



January 25, 2013

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**Ex Parte**

Ms. Marlene H. Dortch  
Secretary  
Federal Communications Commission  
445 12th Street, SW  
Washington, DC 20554

Katie King  
Telecommunications Access Policy Division  
Wireline Competition Bureau  
Federal Communications Commission  
445 12th Street, SW  
Washington, DC 20554

Re: *Connect America Fund, WC Docket No. 10-90*

Dear Ms. Dortch and Ms. King:

On behalf of General Communication, Inc. (“GCI”), the undersigned counsel submits this *ex parte* letter and the attached maps pursuant to the *Second Protective Order*.<sup>1</sup> As required by the *Order*, we have requested and received written approval to designate a portion of the attached presentation as Highly Confidential.<sup>2</sup> Pursuant to the *Order*, we submit (a) one copy of the filing containing Highly Confidential Information to the Secretary’s Office along with this cover letter; (b) two copies of the filing in redacted form to the Secretary’s Office along with the redacted cover letter; and (c) two copies of the filing containing Highly Confidential information to Katie King, of the Telecommunications Access Policy Division of the Wireline Competition Bureau. We will also file a redacted copy of this letter via ECFS.

On January 23, 2013, Christopher Nierman, of GCI, and Michael Carlson and I, representing GCI, along with Giulia McHenry and Bill Zarakas of the Brattle Group, met with several members of the Commission’s staff to present the Brattle Group’s model of the incremental costs of upgrading Alaska to 768 kilobits per second (kbps) downlink and 256 kbps

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<sup>1</sup> See *Connect America Fund, High-Cost Universal Service Support, Second Protective Order*, DA 12-192, 27 FCC Rcd. 1494 (2012).

<sup>2</sup> This permission was granted in an email message from Katherine King, of the Telecommunications Access Policy Division of the Wireline Competition Bureau, sent on January 24, 2013.

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uplink mobile voice and broadband service. Attendees from the Commission's staff included Paul LaFontaine, Paroma Sanyal, William Sharkey, and Jonathan Chambers, of the Office of Strategic Planning and Policy Analysis; Alec MacDonnell, Katie King, Talmage Cox, and Susan Lee, of the Wireline Competition Bureau; Scott Patrick, Aleksandr Yankelevich, Martha Stancill, Erik Salovaarz, Margaret Wiener, Kelly Quinn, Ziad Sleem, Kathy Harris, Susan Singer, and Rita Cook Meyer, of the Wireless Telecommunications Bureau; and Jennifer Tatel, of the Office of General Counsel.

As GCI has explained in prior meetings and comments,<sup>3</sup> Alaska's rural communities will require significant support to upgrade all of Alaska to mobile broadband data speeds of 768/256 kbps service. During the January 23rd meeting, GCI and the Brattle Group presented the Brattle Group's cost estimates of doing so and explained the assumptions underlying the Brattle Group's cost model. Following the presentation, GCI and the Brattle Group fielded questions on the Brattle Group's cost estimates. A copy of the presentation is attached to this document.

Sincerely,



John T. Nakahata  
*Counsel to General Communication, Inc.*

cc: Susan Singer  
Jonathan Chambers  
Rita Cook Meyer  
Talmage Cox  
Kathy Harris  
Paul LaFontaine  
Susan Lee  
Alec MacDonnell  
Kelly Quinn

Scott Patrick  
Erik Salovaarz  
Paroma Sanyal  
William Sharkey  
Ziad Sleem  
Martha Stancill  
Jennifer Tatel  
Margaret Wiener  
Aleksandr Yankelevich

Enclosure

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<sup>3</sup> See, e.g., Reply Comments of General Communication, Inc. on Mobility Fund Phase II, WC Docket No. 10-90, WT Docket No. 10-208 (filed Jan. 7, 2013); Comments of General Communication, Inc. on Mobility Fund Phase II, WC Docket No. 10-90, WT Docket No. 10-208 (filed Dec. 21, 2012).

# Alaska Mobile Broadband Cost Model

## Model Overview and Summary of Results

**William Zarakas  
Giulia McHenry**

**January 2013**

- ◆ Alaska's unique geography and demographics necessitate using a state specific model in order to accurately estimate the cost of providing mobile broadband to targeted areas.
  - Sparsely populated with limited road system;
  - Many communities are remote, disconnected from state-wide road system;
  - Wireline backhaul options are limited.
  
