJS	SCALE: AS NOTED
DESIGNED BY: CWV	DATE: 12/12/13
FILE NAME: THILLE1	SHEET: E1.3 OF ##
PROJECT NUMBER:	

1 E1.4 TIE-LINE PLAN – SHEET 3
1" =100'

PRELIMINARY – NOT FOR CONSTRUCTION

State of Alaska
Department of Community and Economic Development
AIDEA/AEA
Rural Energy Group
813 West Northern Lights Blvd.
Anchorage, Alaska 99503
ALASKA ENERGY AUTHORITY

PROJECT: TWIN HILLS ENERGY PROJECTS

TITLE: TWIN HILLS TO TOGIAK TIE-LINE PLAN AND PROFILE

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: SJS	SCALE: AS NOTED
DESIGNED BY: CWV	DATE: 12/12/13
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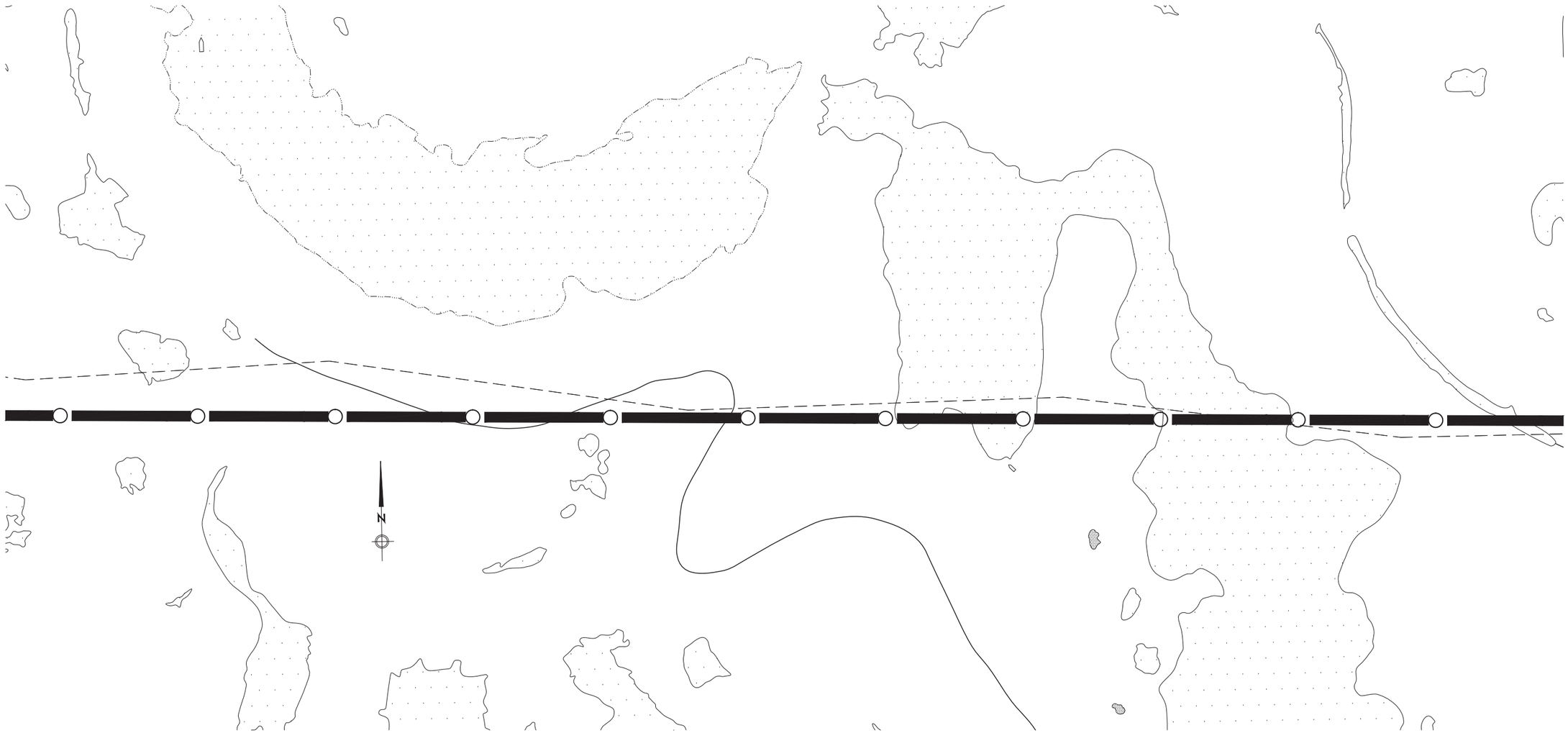
PROJECT NUMBER:	



1 E1.5 TIE-LINE PLAN – SHEET 4
1" =100'

PRELIMINARY – NOT FOR CONSTRUCTION

State of Alaska
Department of Community and Economic Development
AIDEA/AEA
Rural Energy Group
813 West Northern Lights Blvd.
Anchorage, Alaska 99503
ALASKA ENERGY AUTHORITY

PROJECT: TWIN HILLS ENERGY PROJECTS

TITLE: TWIN HILLS TO TOGIAK TIE-LINE PLAN AND PROFILE

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

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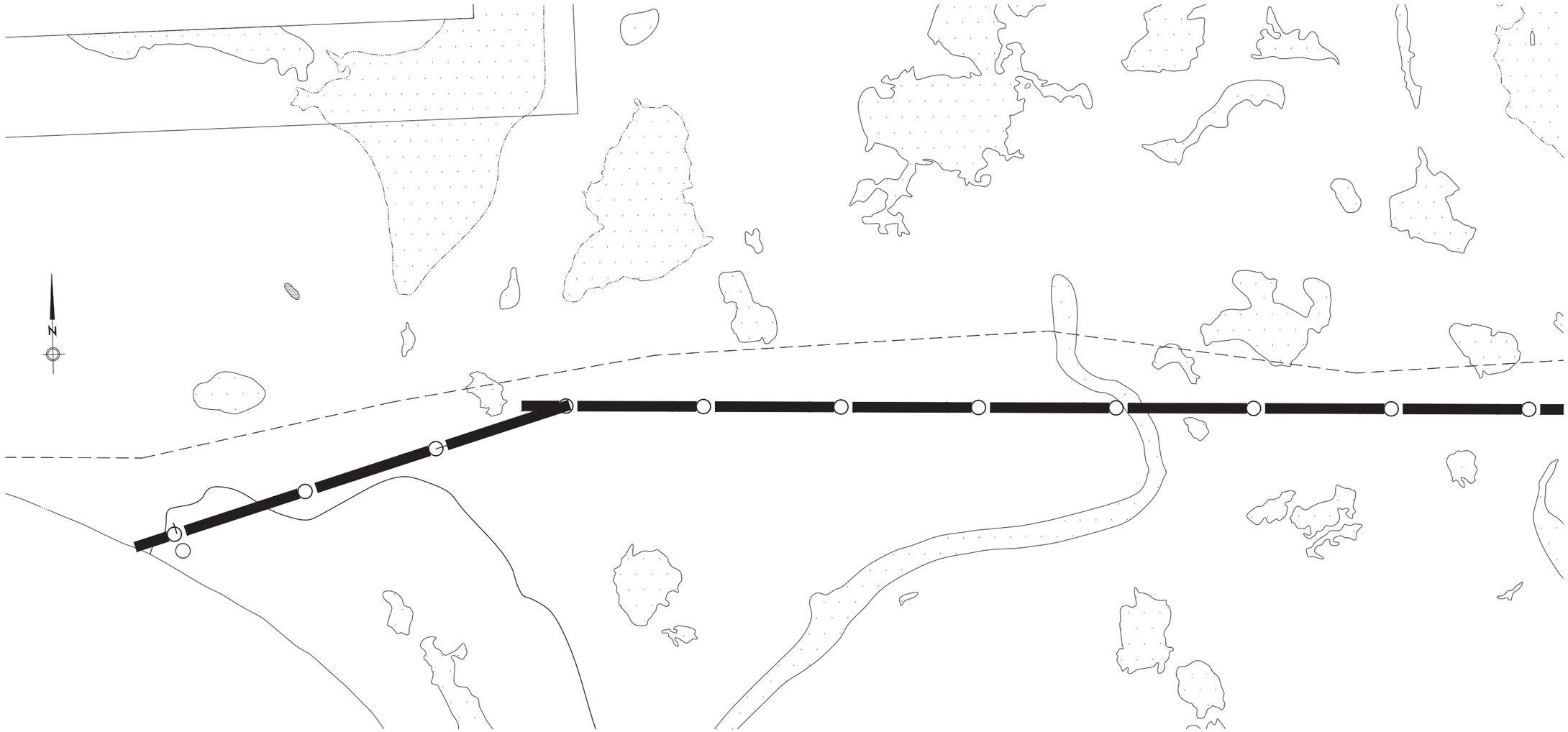
DESIGNED BY: CWV	DATE: 12/12/13
FILE NAME: THILLE1	SHEET: E1.5 OF ##
PROJECT NUMBER:	



1 E1.6 TIE-LINE PLAN – SHEET 5
1" =100'

PRELIMINARY – NOT FOR CONSTRUCTION

State of Alaska
Department of Community and Economic Development
AIDEA/AEA
Rural Energy Group
813 West Northern Lights Blvd.
Anchorage, Alaska 99503
ALASKA ENERGY AUTHORITY

PROJECT: TWIN HILLS ENERGY PROJECTS

TITLE: TWIN HILLS TO TOGIAK TIE-LINE PLAN AND PROFILE

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

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DESIGNED BY: CWV	DATE: 12/12/13
FILE NAME: THILLE1	SHEET: E1.6 OF ##
PROJECT NUMBER:	

1 / E1.7 TIE-LINE PLAN – SHEET 6
1" =100'

PRELIMINARY – NOT FOR CONSTRUCTION

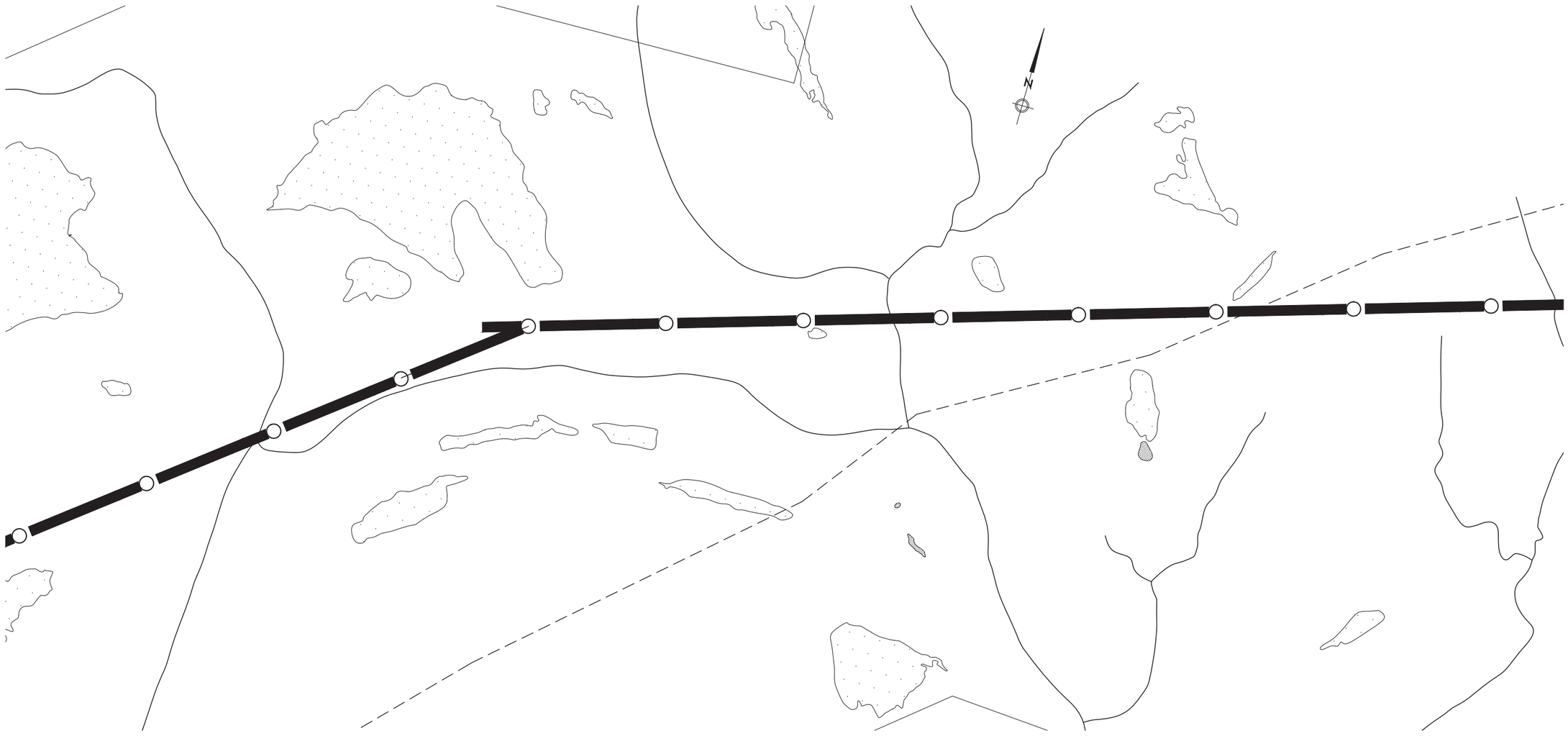
State of Alaska
Department of Community and Economic Development
AIDEA/AEA
Rural Energy Group
813 West Northern Lights Blvd.
Anchorage, Alaska 99503
ALASKA ENERGY AUTHORITY

PROJECT: TWIN HILLS ENERGY PROJECTS

TITLE: TWIN HILLS TO TOGIAK TIE-LINE PLAN AND PROFILE

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: SJS	SCALE: AS NOTED
DESIGNED BY: CWV	DATE: 12/12/13
FILE NAME: THILLE1	SHEET: E1.7 OF ##
PROJECT NUMBER:	



1 E1.8 TIE-LINE PLAN – SHEET 7
1" =100'

PRELIMINARY – NOT FOR CONSTRUCTION

State of Alaska
Department of Community and Economic Development
AIDEA/AEA
Rural Energy Group
813 West Northern Lights Blvd.
Anchorage, Alaska 99503
ALASKA ENERGY AUTHORITY

PROJECT: TWIN HILLS ENERGY PROJECTS

TITLE: TWIN HILLS TO TOGIAK TIE-LINE PLAN AND PROFILE

Gray Stassel Engineering, Inc.
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DRAWN BY: SJS	SCALE: AS NOTED
DESIGNED BY: CWV	DATE: 12/12/13
FILE NAME: THILLE1	SHEET: E1.8 OF ##
PROJECT NUMBER:	

1 / E1.9 TIE-LINE PLAN – SHEET 8
1" =100'

PRELIMINARY – NOT FOR CONSTRUCTION

State of Alaska
Department of Community and Economic Development
AIDEA/AEA
Rural Energy Group
813 West Northern Lights Blvd.
Anchorage, Alaska 99503

ALASKA ENERGY AUTHORITY

PROJECT: TWIN HILLS ENERGY PROJECTS

TITLE: TWIN HILLS TO TOGIAK TIE-LINE PLAN AND PROFILE

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: SJS	SCALE: AS NOTED
DESIGNED BY: CWV	DATE: 12/12/13
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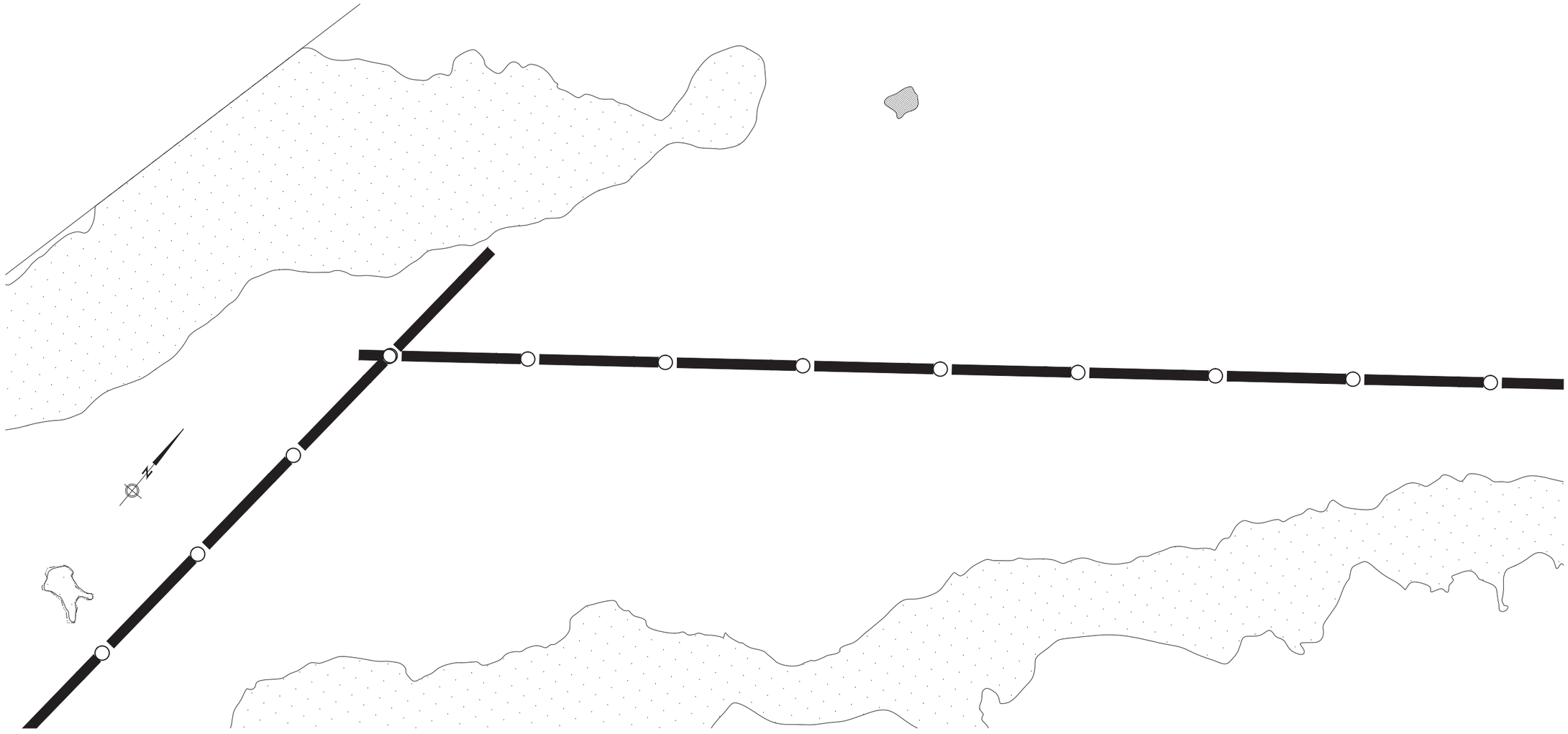
PROJECT NUMBER:	



