

## Broadband USA Applications Database

**Applicant Name:** City of Gustavus

**Project Title:** Gustavus Community Broadband Network

**Project Type:** Last Mile Remote

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### Executive Summary

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Gustavus, Alaska, gateway to Glacier Bay National Park, is situated on a large, flat glacial outwash plain. Farmers and ranchers attracted to its apparently arable land settled 160-acre homesteads in the first half of the 20th century. Agriculture plays little part in an economy now based on government, tourism, construction, education, and health services, but our agrarian legacy includes lot sizes of one to five acres and big gardens. As a result the population of our proposed service area (426 in 2000 with 59 active business licenses) is spread thinly over 23 square miles, in marked contrast to the region's more typical fishing settlements crammed into dense if tiny clusters between sea and cliff. Our low population density, combined with our flat and now heavily forested terrain, poses formidable technological and economic challenges to broadband networking. You cannot drive to Gustavus; like most Southeast Alaska communities we are not connected to the road system. Unlike most Southeast Alaska communities we do not have state ferry service, though that is expected to commence after our new dock is completed in late 2010. We do have a big airport built during World War II to support the Aleutian campaign, and we are within 50 straight-line miles of Juneau, the state's capital, but we claim to be as remote as most places 150 road miles from a non-rural area. Please see the essay "Gustavus Is Remote" (attachment Supplemental Information 1) for our justification of that assertion and an explanation of our consequently high transportation, energy, and communication costs. Local Internet service began in 1995 when Gustavus enthusiastically agreed to be one of six Southeast Alaska communities benefitting from the SEAKNet project, a collaboration of the Alaska State Library, University of Alaska, and the Southeast Regional Resource Center and funded by an NTIA grant. The grant funded installation and one year's operating costs for a 56 Kbps frame relay circuit at the Gustavus school and four analog modems for dial-up access. The University of Alaska was the upstream ISP and the Southeast Regional Resource center provided training and administrative support. After grant funding ran out in 1996 Gustavus SEAKnet continued as a self-supporting function of the Gustavus Community Association. Volunteers administered and operated the network and subscriber fees were husbanded to maintain and expand the network. Over time more modems were added, the network center was moved to the new Gustavus Public Library, the 56K frame relay circuit was replaced by a 1 Mbps business-class satellite connection, the analog modems were replaced with a portmaster integrated access server with 56K digital modems, and an automated billing system was installed. When voters incorporated as the City of Gustavus in 2004 the Gustavus Community Association disbanded and Gustavus SEAKNet was reconstituted as the Gustavus Community Network (GCN), a city-owned Internet Service Provider. Internet service was provided to City Hall by pairing SHDSL modems with a leased two-wire circuit. GCN built a limited wireless network at City Hall to serve the Salmon River meadow area

with high-speed (if not quite broadband) Internet access, connecting the Gustavus Community Clinic. In August, 2005 GCN boasted 158 subscribers, which is 76% of the estimated occupied households at the time. We have learned how to fairly and effectively share a limited, expensive resource (upstream Internet bandwidth) by means of usage-based pricing and sophisticated bandwidth control supported by a flexible, scalable AAA, billing, and payment processing system and professional administration and customer service. We emphasize that no outside financial support was involved during these 13 years of operation and growth; since the original NTIA grant SEAKNet and GCN have been sustained and grown entirely by subscriber revenues and volunteers, working in partnership with the Gustavus Public Library and City of Gustavus, amply demonstrating our qualifications and ability to build and operate a community network. But we have reached a point, for the first time since local Internet service became available, where we need a push to get to the next level of sustainable Internet service. GCN lost momentum in 2006 as dial-up service, the only option offered by GCN to the more than 90% of subscribers living outside the Salmon River meadow wireless coverage area, became ever more inadequate in the face of increasingly media-rich web content. Growth of the wireless network stalled after the limitations of 2.4 GHz technology in our forested flatland became painfully obvious. Customers began installing their own satellite dishes and subscribing to wireless data service newly available from the cellular phone companies. Equipment failure from a botched carrier system replacement by the local telephone company rendered many phone lines unusable for dial-up Internet access in November, causing a mass cancellation of GCN service. By the time the phone lines were repaired over two years later, former GCN subscribers had installed satellite dishes or resigned themselves to having no home Internet access and in any case did not wish to go back to dial-up service, however good. GCN now has 75 subscribers, fewer than half its peak, has lost one key volunteer, and is operating at an unsustainable loss. Meanwhile the best available Internet options for residents outside the very limited Salmon River meadow area are individual satellite dishes and 1xRTT cellular data service, both of which are slow, suffer from high latency and congestion, and are expensive and/or unreliable. "Better than dialup" is the best that can be said of these choices. Even before it issued a request for proposals for broadband Internet service in 2004, GCN recognized the need for broadband Internet access. Local experiments with 2.4 GHz wireless proved that technology alone would never provide community-wide service so the GCN advisory committee sought outside professional help. A contract with engineering firm Borealis Broadband produced a 900 MHz wireless broadband proposal in March, 2008 (see attachment Supplemental Information 3, Borealis Plan). Additional field testing, further discussions, and new technology resulted in refinements that led to the hybrid terrestrial fixed wireless design proposed herein. GCN proposes to use its remaining reserves as matching funds for a grant, totaling \$145,909 to build a 900 MHz wireless backbone connecting to the Internet various neighborhood 2.4 GHz wireless mesh networks. Five years of research, engineering, experience and field testing have resulted in a design that combines the superior range and foliage penetration of 900 MHz wireless technology with the low cost, redundancy, and easy deployment of a self-configuring, standards-based last-mile mesh while leveraging GCN's existing organization, accounting, administration, billing, and payment infrastructure. Connected to an upstream pair of T1 circuits from our partner Ukpik, LLC GCN will stand above any alternative as clearly the fastest, cheapest, and most reliable Internet service. We fully expect, over time, to regain as many customers as we lost since 2005. We see GCN's current unsustainable operating deficit as both a crisis and an opportunity. No action will result in the loss of

affordable \$25/month Internet access for the neediest 10% to 20% of our population, the loss of network openness, dissolution of a successful partnership of the city, library, clinic, volunteers, and contractors, and a lost opportunity for sustainable true public broadband service for the lowest possible investment. And if this opportunity is lost and GCN goes out of business it is unclear when we would ever obtain broadband access in this community, as no one else has offered to serve our remote location (our local phone company having recently declined to partner with us to offer DSL service over their existing infrastructure). Meanwhile there exists an opportunity to provide to a remote community the fastest, cheapest, most open Internet access possible by leveraging past NTIA grant funding and a partnership of dedicated, experienced, capable local volunteers, community organizations, and contractors with a proven track record and existing systems, services, and customers. We know what needs to be done and we know how to do it; we can be a model community network with a design that can be used in small unserved and underserved communities everywhere. The technology is available, construction of the hydro project has made a communications site available, and ARRA has made the funds available. For the lowest possible investment we can build on the success of the original 1995 NTIA grant and the successful partnership that grew from it to build our economy and add an estimated 33 jobs (see question 10), enhance health care delivery and education (questions 10 and 11), promote network openness (question 22), and provide lifeline service to those who need it most (question 27).