- ◆ The Alaska-specific model uses census block, population and road mile data (from U.S. census), and existing cell site locations and backhaul options. It also uses state-specific historic and projected per unit capital and O&M costs.
  - Differentiates upgrade vs. "from scratch" capital costs and O&M costs;
  - Differentiates between satellite, fiber, microwave and TERRA backhaul costs;
  - Also estimates marginal revenues.
  
- ◆ Cost estimates are presented for individual or aggregated geographic areas.
  
- ◆ Cost assumptions are set at default values (i.e., based on historic GCI incurred costs), and can be modified by user.

# Estimating The Cost Of Providing Mobile Broadband

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Coverage

## ◆ Coverage Analysis:

- Identify census blocks to be upgraded or newly served;
- Start with existing wireless carrier cell site locations; determine overlap and duplication; identify existing wireless cell sites and non-wireless telecommunications locations to be upgraded;<sup>1</sup>
- Estimate new cell sites required to serve currently un-served areas based on coverage characteristics of existing cell site network.

Unit Costs

## ◆ Unit Cost Analysis:

- Capital cost for network and cell site based on engineering estimates for upgrades and new build-outs; also capital costs for VSAT ground stations and satellite HUB iDirect.
- Ongoing O&M costs (5 year PV) on an incremental basis for upgrades and total cost for new cell sites and network also based on engineering estimates; also O&M for satellite backhaul (VSAT ground stations).

## ◆ Backhaul Analysis:

- Based on estimates of 1) required bandwidth and 2) engineering cost estimates for terrestrial and satellite options.

## ◆ Undersea Transport Analysis:<sup>2</sup>

- Based on estimates of required bandwidth and current lease rates.

<sup>1</sup> Targeted service levels for wireless broadband are at least 768 kbps downlink/256 kbps uplink on average in the coverage area.

<sup>2</sup> Undersea transport cost reflects cost of connecting with lower 48 states and is, therefore, factored in separately.

# Cost Model Process Flow

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## Coverage Analysis

### Alaska Census Block and Site Data Set

Census Block Coordinates  
C.B. Population  
C.B. Road Miles  
GCI Wireless Site Coordinates  
Other Carrier Wireless Site Coordinates  
GCI (Non-Wireless) Areas of Presence

- **Census Block Analysis**
- **Unserved 3G Area Analysis**
- **Overlap Analysis**
- **Assumptions**

## Summary of Cost Model Alaska Mobile Wireless Broadband Build-Out

## Unit Cost Analysis

### Capital Cost - Wireless Cell Site Costs

(Upgrade new construction and centralized MSC server)

### O&M Expenses - Wireless Cell Site Costs

### Backhaul Costs - Satellite

(Upgrade and New VSAT, iDirect Hub)

### Backhaul Costs - Terrestrial

(Microwave T1 and T3, Fiber T1 and T3, Terra and Fiber 1 Mbps)

### Transport Costs

## Model Output

### Currently Unserved / Areas of Presence

### Additional Currently Served Census Blocks

### FCC Eligible Census Blocks

Borough/Census Area

Current Sites

New Sites

Upgrade (To 3G) Cost

New Site Cost

Site O&M

Backhaul Cost - Satellite

Backhaul Cost-Terrestrial

Transport Cost

# Coverage Analysis

## Geographic Scope

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### Matrix of Alaska Census Blocks Alaska Mobile Wireless Broadband Build-Out

	No Wireline Telecom / No Wireless	Wireline Telecom / No Wireless	Current Service < 768 kbps down / 256 kbps up	Current Service at 768 kbps down / 256 kbps up	Total	%
FCC Eligible List	2,728	1,541	3,798	79	8,146	18%
Non-FCC List - Current Service At 768 kbps down / 256 kbps up				14,152	14,152	31%
Non-FCC List - Current Service < 768 kbps down / 256 kbps up			6,607		6,607	15%
Non-FCC List - No Wireless / Telecom Presence		2,760			2,760	6%
Non-FCC List - No Telecom Presence	13,627				13,627	30%
Total	16,355 36%	4,301 9%	10,405 23%	14,231 31%	45,292 100%	100%

Source: U.S. Census Bureau 2010 Census; GCI Cell Site Data; Carrier Cell Sites from FCC ULS database; Brattle Analysis.



