

ABOUT THE ALASKA SCHOOL  
BROADBAND AUDIT PROJECT



## ABOUT THE ALASKA SCHOOL BROADBAND AUDIT PROJECT

---

The Alaska School Broadband Audit took significant strides to ensure that the data collected and analyzed fully represent the status and needs of Alaska schools and that the data is presented in a manner that could prove useful to interested parties from local educators to state administrators. Specific data collection methods were employed, including committing great resources to using Alaska-based engineers and research firms on the ground to validate school information, extraction of external data from reliable national and state databases, and surveys of school administrators and technical teams.

The information gathered was not only presented in this report but also in a data visualization portal online for easy access to data on a district-by-district level.

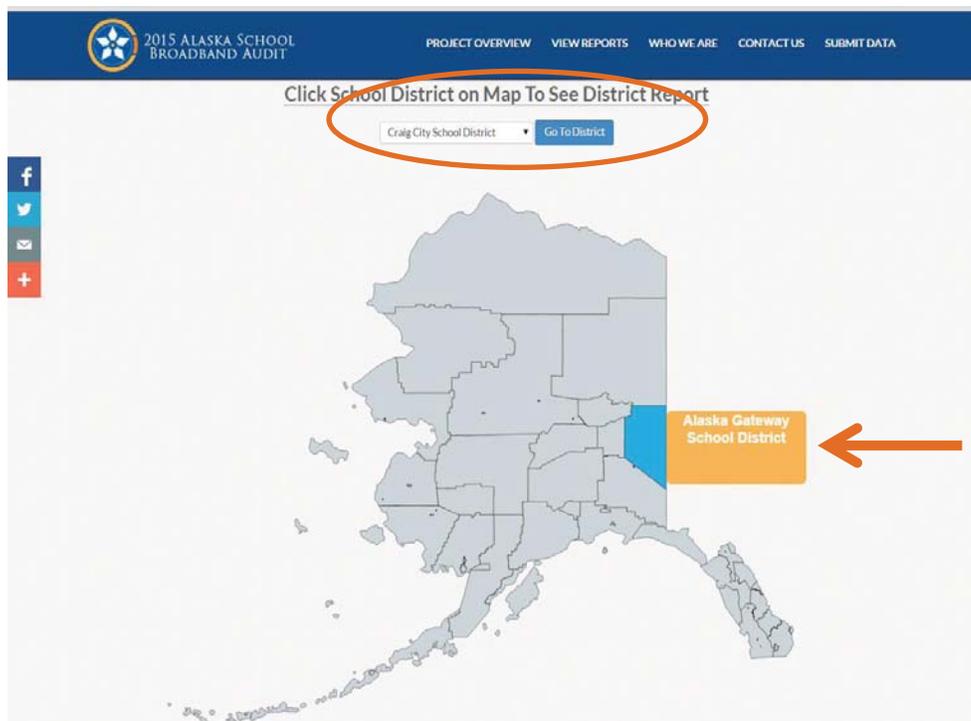
## Data Visualization Portal

The data visualization portal ([akbroadbandaudit.org](http://akbroadbandaudit.org)) provides all Alaska stakeholders – policymakers, school administrators, researchers, teachers, and other Alaska stakeholders – access to the raw datasets and interactive reports and charts and allows users to perform additional analyses and data comparisons of school and/or district broadband data along with state, regional, or national benchmarks. The goal of this data visualization portal is to display the Alaska Broadband Audit results in an engaging manner while offering the ability to download charts, share, and print the visual representation of the data. Additionally, the website allows users to seamlessly access white papers and the complete school audit report with analyses of the data performed by Connect Alaska.

Below are instructions for using the portal:

### A. To View a District and School Report

1. Access the website by going to [www.akbroadbandaudit.org](http://www.akbroadbandaudit.org).
2. Scroll over the school district Alaska map in the middle of the homepage to see the Alaska school districts. When hovering on a school district, it will be highlighted.



3. There are 2 ways to obtain a district report

- Click on the school district on the map or use the dropdown list to select a school district.