1 E1.10 TIE-LINE PLAN – SHEET 9
1" =100'

PRELIMINARY – NOT FOR CONSTRUCTION

State of Alaska
Department of Community and Economic Development
AIDEA/AEA
Rural Energy Group
813 West Northern Lights Blvd.
Anchorage, Alaska 99503
ALASKA ENERGY AUTHORITY

PROJECT: TWIN HILLS ENERGY PROJECTS

TITLE: TWIN HILLS TO TOGIAK TIE-LINE PLAN AND PROFILE

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: SJS	SCALE: AS NOTED
DESIGNED BY: CWV	DATE: 12/12/13
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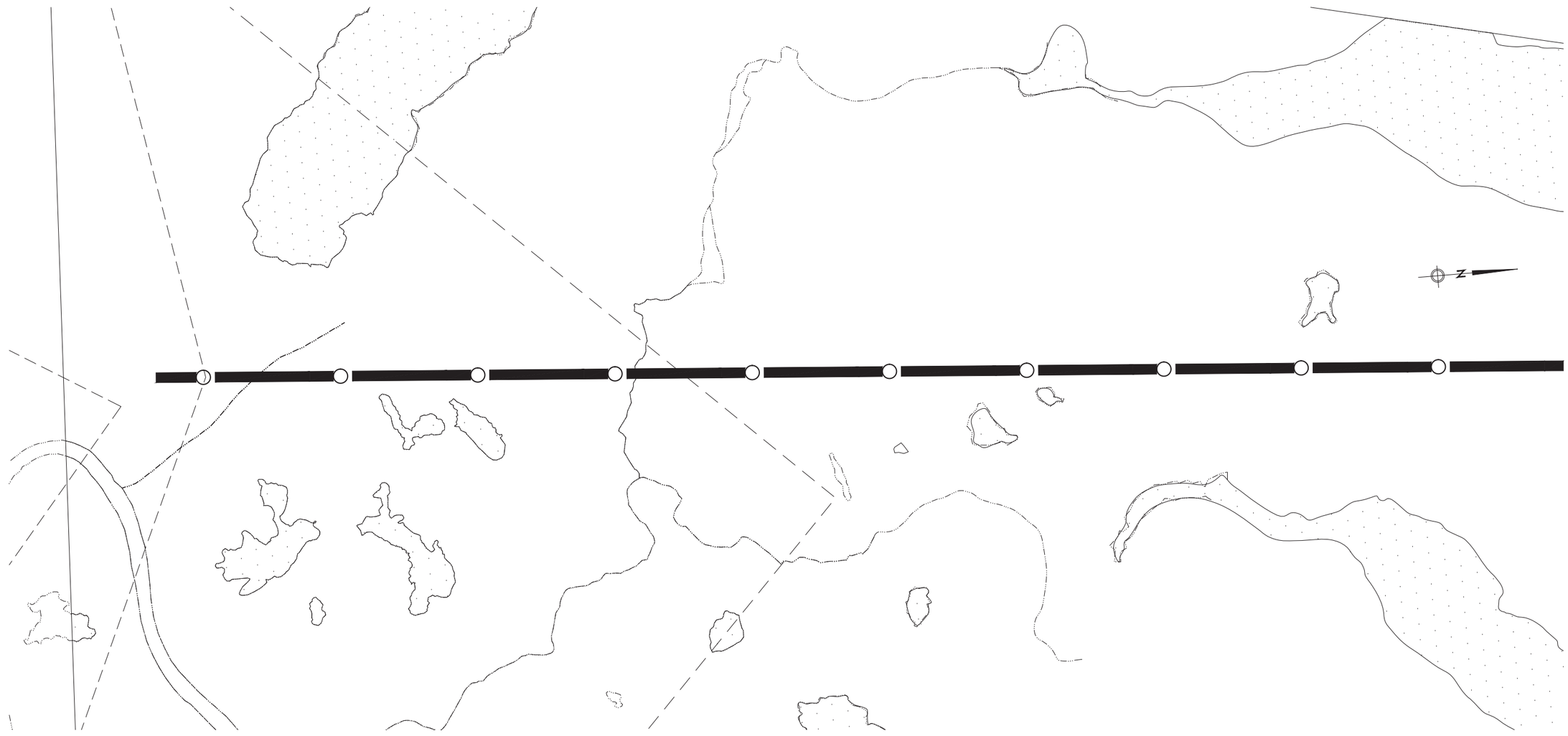
PROJECT NUMBER:	



1 E1.11 TIE-LINE PLAN – SHEET 10
1" =100'

PRELIMINARY – NOT FOR CONSTRUCTION

State of Alaska
Department of Community and Economic Development
AIDEA/AEA
Rural Energy Group
813 West Northern Lights Blvd.
Anchorage, Alaska 99503
ALASKA ENERGY AUTHORITY

PROJECT: TWIN HILLS ENERGY PROJECTS

TITLE: TWIN HILLS TO TOGIAK TIE-LINE PLAN AND PROFILE

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: SJS	SCALE: AS NOTED
DESIGNED BY: CWV	DATE: 12/12/13
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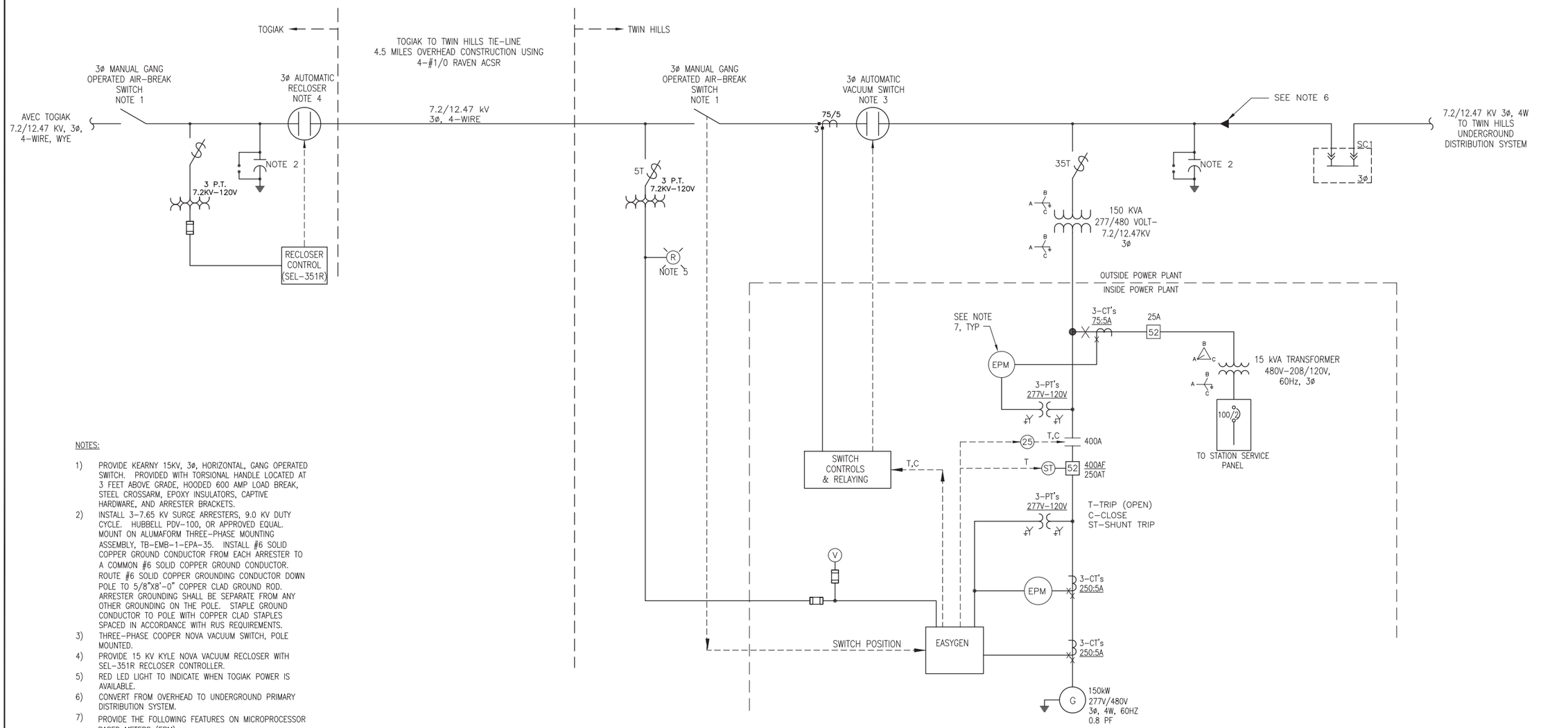
PROJECT NUMBER:	



NOTES:

1) PROVIDE KEARNY 15KV, 3ø, HORIZONTAL, GANG OPERATED SWITCH. PROVIDED WITH TORSIONAL HANDLE LOCATED AT 3 FEET ABOVE GRADE, HOODED 600 AMP LOAD BREAK, STEEL CROSSARM, EPOXY INSULATORS, CAPTIVE HARDWARE, AND ARRESTER BRACKETS.
2) INSTALL 3-7.65 KV SURGE ARRESTERS, 9.0 KV DUTY CYCLE. HUBBELL PDV-100, OR APPROVED EQUAL. MOUNT ON ALUMAFORM THREE-PHASE MOUNTING ASSEMBLY, TB-EMB-1-EPA-35. INSTALL #6 SOLID COPPER GROUND CONDUCTOR FROM EACH ARRESTER TO A COMMON #6 SOLID COPPER GROUND CONDUCTOR. ROUTE #6 SOLID COPPER GROUNDING CONDUCTOR DOWN POLE TO 5/8"X8'-0" COPPER CLAD GROUND ROD. ARRESTER GROUNDING SHALL BE SEPARATE FROM ANY OTHER GROUNDING ON THE POLE. STAPLE GROUND CONDUCTOR TO POLE WITH COPPER CLAD STAPLES SPACED IN ACCORDANCE WITH RUS REQUIREMENTS.
3) THREE-PHASE COOPER NOVA VACUUM SWITCH, POLE MOUNTED.
4) PROVIDE 15 KV KYLE NOVA VACUUM RECLOSER WITH SEL-351R RECLOSER CONTROLLER.
5) RED LED LIGHT TO INDICATE WHEN TOGIAK POWER IS AVAILABLE.
6) CONVERT FROM OVERHEAD TO UNDERGROUND PRIMARY DISTRIBUTION SYSTEM.
7) PROVIDE THE FOLLOWING FEATURES ON MICROPROCESSOR BASED METERS (EPM):
$V_{AB}, V_{BC}, V_{CA}, V_{AN}, V_{BN}, V_{CN}, I_A, I_B, I_C$
WATTS, VARS, PF, F, DEMAND WATTS, WATT HOURS

PRELIMINARY – NOT FOR CONSTRUCTION

State of Alaska
Department of Community and Economic Development
AIDEA/AEA
Rural Energy Group
813 West Northern Lights Blvd.
Anchorage, Alaska 99503
ALASKA ENERGY AUTHORITY

PROJECT: TWIN HILLS ENERGY PROJECTS

TITLE: TWIN HILLS TO TOGIAK TIE-LINE
ONE LINE DIAGRAM

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: CWV	SCALE: AS NOTED
DESIGNED BY: CWV	DATE: 12/18/13
FILE NAME: THILLE2	SHEET: E2 OF ##
PROJECT NUMBER:	

1 E3.1 TOWNSITE AREA PRIMARY DISTRIBUTION CABLE PLAN
1"=100'

NOTES

1. SEE ONE LINE DIAGRAMS AND STAKING SHEETS FOR ALL CABLE TYPES.
2. EXISTING BURIED UTILITY LOCATIONS, INCLUDING WATER/SEWER MAINS & SERVICE, NOT FIELD VERIFIED OR SHOWN ON PLANS. CONTACT CITY PUBLIC WORKS DEPARTMENT FOR UTILITY LOCATES PRIOR TO DIGGING.
3. ALL PRIMARY CONDUCTORS AND EQUIPMENT TO BE LOCATED WITHIN EXISTING ROAD RIGHT-OF-WAYS AND UTILITY EASEMENTS.
4. SECONDARY DISTRIBUTION CONDUCTORS AND EQUIPMENT NOT SHOWN THIS PLAN FOR CLARITY. SEE SHEETS E4.1 AND E4.2
5. FIBER OPTIC CABLE
6. NOT USED
7. CONTRACTOR SHALL CLEARLY LABEL EACH CIRCUIT COMING INTO THE SECTIONALIZING CABINET TO ENSURE THAT THE CIRCUITS OR PHASES WILL NOT BE CROSSED. SEE SPECIFICATIONS.

TRANSFORMER SCHEDULE

TRANSFORMER NUMBER	CAPACITY	HIGH VOLTAGE	PH	LOW VOLTAGE	PH
STEP-UP TRANSFORMERS					
PM1-RESIDENTIAL LOOP	150kVA	12.47 GRND Y/7.2kV	3ø	480/277V	3ø
PM100-COMMERCIAL LOOP	150kVA	12.47 GRND Y/7.2kV	3ø	480/277V	3ø
PM105-WIND TURBINE	112.5kVA	12.47 GRND Y/7.2kV	3ø	480/277V	3ø
RESIDENTIAL LOOP TRANSFORMERS					
PM2	25kVA	7.2kV	1ø	240/120V	1ø
PM3	25kVA	7.2kV	1ø	240/120V	1ø
PM4	25kVA	7.2kV	1ø	240/120V	1ø
PM5	25kVA	7.2kV	1ø	240/120V	1ø
PM6	25kVA	7.2kV	1ø	240/120V	1ø
PM7	25kVA	7.2kV	1ø	240/120V	1ø
PM8	25kVA	7.2kV	1ø	240/120V	1ø
PM9	25kVA	7.2kV	1ø	240/120V	1ø
PM10	25kVA	7.2kV	1ø	240/120V	1ø
PM11	25kVA	7.2kV	1ø	240/120V	1ø
PM12	25kVA	7.2kV	1ø	240/120V	1ø
PM13	25kVA	7.2kV	1ø	240/120V	1ø
PM14	15kVA	7.2kV	1ø	240/120V	1ø
PM15	25kVA	7.2kV	1ø	240/120V	1ø
PM16	15kVA	7.2kV	1ø	240/120V	1ø
PM17	15kVA	7.2kV	1ø	240/120V	1ø
PM18	15kVA	7.2kV	1ø	240/120V	1ø
PM19	15kVA	7.2kV	1ø	240/120V	1ø
COMMERCIAL LOOP/ZAPADNI RD. EXTENSION TRANSFORMERS (TO WIND FARM ONLY)					
PM101	45kVA	12.47 GRND Y/7.2kV	3ø	208/120V	3ø
PM102	45kVA	12.47 GRND Y/7.2kV	3ø	480/277V	3ø
PM103	45kVA	12.47 GRND Y/7.2kV	3ø	208/120V	3ø
PM104	15kVA	7.2kV	1ø	240/120V	1ø

State of Alaska
Department of Community and Economic Development
AIDEA/AEA
Rural Energy Group
813 West Northern Lights Blvd.
Anchorage, Alaska 99503
ALASKA ENERGY AUTHORITY

PROJECT: TWIN HILLS ENERGY PROJECTS

TITLE: TOWNSITE AREA PRIMARY DISTRIBUTION PLAN

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: CWV/CFC	SCALE: AS NOTED
DESIGNED BY: CWV	DATE: 12-18-13
FILE NAME: TWIN DIST E1-5	SHEET: E3.1 OF #
PROJECT NUMBER:	