17,434 census blocks (38% of state total)  
~122,000 people covered (~17% of state Pop)

~586,000 people (~82%) already covered with mobile broadband  
13,627 census blocks (~60% of area but ~0.3% of pop) left un-served

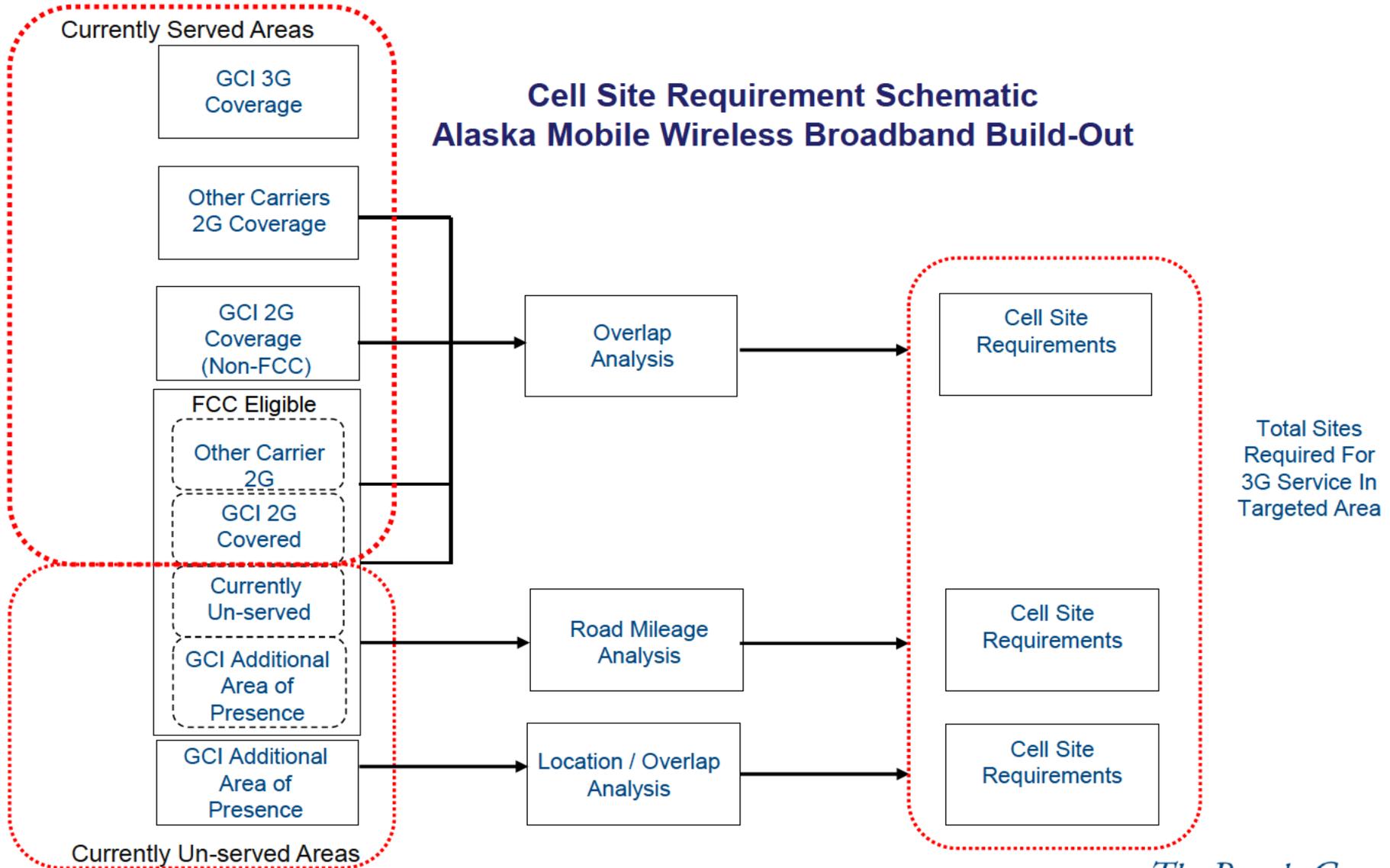
# Coverage Analysis

## Cell Site Requirements

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### Cell Site Requirement Schematic Alaska Mobile Wireless Broadband Build-Out



# Unit Cost Elements

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## Summary of Cost Areas For Upgrading / Building-Out Alaska Mobile Wireless Broadband Build-Out<sup>1</sup>