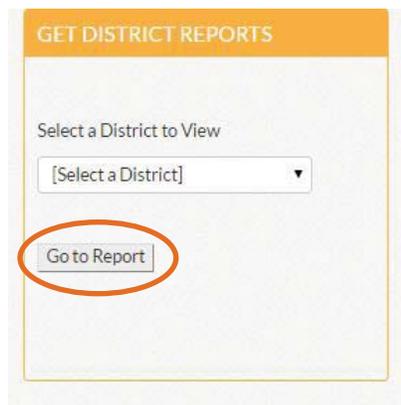


A screenshot of a web interface showing a dropdown menu with 'Craig City School District' selected. To the right of the dropdown is a blue button labeled 'Go To District'.

- A user can also find district reports by going to the reports page using the top navigation and clicking *View Reports*.



Once a user is on the *View Reports* page you can select the school district using the district dropdown list and clicking *Go to Report*.



A screenshot of a web page titled 'GET DISTRICT REPORTS'. It features a dropdown menu labeled 'Select a District to View' with the placeholder text '[Select a District]'. Below the dropdown is a button labeled 'Go to Report', which is circled in orange.

- Viewing the school district reports - The school reports will be generated on the format shown below. To view individual school reports from a selected district, click on the dropdown list next to the district name on the district report to generate the school report.

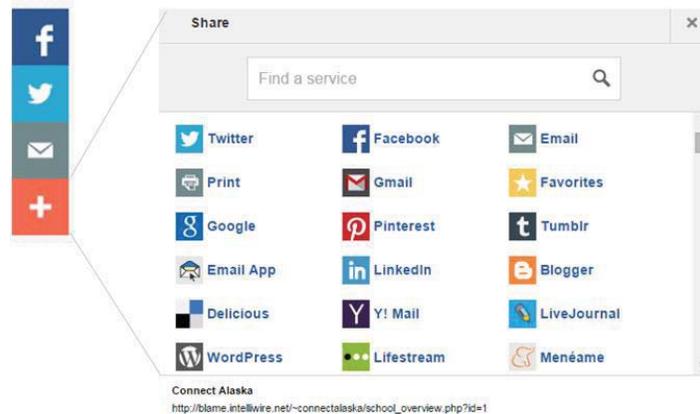
## B. Interacting with School or District Reports

1. When viewing the district report, a user can interact with the reports and charts in the following manner:

- To see the actual bar value, a user should hover over the bar.



- Users can also turn bars on and off by clicking the legend under the chart to see only desired values and/or benchmarks.
- Users can download each chart in various image formats by clicking on the top right corner of the chart.
- Users can share the complete report page seamlessly using social media. Clicking on the red icon with a plus sign provides a large menu of different applications to use to share the reports including email, printing, social media etc.



### C. Comparing and Contrasting School and District Data

The data visualization portal allows users to compare Alaska schools' and/or districts' broadband data to regional peers, any other schools and/or districts, statewide averages and a national benchmark.

1. From the homepage, click on the *View Reports* link on the top navigation.



2. Select the broadband district metric to analyze under the Compare Schools and Districts section of the page.
3. Select up to 3 districts to compare.
4. Select the benchmarks and averages to analyze.

5. Click *GO!* And the results will be generated. The chart will appear below the *GO!* icon. To compare school reports, repeat the same process for schools.

**Compare School and District Data**

**WHAT DO YOU WANT TO COMPARE?**

Select a Metric to Compare

-School Internet Connection ▼

**SELECT A DISTRICT**

District:

[Select a District] ▼

Pick another district:

[Select a District] ▼

Pick a final district:

[Select a District] ▼

**WHAT ARE YOU COMPARING IT TO?**

Compare to National Benchmark

Compare to State Average

Compare to Regional Average

Compare to District Average

**GO!**

[Click Here to Print Report](#)

6. Select the specific district and/or school.
7. Select districts/schools to compare along with the district, regional, state or national benchmarks.
8. Click *GO!* to run the report.
9. Similar to other charts, a user can share or print the report as discussed earlier.