APPENDIX B

CONSTRUCTION COST ESTIMATE

ITEM	QUAN	UNIT	UNIT COST	MATL COST	UNIT HRS	LAB HRS	LAB RATE	LABOR COST	CONTR COST	FREIGHT COST	TOTAL COST	UNIT WT	TOTAL WT(#)
H-Piles, H10X57, 40FT	98	EA	$1,500	$147,000	6.00	588	$125	$73,500			$220,500	2280.00	223,440
H-Piles, H10X57, Contingency	11	EA	$1,500	$16,500	6.00	66	$125	$8,250			$24,750	2280.00	25,080
Anchors, H10X57, 40FT	20	EA	$1,500	$30,000	6.00	120	$125	$15,000			$45,000	2280.00	45,600
35', Class 3 Poles	75	EA	$350.00	$26,250	4.00	300	$125	$37,500			$63,750	920	69,000
40', Class 3 Poles	15	EA	$450.00	$6,750	4.00	60	$125	$7,500			$14,250	1240	18,600
45', Class 3 Poles	4	EA	$550.00	$2,200	4.00	16	$125	$2,000			$4,200	1440	5,760
50', Class 2 Poles	4	EA	$650.00	$2,600	4.00	16	$125	$2,000			$4,600	1950	7,800
C1.11 RUS Construction	99	EA	$150.00	$14,850	2.00	198	$125	$24,750			$39,600	70	6,930
C2.21 RUS Construction	10	EA	$300.00	$3,000	2.00	20	$125	$2,500			$5,500	70	700
#1/0 ACSR Raven	96000	LF	0.40	$38,400	0.01	960	$125	$120,000			$158,400	0.181	17,328
#4/0 ACSR Penguin	7600	LF	0.80	$6,080	0.01	76	$125	$9,500			$15,580	0.450	3,420
Guy	20	EA	50.00	$1,000	2.00	40	$125	$5,000			$6,000	10	200
3-Phase Gang Oper Switch	2	EA	$5,000	$10,000	20	40	$125	$5,000			$15,000	650	1,300
Three-Phase Solid Dielectric Recloser with Mounting Brackets, Operating Handle, and Ground Brackets.	1	EA	$30,000	$30,000	40	40	$125	$5,000			$35,000	200	200
Transformers (480V-7.2kV) 150 kVA Padmount 1-Phase	3	EA	$10,000	$30,000	10	30	$125	$3,750			$33,750	6000	18,000
7.65 kV Distribution Class Surge Arresters	6	EA	$100.00	$600	1	3	$125	$375			$975	5.00	30
OVERHEAD													
Rent Heavy Equip.	1	lump							$15,000		$15,000		
Project Mob / Demob	1	lump							$100,000		$100,000		
Construcion Staking	1	lump							$15,000		$15,000		
Superintendent Overhd Off-Site	80	hr			1	80	$125	$10,000			$10,000		
Superintendent Overhd On-Site	80	hr			1	80	$125	$10,000			$10,000		
Crew Travel Time	96	hr			1	192	$125	$24,000			$24,000		
Crew Airfares	24	trips	$1,000						$24,000		$24,000		
Crew Per Diem	293	mn.dy	$60						$17,550		$17,550		
Housing Rent	3.0	mo.	$1,500						$4,500		$4,500		
FREIGHT													443,388
Barge Freight Seattle-Togiak	443,388	lb.	$0.35							$155,186			
Misc Small Freight/Goldstreaks	1	lump	$5,000							$5,000			
CONSTRUCTION SUBTOTAL				$365,230		2,925		$365,625	$176,050	$160,186	$1,067,091		
Bonds and Insurance	2.5	%							$26,677				
Overhead and Profit	15	%							$160,064				
CONSTRUCTION TOTAL									$186,741		$1,253,832		

ITEM	QUAN	UNIT	UNIT COST	MATL COST	UNIT HRS	LAB HRS	LAB RATE	LABOR COST	CONTR COST	FREIGHT COST	TOTAL COST	UNIT WT	TOTAL WT(#)
Engineering (Design & CCA)	1	lump							$145,000				
Geotech Investigation	1	lump							$125,000				
Engineering Survey Staking	1	lump							$75,000				
Construction Management	1	lump							$100,000				
PROJECT SUB-TOTAL				$365,230				$365,625	$807,791	$160,186	$1,698,832		
Contingency	15	%									$254,825		
								TOTAL PROJECT COST			**$1,953,656**		

$440,825 /mile

ITEM	QUAN	UNIT	UNIT COST	MATL COST	UNIT HRS	LAB HRS	LAB RATE	LABOR COST	CONTR COST	FREIGHT COST	TOTAL COST	UNIT WT	TOTAL WT(#)
DISTRIBUTION UPGRADE													
15 kV, JCN, CIC, 133% #1, EPR	24090	LF	$4.25	$102,383	0.01	241	$125	$30,113			$132,495	2.10	52,195
Trenching/Backfill	13030	LF	$0.00	$0	0.10	1303	$125	$162,875			$162,875	0.00	0
Secondary Cable	5000	LF	$2.75	$13,750	0.05	250	$125	$31,250			$45,000	1.50	7,500
3-Phase Sectionalizer Enclosure	14	EA	$2,250	$31,500	24.00	336	$125	$42,000			$73,500	250	3,500
Transformer - 45 kVA, Three phase, with Ground Sleeve	1	EA	$14,500	$14,500	20	20	$125	$2,500			$17,000	4500	4,500
Transformer - 25 kVA, Single phase, with Ground Sleeve	14	EA	$3,500	$49,000	15.00	210	$125	$26,250			$75,250	700.00	9,800
Secondary Pedestals	16	EA	$400	$6,400	4.00	64	$125	$8,000			$14,400	20.00	320
Meter Bases	51	EA	$175	$8,925	5.00	255	$125	$31,875			$40,800	20.00	1,020
Meters (Elster)	51	EA	$150	$7,650	0.50	26	$125	$3,188			$10,838	5.00	255
Strut, Fasteners, Hardware, Etc.	1	LS	$5,000	$5,000	0.00	0	$125	$0			$5,000	250.00	250
Misc. Tools	1	LS	$5,000	$5,000	0.00	0	$125	$0			$5,000	250.00	250
LED Street Lights	12	EA	$250.00	$3,000	6.00	72	$125	$9,000			$12,000	50.00	600
Modify School for 3 Phase	1	LS	$5,000	$5,000	100	100	$125	$12,500			$17,500	500	500
Demolition	1	LS	$0	$0	300	300	$125	$37,500			$37,500	0	0
OVERHEAD													
Audit Grants	1	lump							$6,000		$6,000		
Rent Heavy Equip.	1	lump							$10,000		$10,000		
Superintendent Overhd Off-Site	40	hr			1	40	$125	$5,000			$5,000		
Superintendent Overhd On-Site	40	hr			1	40	$125	$5,000			$5,000		
Crew Travel Time	48	hr			1	64	$125	$8,000			$8,000		
Crew Airfares	8	trips							$8,000		$8,000		
Crew Per Diem	320	mn.dy							$13,440		$13,440		
Housing Rent	3.0	mo.	$1,500						$4,500		$4,500		
FREIGHT													80,690
Barge Freight Seattle-Togiak	80,690	lb.	$0.35							$28,242			
Misc Small Freight/Goldstreaks	1	lump	$3,000							$3,000			
CONSTRUCTION SUBTOTAL				$252,108		3,320		$415,050	$41,940	$31,242	$740,339		
Bonds and Insurance	2.5	%							$18,508				
Overhead and Profit	15	%							$111,051				
CONSTRUCTION TOTAL									$129,559		$869,898		
Engineering (Design & CCA)	1	lump							$60,000				
Engineering Survey Staking	1	lump							$25,000				
Construction Management	1	lump							$40,000				
PROJECT SUB-TOTAL				$252,108				$415,050	$296,499	$31,242	$994,898		
Contingency	15	%									$149,235		
								TOTAL PROJECT COST			**$1,144,133**		

ITEM	QUAN	UNIT	UNIT COST	MATL COST	UNIT HRS	LAB HRS	LAB RATE	LABOR COST	CONTR COST	TOTAL COST	UNIT WT	TOTAL WT(#)
MODULAR POWER PLANT												
150 kW Genset (JD 6068)	1	ea.	$65,000	$65,000	30	30	$95	$2,850		$67,850	3,000	3,000
Switchgear	1	ea.	$35,000	$35,000	40	40	$95	$3,800		$38,800	500	500
Power & Control Wiring	1	lump	$10,000	$10,000	40	40	$95	$3,800		$13,800	500	500
Step Up Transformer (112.5kVA)	1	ea.	$12,000	$12,000	40	40	$95	$3,800		$15,800	3,500	3,500
Ventilation	1	lump	$10,000	$10,000	20	20	$95	$1,900		$11,900	500	500
Day Tank	1	lump	$10,000	$10,000	40	40	$95	$3,800		$13,800	1,000	1,000
Fuel Piping	1	lump	$2,000	$2,000	20	20	$95	$1,900		$3,900	200	200
Radiator, Exp Tank	1	lump	$7,000	$7,000	20	20	$95	$1,900		$8,900	500	500
Coolant piping	1	lump	$2,000	$2,000	40	40	$95	$3,800		$5,800	300	300
Exhaust Thimble, Pipe, Etc	1	lump	$2,000	$2,000	20	20	$95	$1,900		$3,900	500	500
Station Service Devices/Wiring	1	lump	$5,000	$5,000	40	40	$95	$3,800		$8,800	500	500
Misc Strut, Hangers, Fasteners	1	lump	$2,000	$2,000	20	20	$95	$1,900		$3,900	500	500
Module Structure	1	ea.	$30,000	$30,000	100	100	$95	$9,500		$39,500	10,000	10,000
Move/Setup Module	1	lump	$2,000	$2,000	10	10	$95	$950		$2,950	0	0
Fill Coolant, Fuel, & Lube	1	lump	$1,000	$1,000	10	10	$95	$950		$1,950	500	500
Shop Load Test	1	lump	$0	$0	40	40	$95	$3,800		$3,800	0	0
FIELD SET UP MODULULAR POWER PLANT												
Gravel Pad	1	lump	$1,000	$1,000	40	40	$95	$3,800		$4,800	0	0
Concrete Strip Footings	6	cu.yd.	$150	$900	10	60	$95	$5,700		$6,600	800	4,800
Roof System & Siding	1	lump	$6,000	$6,000	80	80	$95	$7,600		$13,600	3,000	3,000
Landing	1	lump	$1,000	$1,000	20	20	$95	$1,900		$2,900	2,500	2,500
Install Hoods & Exhaust	1	lump	$0	$0	20	20	$95	$1,900		$1,900	2,500	2,500
Vacuum Switch and Controls	1	lump	$20,000	$20,000	40	40	$95	$3,800		$23,800	1,000	1,000
OVERHEAD												
Rent Heavy Equip.	1	lump							$5,000	$5,000		
Commission/Train Operators	1	lump							$5,000	$5,000		
Superintendent Overhd Off-Site	20	hr			1	20	$95	$1,900		$1,900		
Superintendent Overhd On-Site	20	hr			1	20	$95	$1,900		$1,900		
Crew Travel Time	20	hr			1	32	$95	$3,040		$3,040		
Crew Airfares	4	trips							$2,000	$2,000		
Crew Per Diem	20	mn.dy							$1,200	$1,200		
Housing Rent	1	mo							$1,500	$1,500		
FREIGHT												35,800
Barge Freight Anch -Twin Hills	35800	lb.	$0.35							$12,530		
Barge Equip/Freight Mob/De-Mob	2	day	$4,000							$8,000		
Project De-Mob	1	day	$2,000							$2,000		
Misc Small Freight & Gold Streaks	1	lump	$2,000							$2,000		
CONSTRUCTION SUB-TOTAL				$223,900		862		$81,890	$14,700	$345,020		
Engineering (Design & CCA)	1	lump							$50,000			
Construction Management	1	lump							$30,000			
PROJECT SUB-TOTAL				$223,900				$81,890	$94,700	$425,020		
Contingency	15	%								$63,753		
									TOTAL PROJECT COST	**$488,773**		

APPENDIX C

SITE CONTROL DOCUMENTS

Land Status Report
Twin Hills Townsite
Togiak-Twin Hills Tieline
Twin Hills RPSU

Land Status Summary for Twin Hills Townsite

Twin Hills townsite is identified as U.S. Survey 5580. The lots in the townsite were conveyed to the Federal Townsite Trustee. The Trustee then conveyed title to individuals and organizations based on occupancy. In 1991, all remaining unoccupied lots in the townsite were conveyed to the Village of Twin Hills.

I prepared an annotated map which showed the lots which are restricted native townsite lots and which lots are owned by the Village of Twin Hills. That map was provided to you on December 3, 2013. (copy attached). This map was based upon on information in the Federal Townsite Trustee tract book and documents recorded in the Bristol Bay Recording District. Any unrecorded transactions, if any, would not be reflected on this map.

In 1991, all of Tract B, a large unsubdivided tract within U.S. Survey 5580 was conveyed to the Village of Twin Hills. I found one recorded subdivision of Tract B. This is Plat 2006-2, Twin Hills Clinic Subdivision. However, the Village of Twin is still the owner of record of this subdivision.

The townsite has been closed by the Federal Townsite Trustee. Therefore, the Trustee no longer claims any jurisdiction over the townsite. The streets within the townsite are considered, by generally accepted practice, to be public rights of way even though there is not a specific dedication on the plat. This is true of all federal townsite surveys.

Twin Hills is not incorporated as a city and it is not within an organized borough. Therefore, the only local governing entity is the Village of Twin Hills. Again, as a generally accepted practice, the Village of Twin Hills has control over the use of the road rights-of-way and may grant permission to use the rights of way for public utility purposes.

Land Status Summary for Togiak-Twin Hills Tieline

On August 8, 2012, I submitted annotated maps showing the land status of areas that were identified for research. (copy attached). These maps were based upon on information in the Bureau of Land Management master title plats (MTPs) and documents recorded in the Bristol Bay Recording District. Any unrecorded transactions, if any, would not be reflected on this map.

To summarize that report, most of the land between the villages of Togiak and Twin Hills is owned by either the Togiak Native Limited or the Twin Hills Native Corporation. As shown on the maps, there are some Native allotments in the area and also a fish processing plant (USS 878).

Recommendations.

Native allotments and those lots which are restricted native townsite lots require BIA involvement and approval for the granting of utility easements. This takes considerable time and involves survey according to BIA standards, appraisal, and payment of fair market value to name a few of the requirements.

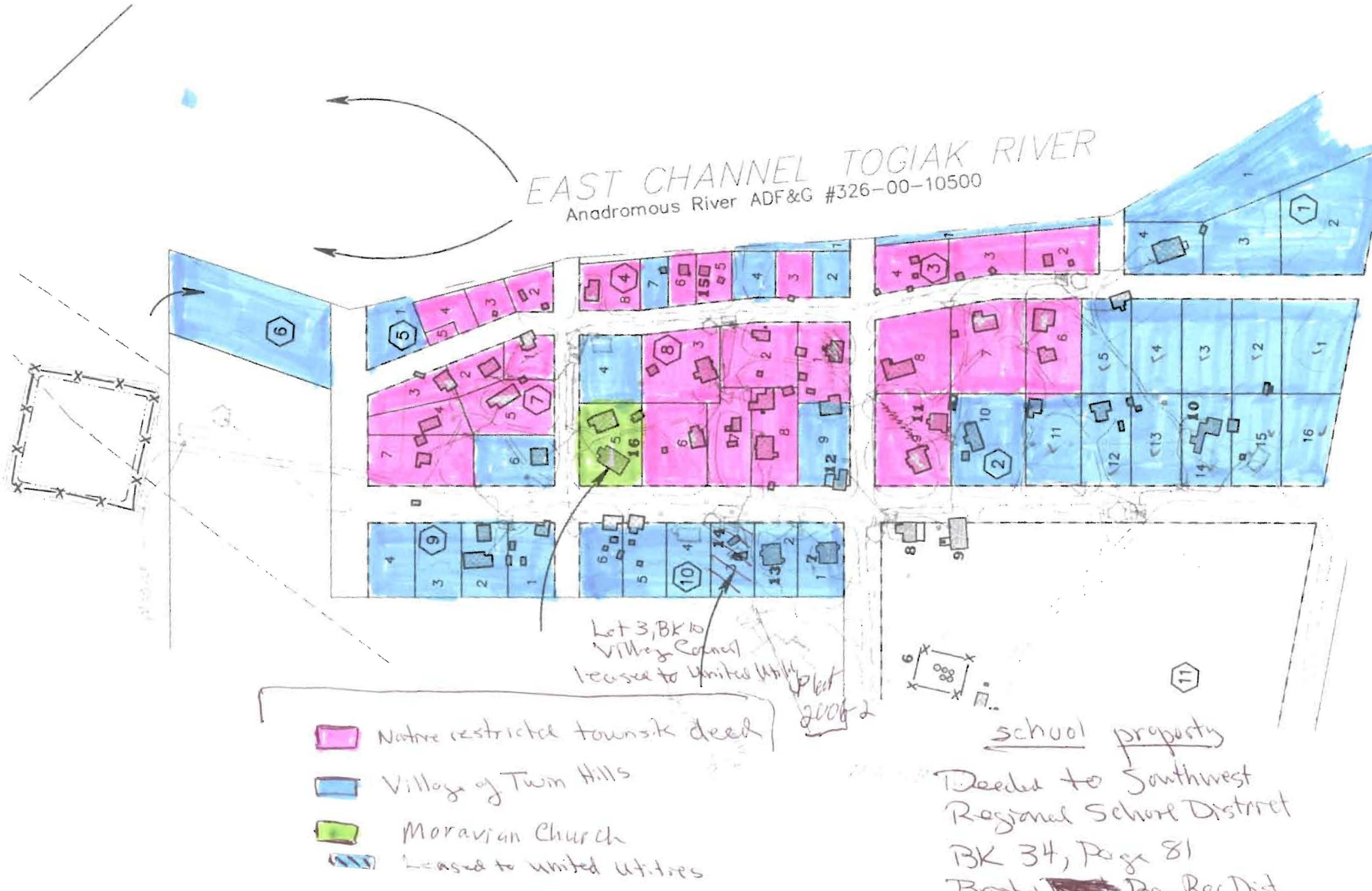
Therefore, it is recommended that the route of the tieline between the villages avoid Native allotments if possible. Also, in the townsite, the main utility lines and utility boxes should be located wherever possible within the road rights of way or on land owned by the Village of Twin Hills.