	Network Element	Comment	Capital Costs	O&M Expenses
Cell Sites	Existing 2G Cell Site	Upgrade To 3G	Equipment and other upgrade costs	Electric power, leases and maintenance
	New 3G Cell Site	Build For 3G Requirements	Facilities, equipment, electrical and labor related costs	Electric power, leases and maintenance
	Central Network Controls	Located at Network Control Area	MSC server	Electric power, leases and maintenance
Backhaul	Satellite Backhaul	Transport leased on Satellite	Upgrade Remote VSAT Ground Station from 2G to 3G Site or New Remote VSAT Ground Station for New 3G Site. Also, cost of materials, equipment, installation and labor of HUB iDirect for satellite	Cost of leasing satellite transponders
Backhaul	Terrestrial Backhaul	Leasing of terrestrial based (microwave or fiber) transport	None; leasing arrangement on microwave and	Cost of leasing ethernet capacity

<sup>1</sup> Targeted service levels for wireless broadband are at least 768 kbps downlink/256 kbps uplink on average in the coverage area, which we also refer to as "3G" for the purposes of this analysis. "2G" represents speeds of less than 768 kbps downlink/256 uplink at the center of the cell site.

**Model output presents Alaska-specific cost analysis at disaggregate as well as aggregated levels:**

- ◆ Cost by disaggregate geographic area (census block, census area and/or borough).
- ◆ Cost by aggregated geographic segments (FCC's list of potentially eligible CBs, other areas but wireless presence, other areas with non-wireless telecom presence).
- ◆ Cost by cost element (cell site capex and O&M, network costs and backhaul, terrestrial and satellite).
- ◆ Cost by key statistics (population, road miles, area covered).

# Representative Output Table

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**Table VII-4** Capital Costs and Present Value of O&M Costs  
For FCC Eligible Areas  
 (Excluding Bandwidth Costs)

Borough / Census Area	Total FCC Eligible Sites									
	Terrestrial Sites		Satellite Sites		Capital			Present Value (5 years) of O&M		
	Sites	Population Covered	Sites	Population Covered	All Cell Sites Cost \$	Satellite VSAT Cost \$	Total \$	All Cell Sites Cost \$	Satellite VSAT Cost \$	Total \$
Aleutians East	0	0	8	3,089						
Aleutians West	0	0	11	5,556						
Anchorage	14	455	0	0						
Bethel	37	15748	2	226						
Bristol Bay	5	997	0	0						
Denali	13	903	0	0						
Dillingham	14	4814	0	0						
Fairbanks North Star	13	523	0	0						
Haines	6	1338	0	0						
Hoonah-Angoon	10	776	0	0						
Juneau	4	106	0	0						
Kenai Peninsula	18	1745	2	516						
Ketchikan Gateway	14	30	0	0						
Kodiak Island	5	864	0	88						
Lake and Peninsula	11	861	9	680						
Matanuska-Susitna	4	868	0	0						
Nome	0	0	32	9,471						
North Slope	7	51	36	6,703						
Northwest Arctic	0	0	20	6,881						
Petersburg	5	717	0	0						
Prince of Wales-Hyder	15	2253	0	0						
Sitka	1	56	0	0						
Skagway	3	31	0	0						
Southeast Fairbanks	24	1038	5	258						
Valdez-Cordova	55	738	0	0						
Wade Hampton	19	6817	2	513						
Wrangell	1	592	0	0						
Yakutat	0	0	3	661						
Yukon-Koyukuk	14	1345	34	3,970						
<b>Total</b>	312	43,664	164	38,613	145,379,720	7,406,240	152,785,960	71,468,716	8,656,308	80,125,024