#### D. Generating the Raw Dataset

1. To generate the complete dataset in an excel format go *View Reports* link on the top navigation.



2. Click on the thumbnail labeled *Alaska School Audit Dataset*.

## Validation Process and Data Collection

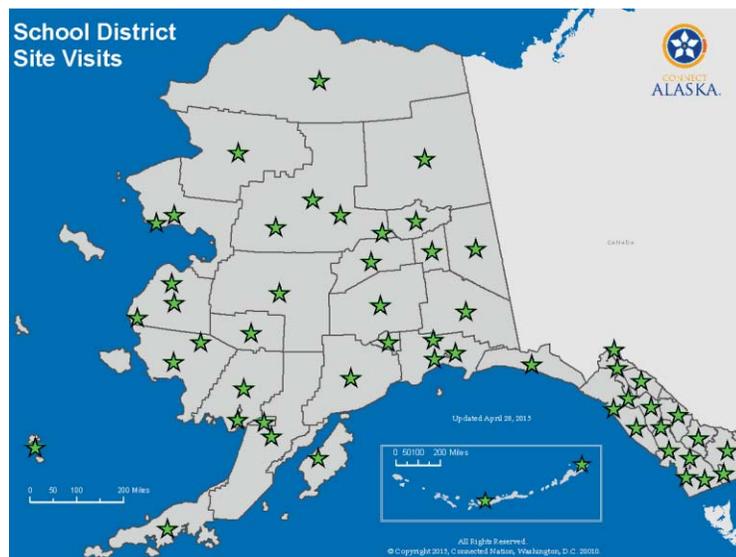
A critical component to the success of the Alaska Broadband Audit was the on-the-ground presence and coordination among the districts across Alaska. As part of the project, Connect Alaska committed substantial hours, manpower, and planning into carrying out school site visits in all 53 school districts in the state. Not only were schools surveyed, but each district was personally visited by a qualified team of engineers focused on understanding the successes, challenges, and current broadband capacity of each district in the state.

Before the actual traveling began, careful planning and coordination was completed. Connect Alaska engineers contacted technology coordinators, administrators, and auditors to plan site visits, and in August 2014, visits to urban and remote districts alike ensued. Engineers traveled across the state to districts on and off the road system, those accessible primarily by ferry, and schools only accessible by air in cars, jets, single-engine, and floatplanes with trips planned strategically to minimize travel costs and time. By the project completion, approximately

- ✓ 58,000 miles flown
- ✓ 2,000 miles driven
- ✓ 60 schools visited
- ✓ 100% of school districts represented

58,000 miles had been flown, 2,000 miles had been driven, and 60 schools had been visited. With the willingness of the school administrators and technical staff being crucial to the success of the site visits, an on-the-ground presence allowed the Alaska Broadband Audit project to understand much more thoroughly the needs of the students in the state.

Figure 25: Map of School District Site Visits



## Validation Process

**Figure 26: Site Validation Image**



When planning a site visit, Connected Nation engineers coordinated with district administrations to identify priority schools for site visits. Visits would be planned around one of two types of locations – those institutions that represented a typical school for the district or those that were significantly different from the other schools in the district perhaps due to connectivity challenges. Once schools were identified, travel plans were coordinated to minimize travel costs and time.

While onsite, the engineers conducted a variety of inspections, tests, and interviews. First and foremost, a visual inspection was completed identifying various technology aspects including backhaul presence and type, network switches and caching equipment, wiring configuration, access points, end points, and devices. Connect Alaska reviewed and took note of routers, switches, modems, and wiring plants and servers and attempted to visually confirm how the connection was made out.

Accompanying photos were taken to capture the school's infrastructure and landscape for identification and reference. Secondly, inventories were gathered on items such as network hardware, staff and student computers, as well as technology-based curriculum solutions.

Wireless and wired speed tests were completed by the engineers onsite by performing tests for latency, upload, download, and wireless radio interference along with other activities as needed based on the network structure. Additionally, an audit questionnaire was completed by the district (see Appendix 2) asking for data regarding the schools that were not directly visited to create a complete picture of how broadband is utilized within the district.

Lastly, interviews with technical and administrative staff were conducted to fully understand the position, current and future needs, and challenges teachers and staff face when bringing broadband to their students.

**Figure 27: Site Validation Image**



## Data Collection

Data from both engineers was compiled and verified to assure integrity and then combined with data collected online to create a picture of broadband service to K-12 public school districts from across Alaska.