Disclaimer: This report does not purport to insure, warrant or certify title. This report is not a legal opinion. All research was limited to a review of the available computerized files. The opinion is the result of a limited research effort as described above.

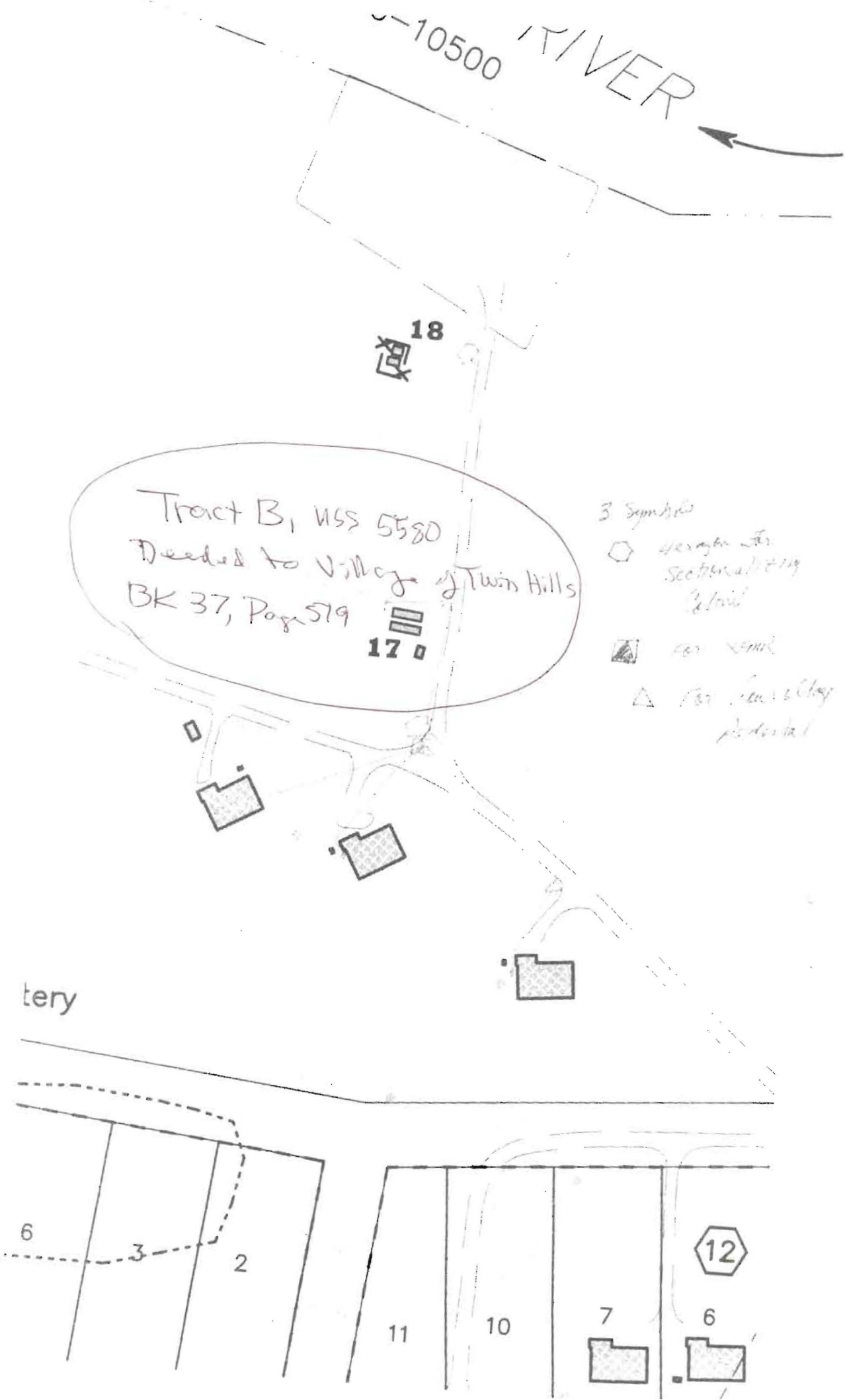
Prepared by

Rick Elliott

Rick Elliott
Land Consultant for AE&E
December 12, 2013


EAST CHANNEL TOGIAK RIVER
Anadromous River ADF&G #326-00-10500
Lot 3, Bk 10
Village Council
leased to United Utilities
Plat 2006-2
Native restricted townsite deed
Village of Twin Hills
Moravian Church
Leased to United Utilities
school property
Deeded to Southwest
Regional School District
BK 34, Page 81

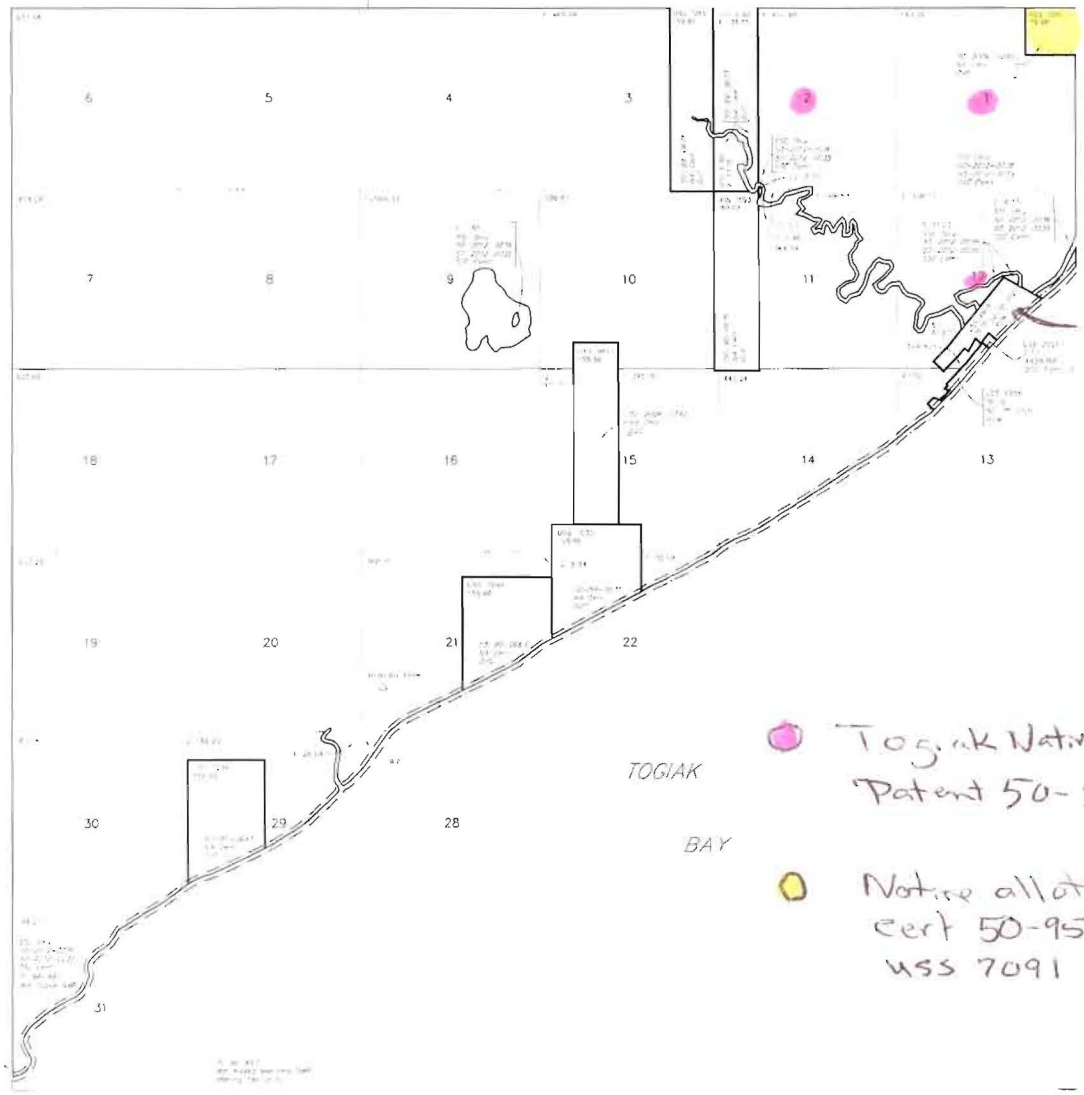
Village Cemetery
13
10
7
6
3
2
9
8
5
4
1
All lots in Block 13 deed to Village of Twin Hills
BK 37, Pg 513
Bristol Bay Rec. Dist.
12
11
10
7
6
3
2
12
9
8
5
4
1
All lots in Block 12 deeded to Village of Twin Hills
BK 37, Page 510
Bristol Bay Recreation Dist.
4
6
Playground
1
5
11
school property
SW Regional School Dist
A
Village of Twin Hills
P
2
3


10500
RIVER
18
Tract B, USS 5580
Deeded to Village of Twin Hills
BK 37, Page 519
17
tery
6
3
2
11
10
7
6
12

SURVEYED TOWNSHIP 13 SOUTH RANGE 67 WEST OF THE SEWARD MERIDIAN, ALASKA

STATUS OF PUBLIC DOMAIN
LAND AND MINERAL TITLES

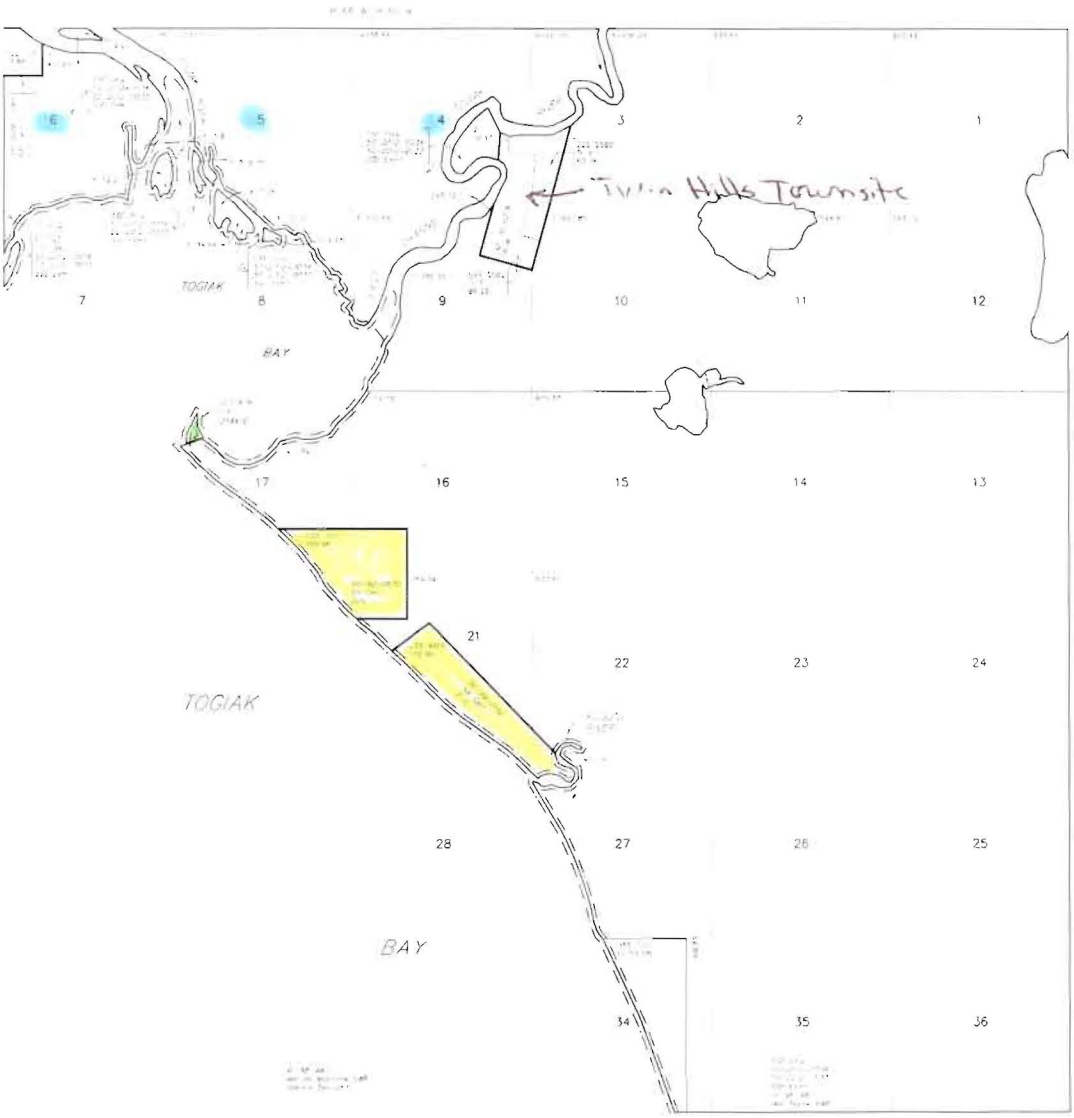
MTP



SURVEYED TOWNSHIP 13 SOUTH RANGE 66 WEST OF THE SEWARD MERIDIAN, ALASKA

STATUS OF PUBLIC DOMAIN LAND AND MINERAL TITLES

MTP



Twin Hills Native Corporation
Patent 50-2012-0033

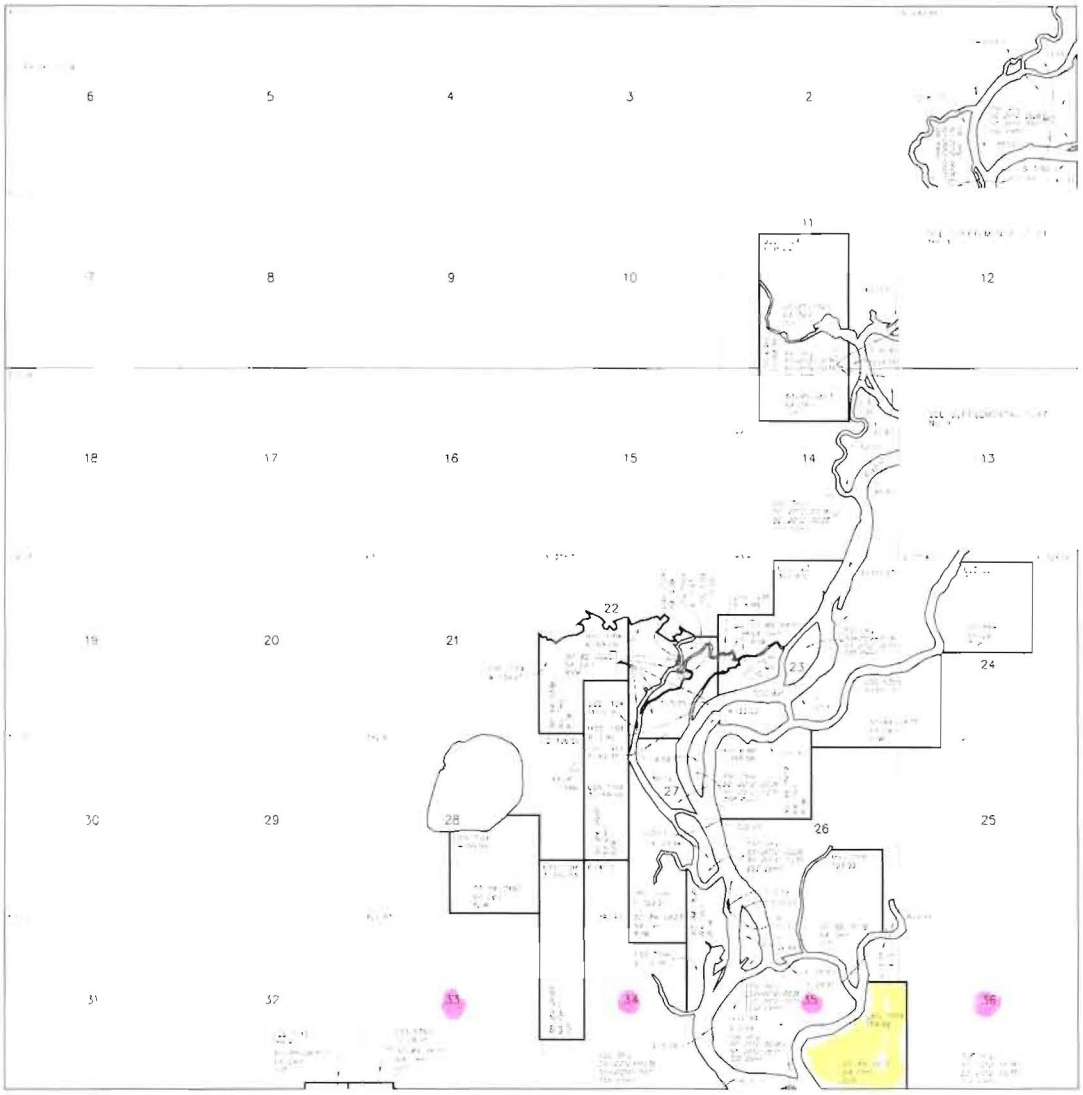
Native allotments
- cert 50-92-0670 - USS 7217
- cert 50-99-0192 - USS 9819

Fish Processing Plant
Patent 259416 - USS 878
North Pacific Seafoods, Inc.
is current owner of record