# Capital Costs

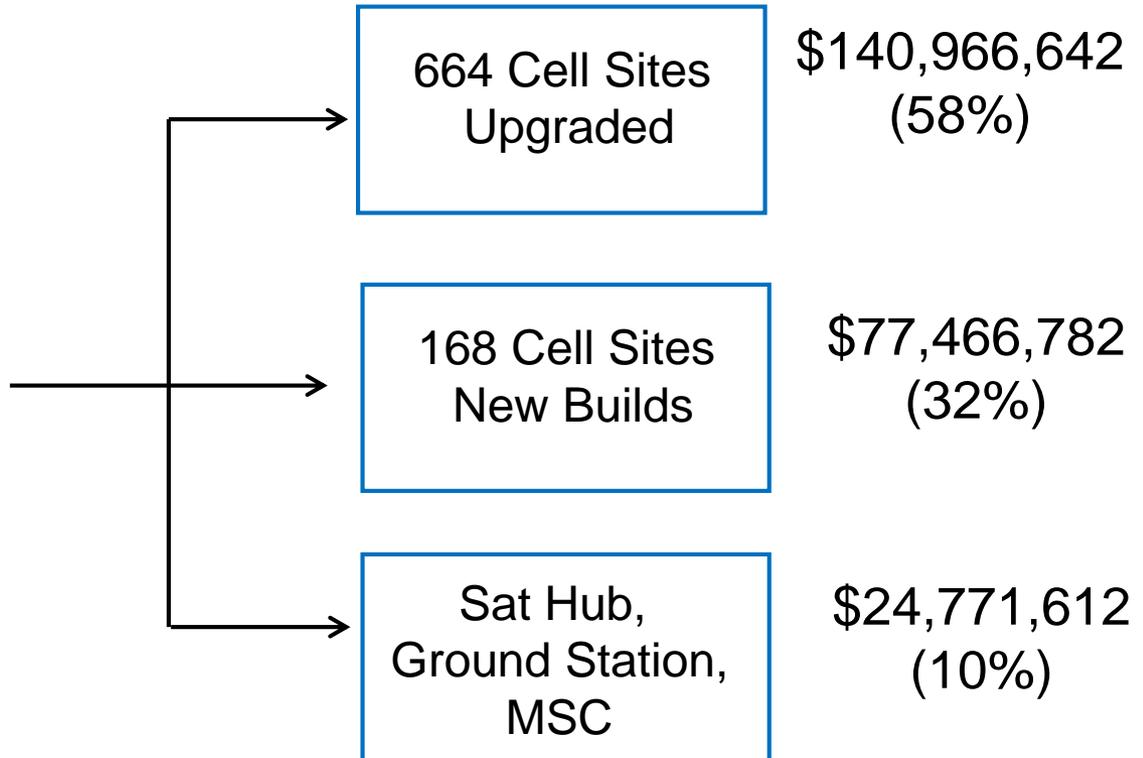
## Total Capital Costs Alaska Mobile Wireless Broadband Build-Out

17,434 census blocks  
~122,000 people covered

### Excludes:

Previously served:  
14,152 census blocks,  
~586,000 pops

Remaining unserved:  
13,627 census blocks,  
~1,900 pops



Total Capital Cost: **\$243,205,036**

Total Upgraded / New sites: 832

# Capital Costs Geographic Breakdown

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## Mobile Broadband Build-Out Capital Costs

	No Wireline Telecom / No Wireless	Wireline Telecom / No Wireless	Current Service < 768 kbps down / 256 kbps up	Total	%
FCC Eligible List	\$80,266,702	\$29,987,046	\$42,532,211	\$152,785,960	63%
Non-FCC List - Current Service < 768 kbps down / 256 kbps up			\$53,780,053	\$53,780,053	22%
Non-FCC List - No Wireless / Telecom Presence		\$21,712,292		\$21,712,292	9%
Total excl Common Network Costs	\$80,266,702	\$51,699,338	\$96,312,264	\$228,278,304	94%
Common Network Costs (Satellite iHub + MSC)				\$14,926,732	6%
<b>Total</b>				<b>\$243,205,036</b>	<b>100%</b>
% of Total	33%	21%	40%	100%	

Source: U.S. Census Bureau 2010 Census; GCI Cell Site Data; Carrier Cell Sites from FCC ULS database; Brattle Analysis.

# O&M Costs (Excluding Backhaul)

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- ◆ Key O&M costs are primarily monthly or annual expenses associated with electric power, leases and maintenance; model includes PV of 5 years of O&M discounted at 7.5%.

## Mobile Broadband Build-Out O&M Costs

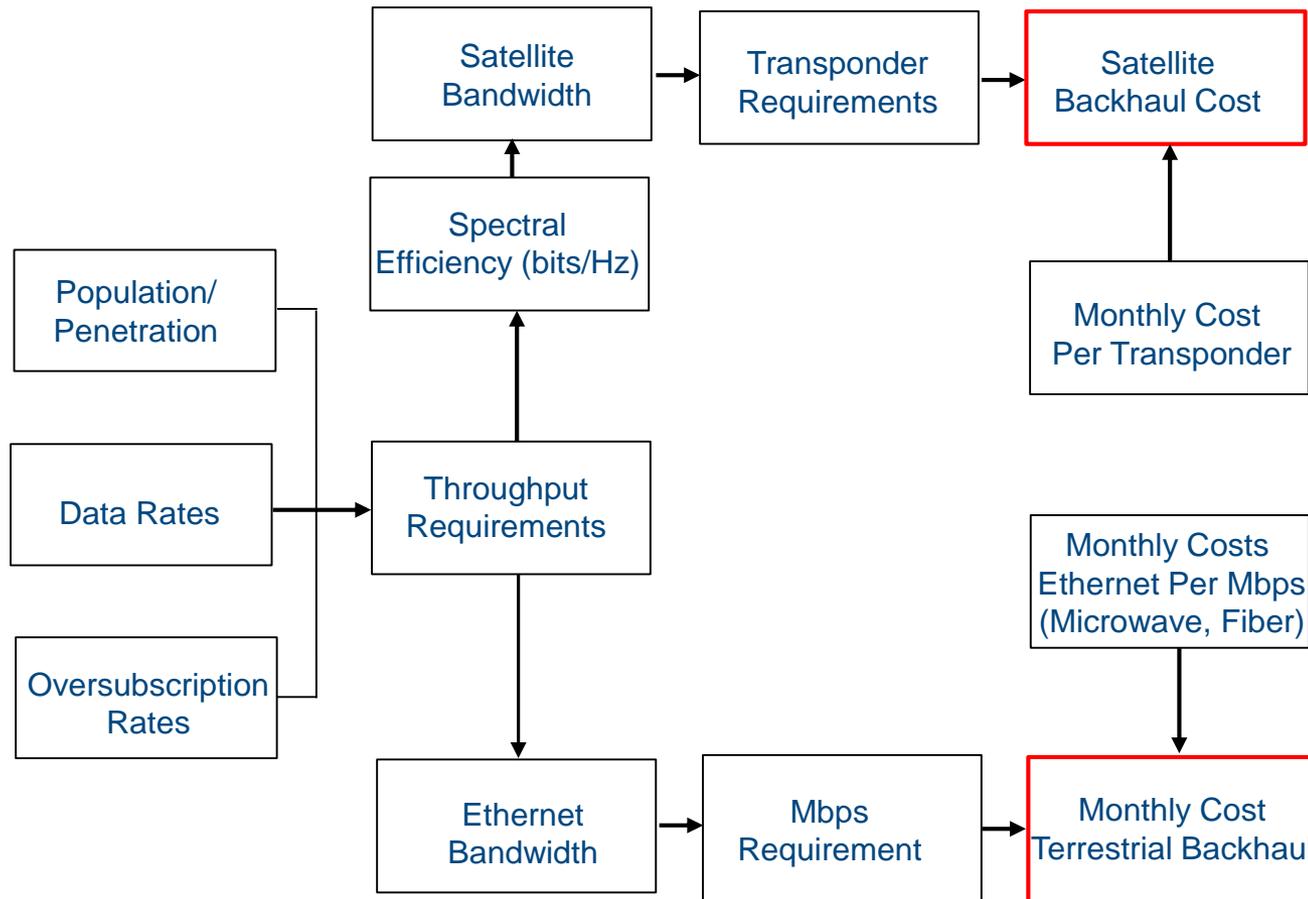
	PV O&M Costs	(%)
Upgraded Cell Sites	\$74,634,157	67%
New Build Cell Sites	\$36,385,272	33%
Common Network Cost	\$41,976	0%
<b>Total</b>	<b>\$111,061,405</b>	<b>100%</b>

	No Wireline Telecom / No Wireless	Wireline Telecom / No Wireless	Current Service < 768 kbps down / 256 kbps up	Total	%
FCC Eligible List	\$36,385,272	\$11,736,384	\$23,347,060	\$71,468,716	64%
Non-FCC List - Current Service < 768 kbps down / 256 kbps up			\$30,881,793	\$30,881,793	28%
Non-FCC List - No Wireless / Telecom Presence		\$8,668,920		\$8,668,920	8%
Total excl. Common Network Cost	\$36,385,272	\$20,405,304	\$54,228,853	\$111,019,429	100%
Common Network Costs (MSC)				\$41,976	0%
Total				\$111,061,405	100%
% of Total	33%	18%	49%	100%	

Source: U.S. Census Bureau 2010 Census; GCI Cell Site Data; Carrier Cell Sites from FCC ULS database; Brattle Analysis.