SURVEYED TOWNSHIP 12 SOUTH RANGE 66 WEST OF THE SEWARD MERIDIAN, ALASKA

STATUS OF PUBLIC DOMAIN
LAND AND MINERAL TITLES

MTP



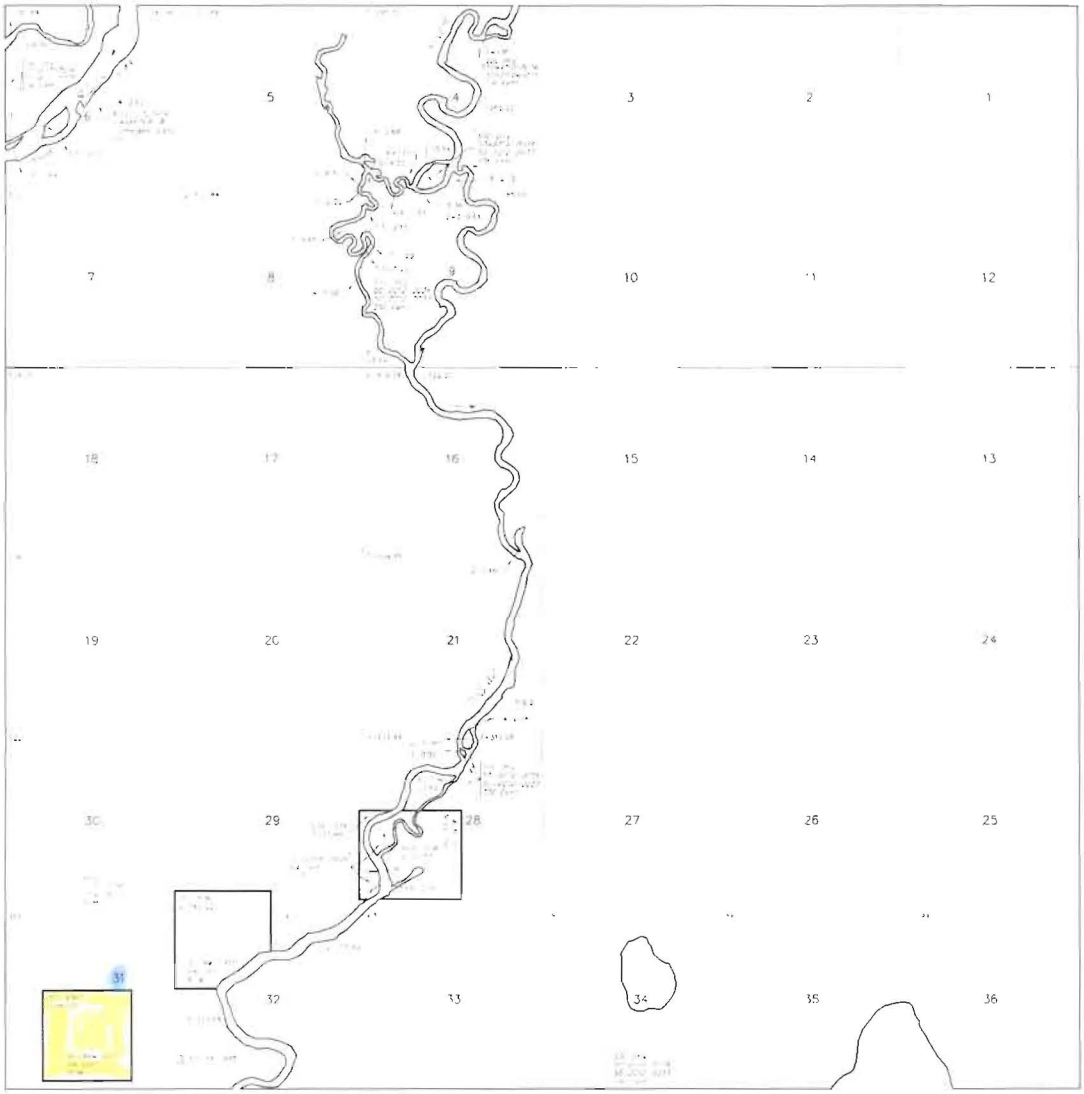
Togiak Natives Limited
Patent 50-2012-0035

Native Allotment
Cert 50-95-0612
USS 7099

SURVEYED TOWNSHIP 12 SOUTH RANGE 65 WEST OF THE SEWARD MERIDIAN, ALASKA

STATUS OF PUBLIC DOMAIN
LAND AND MINERAL TITLES

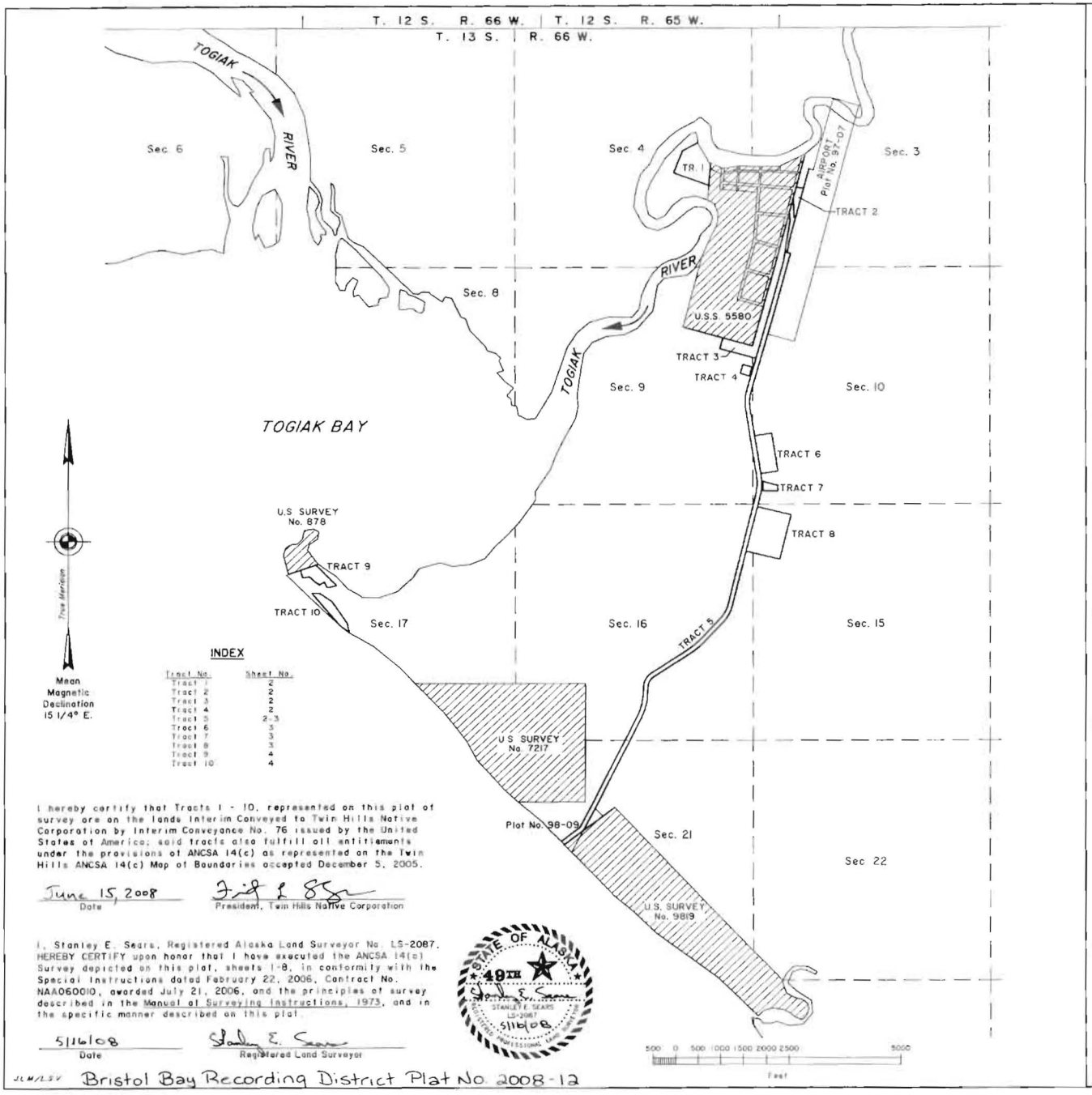
MTP



Twin Hills Native Corporation
Pat 50-2012-0035

Native allotment
Cert 50-84-0227
MSS 6367

ORIGINAL



INDEX

Tract No.	Sheet No.
Tract 1	2
Tract 2	2
Tract 3	2
Tract 4	2
Tract 5	2-3
Tract 6	3
Tract 7	3
Tract 8	3
Tract 9	4
Tract 10	4

I hereby certify that Tracts 1 - 10, represented on this plat of survey are on the lands Interim Conveyed to Twin Hills Native Corporation by Interim Conveyance No. 76 issued by the United States of America; said tracts also fulfill all entitlements under the provisions of ANCSA 14(c) as represented on the Twin Hills ANCSA 14(c) Map of Boundaries accepted December 5, 2005.

June 15, 2008
Date

President, Twin Hills Native Corporation

I, Stanley E. Sears, Registered Alaska Land Surveyor No. LS-2087, HEREBY CERTIFY upon honor that I have executed the ANCSA 14(c) Survey depicted on this plat, sheets 1-8, in conformity with the Special Instructions dated February 22, 2006, Contract No. NAA060010, awarded July 21, 2006, and the principles of survey described in the Manual of Surveying Instructions, 1973, and in the specific manner described on this plat.

5/16/08
Date

Registered Land Surveyor

STATE OF ALASKA 49TH STANLEY E. SEARS LS-2087 5/16/08

JLM/LSV Bristol Bay Recording District Plat No. 2008-12

ALASKA NATIVE CLAIMS SETTLEMENT ACT
(ANCSA) SECTION 14(c),
TRACTS 1 THROUGH 10,
P.L. 92-203 (85 STAT. 688, 702, 703)
THE TWIN HILLS NATIVE CORPORATION
AT
TWIN HILLS, ALASKA
AND THE RETRACEMENT OF PORTIONS OF
U.S. SURVEYS Nos. 878, 5580 AND 9819
AND PORTIONS OF PLAT Nos. 97-07 AND
98-09, BRISTOL BAY RECORDING DISTRICT

This plat contains the entire survey record.

The history of surveys is referenced on sheet 2.

This survey was executed by Stanley E. Sears, Registered Alaska Land Surveyor No. LS-2087, for Twin Hills Native Corporation, August 4, 2006 through August 11, 2007, in accordance with the specifications set forth in the Manual of Surveying Instructions, 1973, Special Instructions dated February 22, 2006, approved April 13, 2006, under Contract No. NAA060010, awarded July 21, 2006, and Notice to Proceed dated July 24, 2006.

This survey was accomplished using the global positioning system (GPS). The control was obtained using fast static with GPS carrier phase receivers. Monuments were positioned using RTK, and positions were confirmed with a redundant fast static observation.

Field assistants were:

Kathleen M. Burnham-Evans, Surveying Technician
Jake L. Maxwell, Surveying Technician
Taylor M. Moore, Surveying Technician
Tom R. Moore, Surveying Technician
Lindsey S. Vaughan, Surveying Technician

Area: 99.04 Acres

The direction of all the lines returned on this plat are reported as mean bearings with reference to the true meridian as determined by global positioning survey methods.

The geographic position of the witness corner to corner No. 4, Tract No. 1, a meander cor., as determined by a tie to National Geodetic Survey Triangulation Station "Togiak", is:

Latitude: 59° 04' 47.19" North
(NAD 27)
Longitude: 160° 17' 11.84" West

The magnetic declination was computed with the U.S. Geological Survey Geomag Program using the IGRF-2005.COF model as of July 30, 2006, and indicates a mean value of 15 1/4° East.

This survey is situated in the vicinity of the village of Twin Hills Alaska, within Township 13 South, Range 66 West, Seward Meridian, Alaska.

The land is primarily gently rolling tundra vegetated with berries and occasional clusters of alder. The soil is silty loam and gravel.

Access to the survey was by helicopter and four wheeler.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Anchorage, Alaska

The survey represented by this plat, sheets 1 - 8, having been properly executed and examined, is hereby accepted for having fulfilled the requirements of Section 14(c) of the Alaska Native Claims Settlement Act.

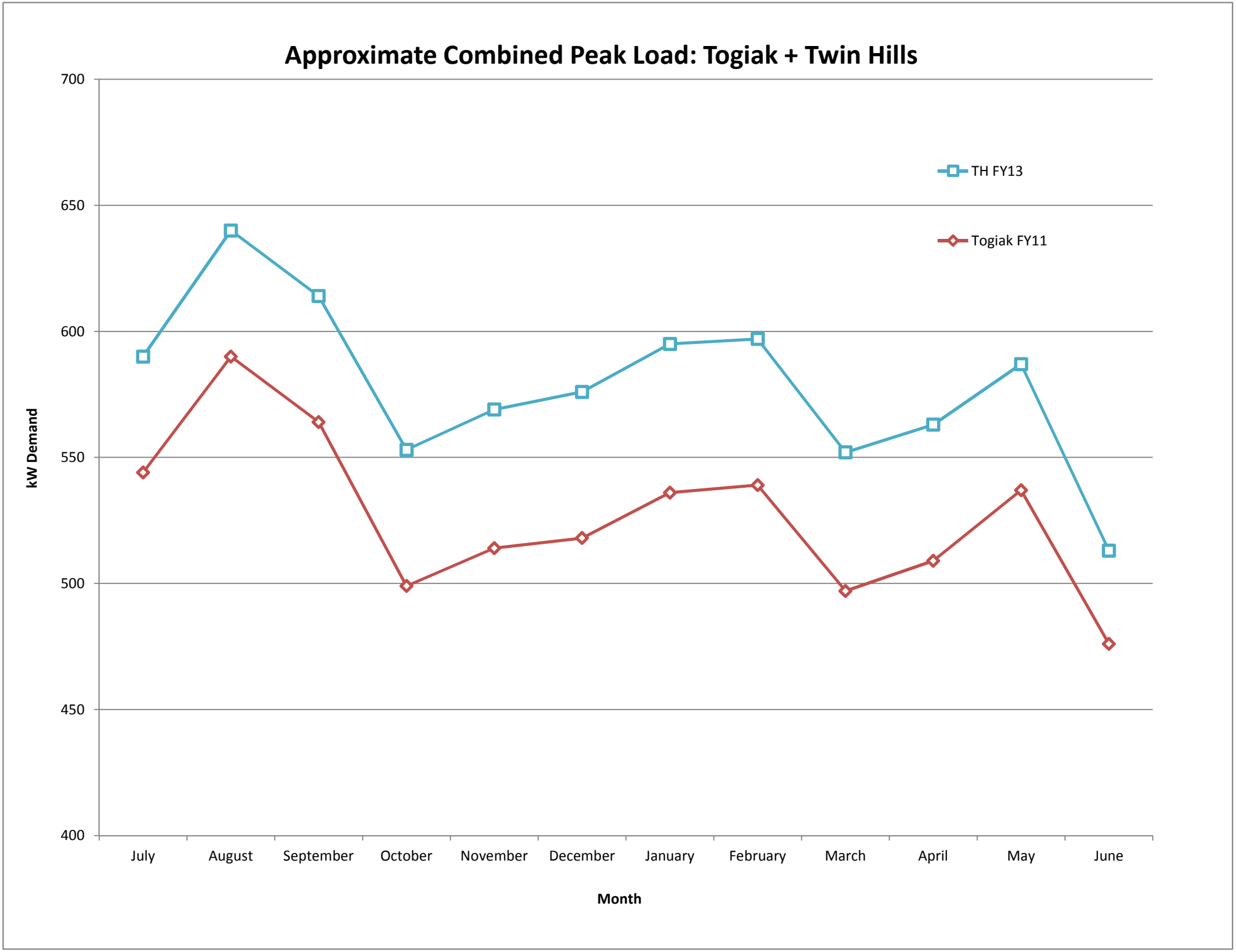
For the Director

July 3, 2008
Date

Deputy State Director for Cadastral Survey, Alaska

APPENDIX D

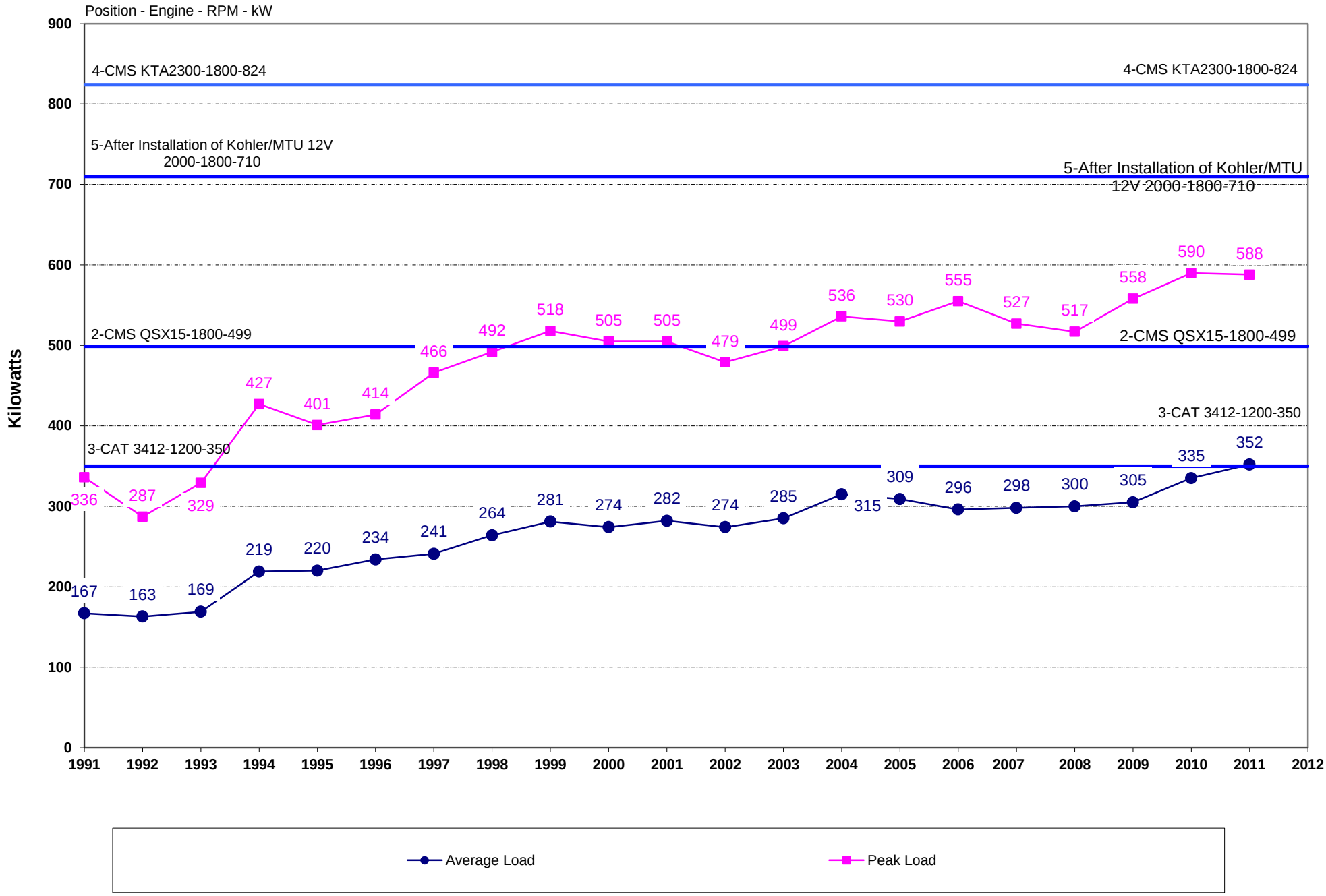
ELECTRICAL LOAD DATA

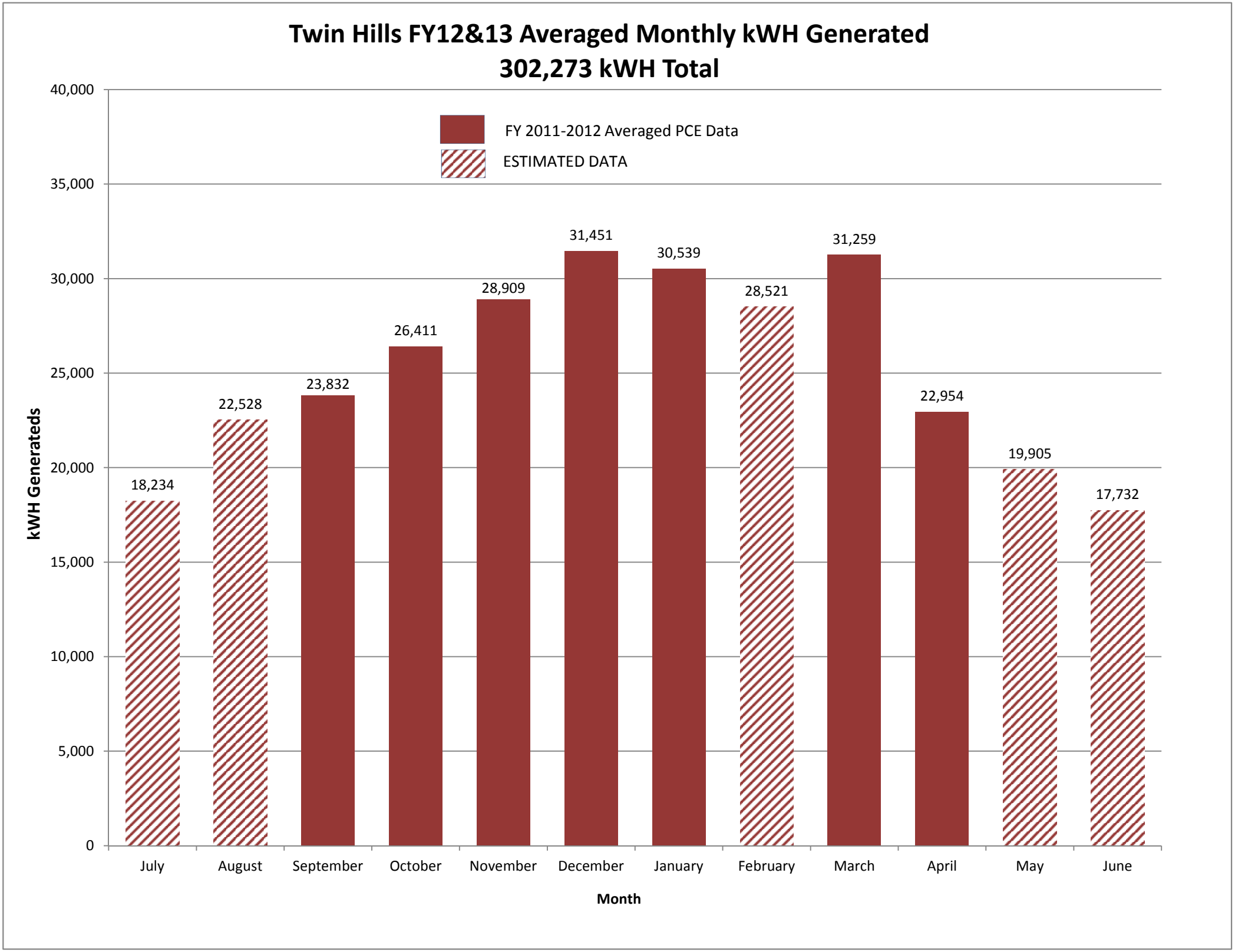

Approximate Combined Peak Load: Togiak + Twin Hills
700
650
600
550
500
450
400
kW Demand
TH FY13
Togiak FY11
July
August
September
October
November
December
January
February
March
April
May
June
Month

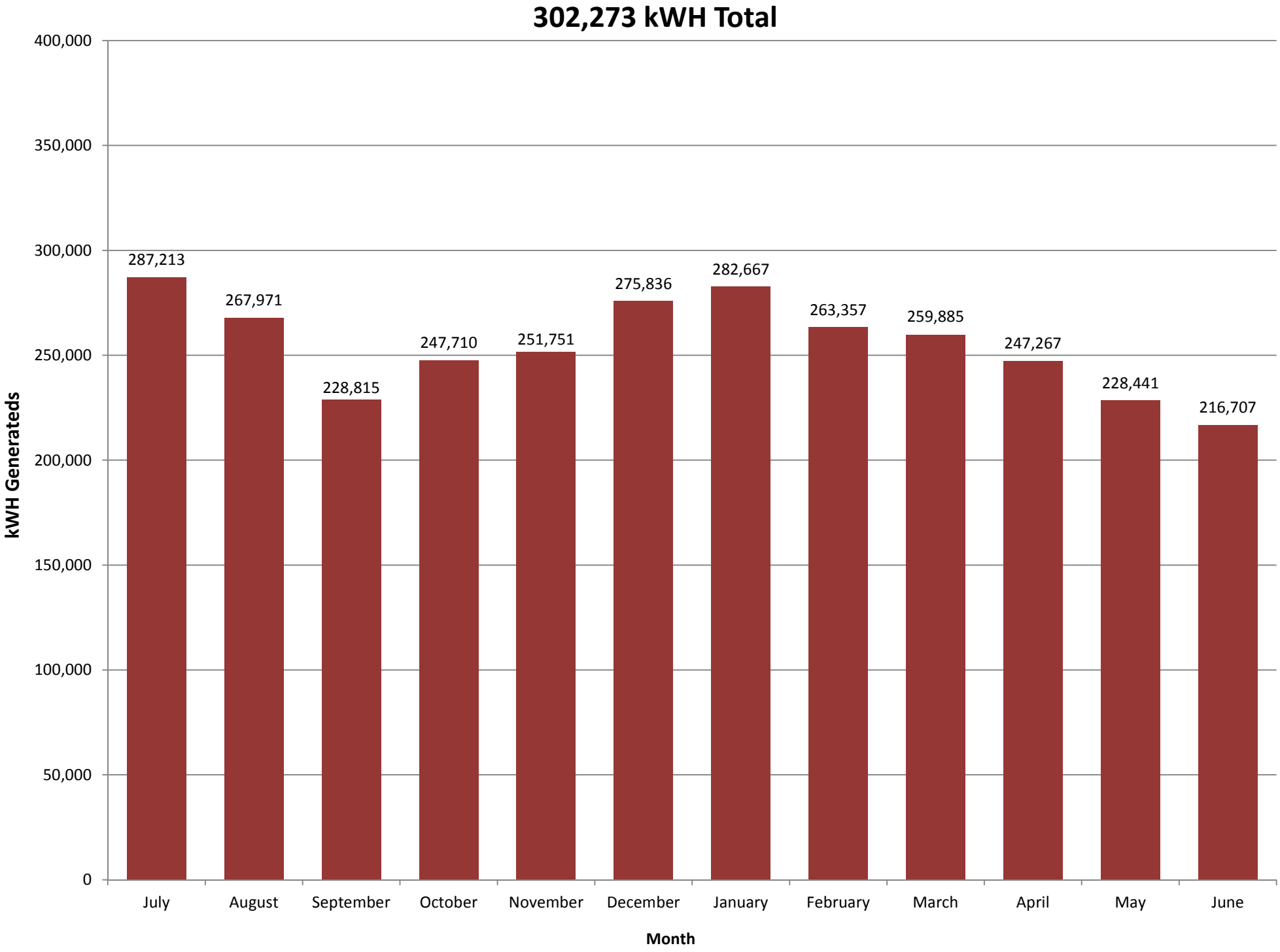
Alaska Village Electric Cooperative

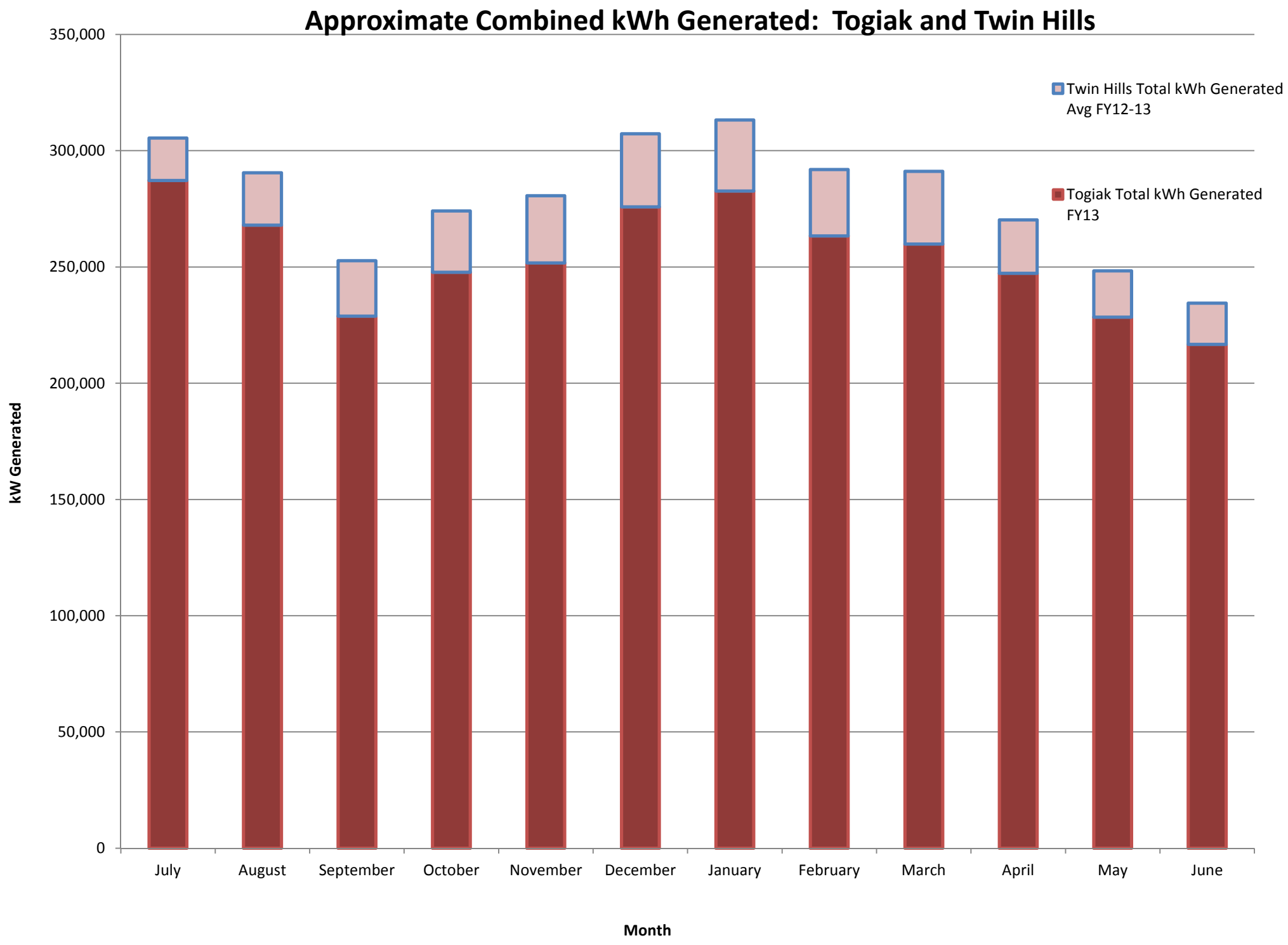
1 Minute Average Peak Load and Annual Average Load by Year and Existing Generating Capacity.

Togiak




Twin Hills FY12&13 Averaged Monthly kWH Generated
302,273 kWH Total
FY 2011-2012 Averaged PCE Data
ESTIMATED DATA
kWH Generateds
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
18,234
22,528
23,832
26,411
28,909
31,451
30,539
28,521
31,259
22,954
19,905
17,732
July
August
September
October
November
December
January
February
March
April
May
June
Month


Togiak FY13 Monthly kWH Generated
302,273 kWH Total
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
kWH Generateds
287,213
267,971
228,815
247,710
251,751
275,836
282,667
263,357
259,885
247,267
228,441
216,707
July
August
September
October
November
December
January
February
March
April
May
June
Month


Approximate Combined kWh Generated: Togiak and Twin Hills
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
kW Generated
July
August
September
October
November
December
January
February
March
April
May
June
Month
Twin Hills Total kWh Generated Avg FY12-13
Togiak Total kWh Generated FY13