Note: These reflect O&M costs and Satellite VSAT costs. It does not include bandwidth costs.

## Determination of Backhaul Costs Alaska Mobile Wireless Broadband Build-Out



# Backhaul Costs

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- ◆ Backhaul costs are a function of the least cost available option: 614 cell sites use terrestrial based backhaul (i.e., fiber, microwave or TERRA) and 218 cell sites use satellite backhaul

## Mobile Broadband Build-Out Backhaul Costs

	PV Backhaul Costs	(%)
Microwave	\$37,791,239	16%
Satellite	\$82,844,960	34%
Terra	\$113,608,448	47%
Fiber	\$7,692,923	3%
<b>Total</b>	<b>\$241,937,569</b>	<b>100%</b>

	No Wireline Telecom / No Wireless	Wireline Telecom / No Wireless	Current Service < 768 kbps down / 256 kbps up	Total	%
FCC Eligible List	\$11,688,019	\$17,598,215	\$176,732,171	\$206,018,405	85%
Non-FCC List - Current Service < 768 kbps down / 256 kbps up			\$26,545,811	\$26,545,811	11%
Non-FCC List - No Wireless / Telecom Presence		\$9,373,353		\$9,373,353	4%
<b>Total</b>	<b>\$11,688,019</b>	<b>\$26,971,569</b>	<b>\$203,277,982</b>	<b>\$241,937,569</b>	<b>100%</b>
% of Total	5%	11%	84%	100%	

Source: U.S. Census Bureau 2010 Census; GCI Cell Site Data; Carrier Cell Sites from FCC ULS database; Brattle Analysis.

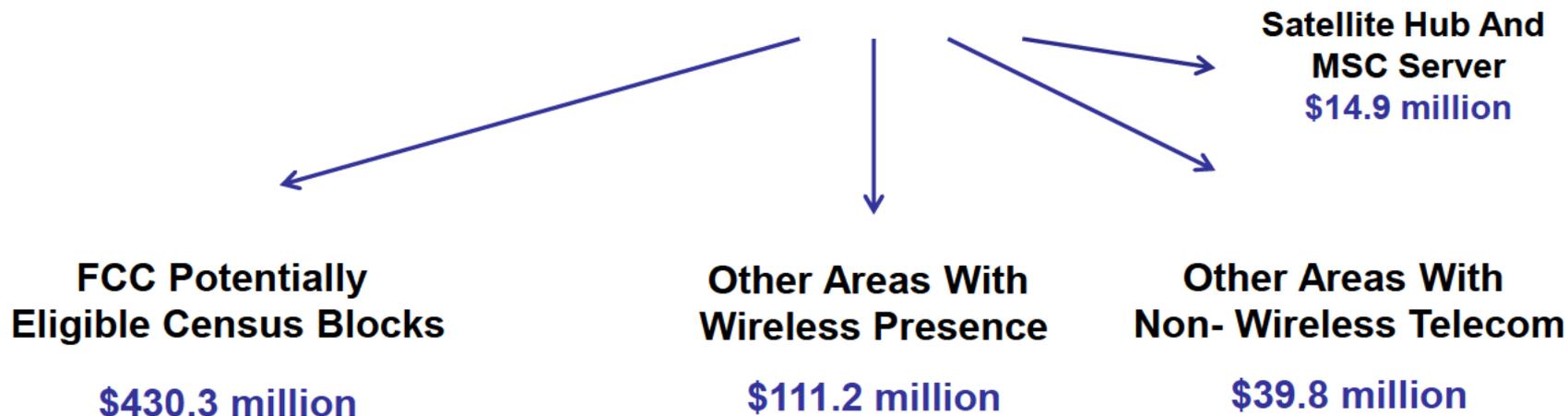
# Total Cost of Providing Mobile Broadband Services

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## Summary of Total Cost Alaska Mobile Wireless Broadband Build-Out

	PV Total Cost	(%)
Capital Costs	\$243,205,036	41%
O&M Costs	\$111,061,405	19%
Backhaul Costs	\$241,937,569	41%
<b>Total</b>	<b>\$596,204,010</b>	<b>100%</b>