		Generation Data												Fuel & Non-Fuel Expenses								
Posting Description	Month	Diesel kWh Generated	Hydro kWh Generated	Other 1 kWh Generated	Other 2 kWh Generated	Total kWh Generated	Total kWh Purchased	Total kWh Available	RCA Calculated Fuel Price	Fuel Used (Gallons)	Fuel Cost	Fuel Efficiency	Non-Fuel Expenses	Unbilled kWh	Total kWh Sold	Powerhouse Consumption kWh	Total kWh Sold & Consumed	Percent Sold & Consumed	Line Loss	Peak Consumption kWh	Population	Total Customers
Twin Hills PCE - .	July	16,920	0	0	0	16,920	0	16,920	$6.00	2,925	$17,550.00	5.78	$1,120.00	58	13,387	0	13,387	79.12%	20.88%	0	81	44
Twin Hills PCE - .	August	16,230	0	0	0	16,230	0	16,230	$6.00	3,151	$18,906.00	5.15	$976.00	71	11,570	0	11,570	71.29%	28.71%	0	81	45
Twin Hills PCE -	September	17,330	0	0	0	17,330	0	17,330	$6.00	2,945	$17,670.00	5.88	$1,112.00	16	12,441	0	12,441	71.79%	28.21%	0	81	44
Twin Hills PCE -	October	24,240	0	0	0	24,240	0	24,240	$6.00	2,709	$16,254.00	8.95	$982.50	1,097	18,405	0	18,405	75.93%	24.07%	0	81	44
Twin Hills PCE -	November	24,890	0	0	0	24,890	0	24,890	$6.00	3,093	$18,558.00	8.05	$1,032.00	38	19,573	0	19,573	78.64%	21.36%	0	81	44
Twin Hills PCE -	December	25,030	0	0	0	25,030	0	25,030	$6.00	2,685	$16,110.00	9.32	$0.00	775	19,600	0	19,600	78.31%	21.69%	0	81	45
Twin Hills PCE - .	January	30,450	0	0	0	30,450	0	30,450	$6.00	3,026	$18,156.00	10.06	$0.00	3,972	27,542	0	27,542	90.45%	9.55%	0	81	44
Twin Hills PCE -	February	23,780	0	0	0	23,780	0	23,780	$6.00	2,441	$14,646.00	9.74	$1,216.00	352	18,528	0	18,528	77.91%	22.09%	0	81	44
Twin Hills PCE -	March	24,420	0	0	0	24,420	0	24,420	$6.00	2,424	$14,544.00	10.07	$1,350.00	332	18,445	0	18,445	75.53%	24.47%	0	81	43
Twin Hills PCE - .	April	21,810	0	0	0	21,810	0	21,810	$8.43	3,375	$24,350.62	6.46	$1,136.00	301	16,960	0	16,960	77.76%	22.24%	0	81	44
Twin Hills PCE -	May	18,060	0	0	0	18,060	0	18,060	$8.43	2,694	$22,710.42	6.70	$1,016.00	105	13,845	0	13,845	76.66%	23.34%	0	81	44
Twin Hills PCE - .	June	16,300	0	0	0	16,300	0	16,300	$6.00	2,270	$0.00	7.18	$1,120.00	125	12,848	0	12,848	78.82%	21.18%	0	81	45
		259,460	0	0	0	259,460	0	259,460	$6.41	33,738	$199,455.04	7.69	$11,060.50	7,242	203,144	0	203,144	78.29%	21.71%			
Twin Hills PCE - .	July	14,590	0	0	0	14,590	0	14,590	$6.00	2,536	$15,216.00	5.75	$1,152.00	3	12,001	0	12,001	82.25%	17.75%	0	75	44
Twin Hills PCE - .	August	17,490	0	0	0	17,490	0	17,490	$6.00	2,731	$16,386.00	6.40	$1,152.00	287	13,831	0	13,831	79.08%	20.92%	0	75	44
Twin Hills PCE- S	September	16,990	0	0	0	16,990	0	16,990	$4.04	2,691	$10,867.07	6.31	$1,216.00	365	12,827	0	12,827	75.50%	24.50%	0	75	43
Twin Hills PCE- C	October	0	0	0	0	19,238	0	19,238	$4.00	2,271	$9,170.98	8.47	$1,954.00	482	15,984	2,899	18,883	98.16%	1.84%	55	75	43
Twin Hills PCE -	November	21,690	0	0	0	21,690	0	21,690	$4.00	2,392	$7,798.16	9.07	$1,472.00	600	17,496	211	17,707	81.64%	18.36%	57	75	42
Twin Hills PCE -	December	29,908	0	0	0	29,908	0	29,908	$4.00	2,786	$9,082.64	10.74	$1,520.00	1,918	21,554	3,753	25,307	84.62%	15.38%	54	75	41
Twin Hills PCE-J	January	24,055	0	0	0	24,055	0	24,055	$4.00	2,248	$8,992.00	10.70	$1,384.00	504	16,150	2,889	19,039	79.15%	20.85%	53	75	41
Twin Hills PCE -	February	23,454	0	0	0	23,454	0	23,454	$4.00	2,104	$6,859.25	11.15	$1,008.00	374	16,278	1,875	18,153	77.40%	22.60%	53	75	41
Twin Hills PCE -	March	27,659	0	0	0	27,659	0	27,659	$4.00	2,449	$7,983.98	11.29	$1,280.00	520	19,030	1,415	20,445	73.92%	26.08%	55	75	41
Twin Hills PCE- A	April	25,216	0	0	0	25,216	0	25,216	$4.00	2,333	$7,605.81	10.81	$2,528.00	441	15,950	3,053	19,003	75.36%	24.64%	52	75	42
Twin Hills PCE -	May	23,039	0	0	0	23,039	0	23,039	$4.00	2,197	$7,162.44	10.49	$2,608.00	554	16,590	3,069	19,659	85.33%	14.67%	51	75	43
Twin Hills PCE - .	June	17,672	0	0	0	17,672	0	17,672	$4.00	1,802	$5,874.70	9.81	$1,024.00	861	13,771	2,921	16,692	94.45%	5.55%	40	75	43
		241,763	0	0	0	261,001	0	261,001	$4.34	28,540	$112,999.03	8.47	$18,298.00	6,909	191,462	22,085	213,547	81.82%	18.18%			
Twin Hills PCE - .	July	19,483	0	0	0	19,483	0	19,483	$3.26	2,007	$6,543.02	9.71	$1,504.00	313	13,799	3,105	16,904	86.76%	13.24%	45	74	43
Twin Hills PCE- A	August	21,249	0	0	0	21,249	0	21,249	$3.92	2,079	$8,154.88	10.22	$1,232.50	310	14,411	3,048	17,459	82.16%	17.84%	50	74	44
Twin Hills PCE -	September	22,586	0	0	0	22,586	0	22,586	$3.92	2,277	$8,931.53	9.92	$612.00	319	14,367	3,171	17,538	77.65%	22.35%	48	74	44
Twin Hills PCE- C	October	25,220	0	0	0	25,220	0	25,220	$3.92	0	$0.00	#DIV/0!	$1,054.00	434	16,103	3,319	19,422	77.01%	22.99%	0	74	43
Twin Hills PCE -	November	27,570	0	0	0	27,570	0	27,570	$3.92	0	$0.00	#DIV/0!	$1,190.00	358	17,280	2,954	20,234	73.39%	26.61%	55	74	43
Twin Hills PCE -	December	29,435	0	0	0	29,435	0	29,435	$3.92	2,831	$11,104.60	10.40	$1,411.00	454	20,114	2,129	22,243	75.57%	24.43%	57	74	43
Twin Hills PCE - .	January	28,700	0	0	0	28,700	0	28,700	$3.92	2,610	$10,237.73	11.00	$1,020.00	341	19,786	1,796	21,582	75.20%	24.80%	59	74	43
Twin Hills PCE -	February	25,689	0	0	0	25,689	0	25,689	$3.92	2,482	$9,735.65	10.35	$544.00	351	17,619	1,624	19,243	74.91%	25.09%	58	74	43
Twin Hills PCE-M	March	28,809	0	0	0	28,809	0	28,809	$3.92	2,694	$10,567.22	10.69	$1,156.00	490	19,923	0	19,923	69.16%	30.84%	54	74	43
Twin Hills PCE-A	April	27,413	0	0	0	27,413	0	27,413	$3.92	2,669	$10,469.15	10.27	$1,122.00	332	17,966	0	17,966	65.54%	34.46%	58	74	43
Twin Hills PCE-M	May	23,333	0	0	0	23,333	0	23,333	$3.92	2,417	$9,480.68	9.65	$1,207.00	43	15,981	1,722	17,703	75.87%	24.13%	49	74	43
Twin Hills PCE-J	June	20,257	0	0	0	20,257	0	20,257	$3.92	2,118	$8,307.86	9.56	$1,538.50	123	13,145	2,933	16,078	79.37%	20.63%	49	74	43
		299,744	0	0	0	299,744	0	299,744	$3.87	24,184	$93,532.32	12.39	$13,591.00	3,868	200,494	25,801	226,295	75.50%	24.50%			

		Generation Data												Fuel & Non-Fuel Expenses								
Posting Description	Month	Diesel kWh Generated	Hydro kWh Generated	Other 1 kWh Generated	Other 2 kWh Generated	Total kWh Generated	Total kWh Purchased	Total kWh Available	RCA Calculated Fuel Price	Fuel Used (Gallons)	Fuel Cost	Fuel Efficiency	Non-Fuel Expenses	Unbilled kWh	Total kWh Sold	Powerhouse Consumption kWh	Total kWh Sold & Consumed	Percent Sold & Consumed	Line Loss	Peak Consumption kWh	Population	Total Customers
Twin Hills PCE-Jl	July	21,778	0	0	0	21,778	0	21,778	$3.92	2,197	$8,617.73	9.91	$1,054.00	48	14,188	3,159	17,347	79.65%	20.35%	58	74	43
Twin Hills PCE-A	August	24,197	0	0	0	24,197	0	24,197	$3.92	2,260	$8,864.85	10.71	$1,003.00	163	15,024	3,355	18,379	75.96%	24.04%	54	74	41
Twin Hills PCE-S	September	25,000	0	0	0	25,000	0	25,000	$3.92	2,305	$9,041.36	10.85	$1,054.00	199	14,565	3,036	17,601	70.40%	29.60%	51	74	43
Twin Hills PCE-O	October	26,760	0	0	0	26,760	0	26,760	$3.92	2,719	$10,665.28	9.84	$782.00	551	18,357	3,597	21,954	82.04%	17.96%	0	74	43
Twin Hills PCE-N	November	28,473	0	0	0	28,473	0	28,473	$3.92	2,682	$10,520.15	10.62	$1,139.00	629	19,019	1,939	20,958	73.61%	26.39%	0	74	43
Twin Hills PCE-D	December	32,079	0	0	0	32,079	0	32,079	$3.92	3,008	$11,798.88	10.66	$1,139.00	625	21,801	1,925	23,726	73.96%	26.04%	0	74	43
Twin Hills PCE-J	January	31,418	0	0	0	31,418	0	31,418	$3.92	2,977	$11,677.28	10.55	$1,343.00	403	23,239	2,143	25,382	80.79%	19.21%	50	74	42
Twin Hills PCE-F	February	29,075	0	0	0	29,075	0	29,075	$4.38	2,748	$12,037.06	10.58	$1,190.00	638	19,443	1,775	21,218	72.98%	27.02%	0	74	42
Twin Hills PCE-M	March	32,685	0	0	0	32,685	0	32,685	$4.38	3,162	$13,850.51	10.34	$1,139.00	1,042	21,080	2,219	23,299	71.28%	28.72%	0	74	43
Twin Hills PCE-A	April	17,898	0	0	0	17,898	0	17,898	$4.38	2,149	$9,413.26	8.33	$1,649.00	989	14,567	1,433	16,000	89.40%	10.60%	60	74	43
Twin Hills PCE -	May	0	0	0	0	20,977	0	20,977	$4.38	2,395	$10,490.82	8.76	$1,020.00	1,160	15,441	1,647	17,088	81.46%	18.54%	60	74	43
Twin Hills PCE -	June	0	0	0	0	18,849	0	18,849	$4.38	2,152	$9,426.41	8.76	$969.00	943	14,860	1,647	16,507	87.58%	12.42%	60	74	43
		269,363	0	0	0	309,189	0	309,189	$4.11	30,754	$126,403.59	8.76	$13,481.00	7,390	211,584	27,875	239,459	77.45%	22.55%			
Twin Hills PCE -	July	0	0	0	0	14,691	0	14,691	$4.38	2,025	$8,870.11	0.00	$1,173.00	721	14,338	1,753	16,091	109.53%	-9.53%	46	79	43
Twin Hills PCE -	August	20,859	0	0	0	20,859	0	20,859	$4.38	2,175	$9,527.15	9.59	$1,768.00	728	19,566	1,743	21,309	102.16%	-2.16%	50	79	43
Twin Hills PCE -	September	22,663	0	0	0	22,663	0	22,663	$4.60	2,240	$10,305.34	10.12	$561.00	968	19,678	1,762	21,440	94.60%	5.40%	50	79	43
Twin Hills PCE -	October	26,062	0	0	0	26,062	0	26,062	$4.60	2,564	$11,795.94	10.16	$1,751.00	1,294	23,907	2,020	25,927	99.48%	0.52%	54	79	43
Twin Hills PCE -	November	29,345	0	0	0	29,345	0	29,345	$4.60	2,835	$13,042.70	10.35	$1,122.00	1,670	25,762	1,976	27,738	94.52%	5.48%	55	79	42
Twin Hills PCE -	December	30,822	0	0	0	30,822	0	30,822	$4.60	2,671	$12,288.20	11.54	$1,333.55	1,559	26,951	1,914	28,865	93.65%	6.35%	58	79	44
Twin Hills PCE -	January	29,659	0	0	0	29,659	0	29,659	$4.60	2,630	$12,099.58	11.28	$2,414.20	1,849	25,575	1,926	27,501	92.72%	7.28%	59	79	42
Twin Hills PCE -	February	0	0	0	0	27,967	0	27,967	$4.60	3,855	$17,735.31	0.00	$1,560.52	1,546	27,221	1,687	28,908	103.37%	-3.37%	58	79	42
Twin Hills PCE -	March	29,833	0	0	0	29,833	0	29,833	$4.60	3,873	$40,821.12	7.70	$1,355.81	1,578	27,237	1,850	29,087	97.50%	2.50%	55	79	42
Twin Hills PCE -	April	28,010	0	0	0	28,010	0	28,010	$4.60	2,596	$11,943.16	10.79	$3,111.00	1,149	25,678	1,699	27,377	97.74%	2.26%	54	79	43
Twin Hills PCE -	May	0	0	0	0	18,833	0	18,833	$4.60	2,596	$11,943.16	0.00	$561.26	1,142	25,108	0	25,108	133.32%	-33.32%	50	79	43
Twin Hills PCE -	June	16,615	0	0	0	16,615	0	16,615	$4.60	2,177	$10,015.51	7.63	$2,824.98	874	14,933	1,619	16,552	99.62%	0.38%	37	79	44
		233,868	0	0	0	295,358	0	295,358	$4.56	32,237	$170,387.28	7.25	$19,536.32	15,078	275,954	19,949	295,903	100.18%	-0.18%			

		Generation Data												Fuel & Non-Fuel Expenses								
Posting Description	Month	Diesel kWh Generated	Hydro kWh Generated	Other 1 kWh Generated	Other 2 kWh Generated	Total kWh Generated	Total kWh Purchased	Total kWh Available	RCA Calculated Fuel Price	Fuel Used (Gallons)	Fuel Cost	Fuel Efficiency	Non-Fuel Expenses	Unbilled kWh	Total kWh Sold	Powerhouse Consumption kWh	Total kWh Sold & Consumed	Percent Sold & Consumed	Line Loss	Peak Consumption kWh	Population	Total Customers
Togiak PCE	July	148,635	0	0	0	148,635	0	148,635	$2.62	10,734	$41,357.03	13.85	$0.00	0	169,220	2,364	171,584	115.44%	-15.44%	369	787	307
Togiak PCE	August	197,584	0	0	0	197,584	0	197,584	$2.62	14,034	$54,071.60	14.08	$0.00	0	191,521	3,096	194,617	98.50%	1.50%	472	787	305
Togiak PCE	September	212,044	0	0	0	212,044	0	212,044	$2.62	14,846	$57,200.15	14.28	$0.00	0	216,566	3,437	220,003	103.75%	-3.75%	505	787	307
Togiak PCE	October	230,549	0	0	0	230,549	0	230,549	$4.43	16,348	$64,005.69	14.10	$0.00	0	205,759	4,731	210,490	91.30%	8.70%	472	787	308
Togiak PCE - N	November	237,332	0	0	0	237,332	0	237,332	$4.43	16,365	$64,072.25	14.50	$0.00	0	230,919	4,661	235,580	99.26%	0.74%	495	787	303
Togiak PCE - D	December	248,189	0	0	0	248,189	0	248,189	$4.43	17,322	$67,819.09	14.33	$0.00	0	216,689	3,515	220,204	88.72%	11.28%	0	787	302
Togiak PCE - J	January	257,939	0	0	0	257,939	0	257,939	$4.43	19,063	$74,635.46	13.53	$0.00	0	247,635	3,137	250,772	97.22%	2.78%	558	787	302
Togiak PCE - F	February	232,372	0	0	0	232,372	0	232,372	$4.43	17,405	$68,144.06	13.35	$0.00	0	252,737	2,828	255,565	109.98%	-9.98%	509	787	305
Togiak PCE - M	March	246,086	0	0	0	246,086	0	246,086	$4.43	17,836	$69,832.00	13.80	$0.00	0	212,228	3,502	215,730	87.66%	12.34%	520	787	303
Togiak PCE - A	April	215,342	0	0	0	215,342	0	215,342	$4.43	15,710	$61,507.79	13.71	$0.00	0	225,202	3,760	228,962	106.32%	-6.32%	472	787	305
Togiak PCE	May	196,248	0	0	0	196,248	0	196,248	$4.43	16,137	$63,179.58	12.16	$0.00	0	177,464	3,075	180,539	92.00%	8.00%	462	787	303
Togiak PCE	June	171,783	0	0	0	171,783	0	171,783	$4.43	13,150	$41,454.00	13.06	$591,654.12	0	162,522	2,660	165,182	96.16%	3.84%	365	787	305
		2,594,103	0	0	0	2,594,103	0	2,594,103	$3.97	188,950	$727,278.70	13.73	$591,654.12	0	2,508,462	40,766	2,549,228	98.27%	1.73%			
Togiak PCE	July	186,513	0	0	0	186,513	0	186,513	$4.43	14,221	$44,768.00	13.12	$0.00	0	172,663	3,412	176,075	94.40%	5.60%	406	802	305
Togiak PCE	August	203,795	0	0	0	203,795	0	203,795	$4.43	16,028	$50,456.14	12.71	$0.00	0	187,396	3,926	191,322	93.88%	6.12%	452	802	303
Togiak PCE - S	September	212,504	0	0	0	212,504	0	212,504	$2.91	16,484	$51,891.63	12.89	$0.00	0	183,439	3,891	187,330	88.15%	11.85%	471	802	313
Togiak PCE	October	234,415	0	0	0	234,415	0	234,415	$2.91	18,790	$59,637.58	12.48	$0.00	0	229,395	2,529	231,924	98.94%	1.06%	497	802	310
Togiak PCE	November	250,217	0	0	0	250,217	0	250,217	$2.91	18,499	$58,713.98	13.53	$0.00	0	240,509	2,876	243,385	97.27%	2.73%	515	802	309
Togiak PCE	December	263,799	0	0	0	263,799	0	263,799	$2.91	19,606	$62,227.48	13.46	$0.00	0	249,936	3,129	253,065	95.93%	4.07%	543	802	308
Togiak PCE	January	266,204	0	0	0	266,204	0	266,204	$2.91	19,367	$61,468.92	13.75	$0.00	0	247,733	2,639	250,372	94.05%	5.95%	531	802	306
Togiak PCE	February	235,145	0	0	0	235,145	0	235,145	$2.91	17,127	$54,359.39	13.73	$0.00	0	229,204	2,343	231,547	98.47%	1.53%	505	802	308
Togiak PCE - M	March	271,704	0	0	0	271,704	0	271,704	$3.26	19,901	$63,163.78	13.65	$0.00	0	271,341	2,584	273,925	100.82%	-0.82%	0	802	306
Togiak PCE - A	April	225,405	0	0	0	225,405	0	225,405	$3.26	16,969	$53,857.91	13.28	$0.00	0	211,510	4,688	216,198	95.92%	4.08%	0	802	307
Togiak PCE - M	May	216,012	0	0	0	216,012	0	216,012	$3.26	16,415	$52,099.57	13.16	$0.00	0	208,537	3,930	212,467	98.36%	1.64%	0	802	312
Togiak PCE - J	June	206,113	0	0	0	206,113	0	206,113	$3.26	14,843	$49,311.00	13.89	$665,838.50	0	193,521	3,170	196,691	95.43%	4.57%	0	802	310
		2,771,826	0	0	0	2,771,826	0	2,771,826	$3.28	208,250	$661,955.38	13.31	$665,838.50	0	2,625,184	39,117	2,664,301	96.12%	3.88%			
Togiak PCE - J	July	263,885	0	0	0	263,885	0	263,885	$3.26	19,223	$63,863.00	13.73	$0.00	0	255,285	3,820	259,105	98.19%	1.81%	0	820	318
Togiak PCE - A	August	269,147	0	0	0	269,147	0	269,147	$3.26	19,942	$66,251.31	13.50	$0.00	0	259,814	3,494	263,308	97.83%	2.17%	0	820	318
Togiak PCE - S	September	232,552	0	0	0	232,552	0	232,552	$3.26	17,670	$58,703.27	13.16	$0.00	0	233,898	2,810	236,708	101.79%	-1.79%	0	820	318
Togiak PCE- O	October	239,611	0	0	0	239,611	0	239,611	$3.26	17,132	$56,201.53	13.99	$0.00	0	221,414	2,997	224,411	93.66%	6.34%	0	820	317
Togiak PCE	November	250,823	0	0	0	250,823	0	250,823	$3.26	17,951	$58,888.26	13.97	$0.00	0	241,396	2,458	243,854	97.22%	2.78%	0	820	318
Togiak PCE-D	December	265,950	0	0	0	265,950	0	265,950	$3.26	20,044	$65,754.34	13.27	$0.00	0	256,277	2,283	258,560	97.22%	2.78%	0	820	316
Togiak PCE- J	January	290,675	0	0	0	290,675	0	290,675	$3.26	20,437	$67,045.62	14.22	$0.00	0	257,629	2,921	260,550	89.64%	10.36%	0	820	316
Togiak PCE - F	February	244,059	0	0	0	244,059	0	244,059	$3.26	17,196	$56,413.20	14.19	$0.00	0	232,590	2,540	235,130	96.34%	3.66%	0	820	317
Togiak PCE - M	March	260,421	0	0	0	260,421	0	260,421	$3.26	18,394	$60,343.36	14.16	$0.00	0	243,624	2,379	246,003	94.46%	5.54%	0	820	321
Togiak PCE - A	April	247,682	0	0	0	247,682	0	247,682	$3.26	17,403	$57,092.28	14.23	$0.00	0	247,235	2,526	249,761	100.84%	-0.84%	0	820	318
Togiak PCE - M	May	245,071	0	0	0	245,071	0	245,071	$3.26	17,736	$58,184.72	13.82	$0.00	0	227,019	2,714	229,733	93.74%	6.26%	0	820	319
Togiak PCE - J	June	235,200	0	0	0	235,200	0	235,200	$3.26	16,872	$67,444.13	13.94	$737,788.32	0	230,597	2,542	233,139	99.12%	0.88%	0	820	317
		3,045,076	0	0	0	3,045,076	0	3,045,076	$3.26	220,000	$736,185.02	13.84	$737,788.32	0	2,906,778	33,484	2,940,262	96.56%	3.44%			

Posting Description	Month	Diesel kWh Generated	Hydro kWh Generated	Other 1 kWh Generated	Other 2 kWh Generated	Total kWh Generated	Total kWh Purchased	Total kWh Available	RCA Calculated Fuel Price	Fuel Used (Gallons)	Fuel Cost	Fuel Efficiency	Non-Fuel Expenses	Unbilled kWh	Total kWh Sold	Powerhouse Consumption kWh	Total kWh Sold & Consumed	Percent Sold & Consumed	Line Loss	Peak Consumption kWh	Population	Total Customers
Togiak PCE-JU	July	299,763	0	0	0	299,763	0	299,763	$3.26	21,406	$88,858.45	14.00	$0.00	0	266,781	3,894	270,675	90.30%	9.70%	0	817	205
Togiak PCE- A	August	257,536	0	0	0	257,536	0	257,536	$3.26	20,951	$86,969.70	12.29	$0.00	0	255,001	3,939	258,940	100.55%	-0.55%	0	817	285
Togiak PCE - S	September	222,821	0	0	0	222,821	0	222,821	$4.64	16,176	$67,148.19	13.77	$0.00	0	224,820	2,889	227,709	102.19%	-2.19%	0	817	316
Togiak PCE - C	October	232,469	0	0	0	232,469	0	232,469	$4.64	17,621	$71,958.88	13.19	$0.00	0	228,369	2,911	231,280	99.49%	0.51%	0	817	319
Togiak PCE - N	November	273,434	0	0	0	273,434	0	273,434	$4.64	19,637	$80,191.62	13.92	$0.00	0	263,270	2,987	266,257	97.38%	2.62%	0	817	320
Togiak PCE - D	December	270,248	0	0	0	270,248	0	270,248	$4.64	21,690	$67,699.58	12.46	$0.00	0	259,084	2,381	261,465	96.75%	3.25%	0	817	316
Togiak PCE - J	January	311,440	0	0	0	311,440	0	311,440	$4.64	22,478	$91,791.16	13.86	$0.00	0	293,161	2,760	295,921	95.02%	4.98%	0	817	321
Togiak PCE - F	February	254,227	0	0	0	254,227	0	254,227	$4.64	18,165	$74,178.59	14.00	$0.00	0	244,153	2,486	246,639	97.02%	2.98%	0	817	317
Togiak PCE - M	March	266,508	0	0	0	266,508	0	266,508	$4.64	19,724	$80,544.93	13.51	$0.00	0	259,828	2,656	262,484	98.49%	1.51%	0	817	318
Togiak PCE - A	April	237,043	0	0	0	237,043	0	237,043	$4.64	15,781	$64,444.87	15.02	$0.00	0	224,878	2,604	227,482	95.97%	4.03%	0	817	315
Togiak PCE - M	May	216,538	0	0	0	216,538	0	216,538	$4.64	16,035	$65,482.13	13.50	$0.00	0	207,713	2,498	210,211	97.08%	2.92%	0	817	319
Togiak PCE - J	June	225,871	0	0	0	225,871	0	225,871	$4.64	16,230	$69,285.87	13.92	$708,976.15	0	213,341	2,919	216,260	95.74%	4.26%	0	817	319
		3,067,898	0	0	0	3,067,898	0	3,067,898	$4.41	225,894	$908,553.97	13.58	$708,976.15	0	2,940,399	34,924	2,975,323	96.98%	3.02%			
Togiak PCE - J	July	287,213	0	0	0	287,213	0	287,213	$4.18	21,351	$89,332.58	13.45	$0.00	0	275,060	3,977	279,037	97.15%	2.85%	0	842	316
Togiak PCE - A	August	267,971	0	0	0	267,971	0	267,971	$4.18	19,466	$81,445.74	13.77	$0.00	0	254,638	3,646	258,284	96.39%	3.61%	0	842	317
Togiak PCE - S	September	228,815	0	0	0	228,815	0	228,815	$4.18	16,054	$67,107.18	14.25	$0.00	0	216,906	3,047	219,953	96.13%	3.87%	0	842	315
Togiak PCE- O	October	247,710	0	0	0	247,710	0	247,710	$4.64	17,774	$76,088.72	13.94	$0.00	0	231,297	3,893	235,190	94.95%	5.05%	0	842	313
Togiak PCE- N	November	251,751	0	0	0	251,751	0	251,751	$4.64	20,118	$86,123.15	12.51	$0.00	0	239,429	3,817	243,246	96.62%	3.38%	0	842	323
Togiak PCE - D	December	275,836	0	0	0	275,836	0	275,836	$4.64	29,745	$127,335.37	9.27	$0.00	0	261,235	3,975	265,210	96.15%	3.85%	0	842	317
Togiak PCE - J	January	282,667	0	0	0	282,667	0	282,667	$3.39	19,788	$84,710.45	14.28	$0.00	0	267,312	4,233	271,545	96.07%	3.93%	0	842	316
Togiak PCE - F	February	263,357	0	0	0	263,357	0	263,357	$3.39	17,964	$76,902.09	14.66	$0.00	0	248,348	2,817	251,165	95.37%	4.63%	0	842	314
Togiak PCE - M	March	259,885	0	0	0	259,885	0	259,885	$3.39	18,722	$80,147.01	13.88	$0.00	0	245,504	2,301	247,805	95.35%	4.65%	0	842	315
Togiak PCE - A	April	247,267	0	0	0	247,267	0	247,267	$3.39	17,461	$74,748.79	14.16	$0.00	0	250,392	2,344	252,736	102.21%	-2.21%	0	842	321
Togiak PCE - M	May	228,441	0	0	0	228,441	0	228,441	$3.39	17,533	$75,057.02	13.03	$0.00	0	218,021	2,802	220,823	96.67%	3.33%	0	842	318
Togiak PCE - J	June	216,707	0	0	0	216,707	0	216,707	$3.39	16,272	$0.00	13.32	$0.00	0	207,924	2,878	210,802	97.28%	2.72%	0	842	315
		3,057,620	0	0	0	3,057,620	0	3,057,620	$3.90	232,248	$918,998.10	13.17	$0.00	0	2,916,066	39,730	2,955,796	96.67%	3.33%			

APPENDIX E

COMMUNITY CORRESPONDENCE

MEMORANDUM OF UNDERSTANDING
BETWEEN
THE TWIN HILLS VILLAGE COUNCIL
AND
ALASKA VILLAGE ELECTRIC COOPERATIVE, INC.

The parties authorized to act on behalf of Alaska Electric Cooperative, Inc. and the Twin Hills Village Council hereby agrees as follows:

1. The parties agree that it is in the public interest for the State of Alaska to construct an electric intertie between Twin Hills and Togiak. AVEC is the certificated electric utility for Togiak.

2. Once such an intertie is constructed, AVEC is willing in principle to add Twin Hills to AVEC's certificated service area and to accept Twin Hills' electric customers as members of AVEC.

3. AVEC's willingness to add Twin Hills to the AVEC system is subject to certain conditions, including but not limited to: (a) negotiation and approval of an acceptable purchase and sale agreement by AVEC's Board of Directors and the Twin Hills Village Council; (b) AVEC's satisfaction with the results of any due diligence investigation AVEC conducts; (c) the parties' agreement on a purchase price (that in any event would be no more than the net book value of the City's electric utility assets less any costs of operational or safety improvements to be performed by AVEC); (d) securing the approval of the Regulatory Commission of Alaska.

4. The only remedy available to a party for an alleged breach of this Memorandum shall be the cancellation of the Memorandum. Nothing in this Memorandum obligates either party to expend any funds or undertake any particular project contemplated herein.

Twin Hills Village Council

By: John W. Sharp
John W. Sharp
Council President

Date: 12-18-13

Alaska Village Electric Cooperative,

By: Meera Kohler
Meera Kohler
Chief Executive Officer

Date: December 18, 2013

fs/AVEC/GenAdv/12-9-13

Twin Hills Village Council

P. O. Box TWA
Twin Hills, AK 99576-8996
Phone: (907) 525-4821 | Fax: (907) 525-4822 | E-mail:William15@starband.net

fax

TO:	Alan Fetters	FROM:	William Ilutsik
FAX:	907-269-3044	PAGES:	2 including cover
PHONE:	907-771-3063	DATE:	8/18/2011
RE:	Resolution	CC:	

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Comments:

Hi Alan,

The Council had a special meeting to address this developing project and they stressed the importance of proceeding with the RPSU CDR. It was passed unanimously.

Sincerely,

William Ilutsik, V. P. THVC

ORIGINAL IS IN THE MAIL.

Twin Hills Village Council
RESOLUTION No. 2011-11

A RESOLUTION OF THE TWIN HILLS VILLAGE COUNCIL ON BEHALF OF THE RESIDENTS OF TWIN HILLS AUTHORIZING THE COUNCIL TO REQUEST FUNDING FROM THE ALASKA ENERGY AUTHORITY RURAL POWER SYSTEM UPGRADE (RPSU) PROGRAM FOR DEVELOPMENT OF AN RPSU CONCEPT DESIGN FOR THE COMMUNITY OF TWIN HILLS AND AUTHORIZING THE COUNCIL PRESIDENT TO EXECUTE ANY SUBSEQUENT DOCUMENTS NECESSARY TO SECURE FUNDS FOR THE PROJECT.

WHEREAS, Twin Hills Village Council is authorized to provide electric power to the community of Twin Hill under Certificate of Public Convenience and Necessity, CPC&N No.729, issued by the Regulatory Commission of Alaska, and

WHEREAS, it is recognized that the residents and infrastructure in the community of Twin Hills are dependent on the electric utility to operate in a cost effective and reliable manner, and

WHEREAS, the Alaska Energy Authority has recently completed a Bulk Fuel Upgrade project in Twin Hills that provides long term, reliable fuel storage and handling infrastructure, and

WHEREAS, the Alaska Energy Authority has identified the community of Twin Hills as a priority for development of a Rural Power System Upgrade Concept Design Report, and

WHEREAS, the existing Twin Hills diesel power plant and electric distribution system is antiquated and in need of upgrade and replacement, and

WHEREAS, a Heat Recovery Study has been completed that identifies potential to utilize available recovered heat from the existing Twin Hills diesel power plant to reduce heating fuel consumption of nearby community buildings, and

WHEREAS, there is potential to electrically intertie the communities of Togiak and Twin Hills, which would provide for long term, reliable power for the community of Twin Hills, and

WHEREAS, the Council desires to evaluate the costs and benefits of locally generating electric power compared to receiving electric power from Togiak via an electric intertie, and

WHEREAS, it is in Council's and the community of Twin Hills' best interests to improve the efficiency and reduce the cost of electricity, and to help reduce the community's reliance on diesel fuel, and

WHEREAS, the Council ranks this project as one of the highest priorities in the comprehensive development of the community; and the Council is in good standing with respect to its existing credit and Federal Tax Obligations, NOW THEREFORE,

BE IT RESOLVED, that it is the determination of this body to request a Rural Power System Upgrade Concept Design Report be prepared for Twin Hills to help reduce the community's dependency on diesel fuel, to upgrade our electrical system to a modern, safe, and more efficient standard in accordance with RUS standards, and that the Village Council President, John Sharp, or their designee, is authorized and empowered to act as the lead contact in this project, and to execute and submit any subsequent documents on behalf of the Council to secure grant funding for the project.

Passed on this 17th day ofAugust, 2011, by the action of the members of Twin Hills Village Council.

CERTIFICATE

The Undersigned, John W. Sharp, president of Twin Hills Village Council, does hereby certify that at a meeting of the Twin Hills Village Council duly called and held on the 17th day of August, 2011 at Twin Hills, which a quorum was at all times present and voting, the foregoing resolution was duly adopted.

Dated this 17th day of August, 2011, at Twin Hills, Alaska.

SIGNED: John W. Sharp
President, John W. Sharp

Twin Hills Village Council

P. O. Box TWA
Twin Hills, AK 99576-8996
Phone: (907) 525-4821 | Fax: (907) 525-4822 | E-mail:William15@starband.net

fax

TO:	Alan Fetters, Project Manager, AEA	FROM:	William Ilutsik V.P.
FAX:	907-~~269~~ 771-3044	PAGES:	2 inc. cover
PHONE :		DATE:	9/14/2012
RE:	Underground Distribution System	CC:	

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Comments:

Have a nice day and weekend.

Twin Hills Village Council
P. O. Box TWA
Twin Hills, AK 99576-8996
Phone: (907) 525-4821
Fax: (907) 525-4822
E-mail: william15@starband.net

September 14, 2012

Mr. Alan Fetters
Project Manager
Alaska Energy Authority
813 West Northern Lights Blvd.
Anchorage, AK 99503

RE: Underground Distribution System

Dear Alan:

The Twin Hills Village Council has decided that an underground distribution system is preferable than overhead. The Council requests that the Alaska Energy Authority consider this option during the preparation of the conceptual design report.

Thanks for your consideration.

Sincerely,

John W. Sharp, President

Twin Hills Village Council

P. O. Box TWA
Twin Hills, AK 99576-8996
Phone: (907) 525-4821 | Fax: (907) 525-4822 | E-mail:William15@starband.net

fax

TO:	Bill Price, Project Engineer	FROM:	William Ilutsik, V.P.
FAX:	(907) 349-8001	PAGES:	3 inc. cover
PHONE:	(907) 349-0100	DATE:	12/18/2013
RE:	Local Available Heavy Equipment/Labor pool.	CC:	

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Comments:

HI Bill,

I filled out the list with the best of my knowledge.

Questions, call me (907) 525-4821 or email me william15@starband.net

Sincerely,

William Ilutsik, V.P.

TWIN HILLS POWER PLANT UPGRADE PROJECT
LOCALLY AVAILABLE EQUIPMENT LIST

OWNER	MAKE	MODEL	YEAR	CAPACITY (YDS, TONS)	ATTACHMENTS - (BACK-HOE, FORKS, AUGER, ETC..)	CONDITION, COMMENTS
DUMP TRUCKS						
THVC	Freight-liner	SD114	2012	54000 LBS		NEW
DOZERS						
THVC	Komatsu	37 PX-2	2003			GOOD
LOADERS						
THVC	John Deere	544G	1994		Fork	GOOD
TRACK HOES (EXCAVATORS)						
THVC	John Deere	200 C LC	1993		LOADER	GOOD
THVC	John Deere	410D	2007			GOOD
SKID-STEERS (BOBCATS)						
CRANES						

TWIN HILLS POWER PLANT UPGRADE PROJECT
LOCAL LABOR POOL

Name	Laborer	Truck Driver	Heavy Equip Operator	Heavy Equip Mechanic	Welders Helper	Certified Welder (1)	Apprentice Electrician	Journeyman Electrician (2)
Julius Henry		✓	✓					
Tim Wanhola		✓	✓					
Wilbur Sharp		✓	✓					
William Page	✓							
Roger Dillard	✓					✓		
Lester Henry	✓							
JAMES KuKu	✓							

1) With Current API Welding Certificate
2) With Current Certificate of Fitness

12/10/2013