# Cost Breakdown – Geographic Segment

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## Summary of Cost of Providing Mobile Broadband to Targeted Areas

	No Wireline Telecom / No Wireless	Wireline Telecom / No Wireless	Current Service < 768 kbps down / 256 kbps up	Total	%
FCC Eligible List	\$128,339,993	\$59,321,646	\$242,611,442	\$430,273,081	72%
Non-FCC List - Current Service < 768 kbps down / 256 kbps up			\$111,207,657	\$111,207,657	19%
Non-FCC List - No Wireless / Telecom Presence		\$39,754,565		\$39,754,565	7%
Total excl. Common Network Costs	\$128,339,993	\$99,076,211	\$353,819,099	\$581,235,303	97%
Common Network Cost (Satellite iHub + MSC)				\$14,968,708	3%
Total				\$596,204,010	100%
% of Total	22%	17%	59%	100%	

Source: U.S. Census Bureau 2010 Census; GCI Cell Site Data; Carrier Cell Sites from FCC ULS database; Brattle Analysis.

Does not include cost of undersea transport from hubs in Alaska  
(PV = \$31 million)

# Cost Breakdown – Summary Metrics

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## Cost Metrics - Providing Mobile Broadband To 17,434 Census Blocks In Alaska

	Cost Metrics							
	Cell Sites		Population		Area (Square Miles)		Road Miles	
	Cell Sites	Marginal Cost Per Cell Site	Population	Cost Per Pop	Area	Cost Per Sq. Mile	Road Miles	Cost Per Road Mile
Common Network Costs	832	\$17,991	122,076	\$123	365,310	\$41	25,048	\$598
FCC Potentially Eligible Areas	476	\$903,935.04	82,277	\$5,230	335,694	\$1,282	19,401	\$22,178
Additional Areas Currently Served	291	\$382,156.90	34,188	\$3,253	24,956	\$4,456	4,460	\$24,932
Areas (Non-Wireless) Presence	65	\$611,608.69	5,611	\$7,085	4,660	\$8,531	1,186	\$33,520
<b>Total Costs</b>	<b>832</b>	<b>\$716,591.36</b>	<b>122,076</b>	<b>\$4,884</b>	<b>365,310</b>	<b>\$1,632</b>	<b>25,048</b>	<b>\$23,803</b>
<b>Nominal Monthly Cost</b>		<b>\$14,760</b>		<b>\$101</b>		<b>\$34</b>		<b>\$490</b>

Note: O&M bandwidth costs for satellite and terrestrial backhaul are calculated on an incremental basis. The costs for Additional Areas Currently Served and Areas (Non-Wireless) Presence assume the previously listed costs are already being incurred. The common network cost per cell site is an average cost and not a marginal cost.

Source: U.S. Census Bureau 2010 Census; GCI Cell Site Data; Carrier Cell Sites from FCC ULS database; Brattle Analysis.

- ◆ Carriers would realize additional revenues from offering mobile broadband services:
  - Upgrading of services to mobile broadband levels from lesser speed wireless levels;
  - New revenue streams resulting from the introduction of wireless service.
  
- ◆ 10,405 of the census blocks are already served with wireless services (at levels below 768 kbps down / 256 kbps up on average in the coverage area); upgrading to mobile broadband data plans are estimated to produce marginal revenues of approximately 6.2 million per year.
  
- ◆ New revenues from the 7,029 new census blocks currently unserved are estimated to produce roughly \$9.5 million per year.
  
- ◆ Total additional revenues estimated to accrue to carriers from providing mobile broadband services in the targeted census blocks is \$63.5 million on a PV basis.

## Summary of Total Cost Alaska Mobile Wireless Broadband Build-Out

	<b>PV Total Cost</b>	<b>(%)</b>
Capital Costs	\$243,205,036	41%
O&M Costs	\$111,061,405	19%
Backhaul Costs	\$241,937,569	41%
<b>Total</b>	<b>\$596,204,010</b>	<b>100%</b>

### **CETC Support in Alaska (as of 7/1/2013)**

**\$426.4 million**

(PV of 5 year stream @ \$105.4 million per year)

### **Remote Alaska High Cost Support**

**\$315.6 million**

(PV of 5 year stream @ \$78 million per year)