A myriad of information was garnered during the site visits including:

- Current Broadband Service Provider
- Technology and Type of Service
- Broadband Partnerships with other Institutions
- Broadband Service Level
- Monthly Broadband Rate for Service
- E-rate Discounts
- Dedicated or Shared Connection
- Internal and External Download and Upload Speeds
- Latency
- LAN connections
- Wi-Fi Accessibility
- Buildings – Single Structure or Multiple Structures
- Connection of Buildings
- Managed versus Passive Networks
- Primary Networking Equipment
- Planned Upgrades
- Connection and Security Policies
- Number of Devices per Student and per Faculty-Staff
- School Provided Devices and Bring-Your-Own-Device Policies
- Average Age of Devices
- Technology Budget for Equipment
- Future Technology Investments
- Non-Technical Barriers to Technology Implementation
- WAN Connectivity
- Number of schools connected to WAN
- Technology Type Used for WAN Deployment
- Limitations Preventing WAN Usage
- Current and Future Broadband Needs
- Barriers to Broadband Improvements

### Challenges in Data Collection

While performing the audits and data collections a number of challenges were encountered for showcasing an accurate picture of how broadband affects education in the state.

In a state like Alaska with a great number of remote and rural areas, often off the road system, robust connectivity is crucial yet frequently very difficult to obtain due to environmental challenges, affordability, and other factors. These same factors affected the data collection process as weather, flights, and ferry transportation often determined the travel schedule for visiting sites in some of the most rural of areas.

**Figure 28: Image of the Lower Yukon School District Central Office**



Additionally, properly representing the data as mid-year changes occurred in particular districts also served as challenging. For example, funding became available in 2015 for districts to increase bandwidth in small sites to 10 Mbps for the support of educational activities. This funding caused a much-needed bump to a number of sites offering higher speeds than originally represented in the earliest data collection.

Engineers also learned that many institutions combine bandwidth with the local community library when that is housed within the school causing the bandwidth reported to be higher than may have been expected when looking strictly at the district E-rate application.

Ongoing monitoring of networks in the state would be a vital data gathering activity for those attempting to determine the best manner to support broadband in K-12 education as Alaska schools aim to connect their students with the benefits of distance learning, online testing, and other digital applications.

## External Data Resources

In addition to data points collected directly from schools or school districts themselves regarding technology adoption and use, Connect Alaska research staff also searched and extracted some socio-economic, demographic, and geographic information from various external resources at the individual school or school district level, and merged them into the Audited dataset for comprehensive analyses. Specifically, based on multiple databases from the Alaska Department of Education & Early Development (EED), the research staff collected student body population by schools and school districts, number of schools in school districts, and school district ID,<sup>21</sup> and verified and adjusted self-reported school types and school physical addresses.<sup>22</sup> To examine how the community income level impacts technology adoption and use among schools, median household income and poverty rate by school district levels were extracted from Census 2013 and manipulated into the collected data. In addition, the Free/Reduced Lunch Eligibility is another important metric to measure a community's level of wealth. Therefore, this metric by individual school and individual school district level were also included in the dataset. Individual school level eligibility was from the Alaska Department of Education and Early Development's (EED) 2013 National School Lunch Program Free & Reduced Percentage Report,<sup>23</sup> and the district level eligibility was extracted from the Universal Service Administrative Company's (USAC) 2015 470 information.<sup>24</sup>

School and school district urban/rural classification were under the new E-rate rule, where schools are classified as urban when a school's physical address is located in one of the following areas: 1) 'Urban areas' which are densely settled cores of census tracts that have 50,000 or more people, and 2) 'Urbanized clusters' which are located near 'Urban areas' that have between 25,000 and 49,999 people; schools that are not located in these areas are classified as rural. School district urban/rural classification depends on how many schools in a district are located in urban or rural areas. If a majority of a district's schools are classified as rural, then this entire school district is classified as rural; otherwise, it is labeled as urban. For audited schools' urban/rural classification, the research staff identified urban/rural status of most of the schools by matching the USAC's urban/rural report with the audited dataset by school names.<sup>25</sup> For those with invalid physical addresses in the USAC report, the research staff included them under the new E-rate rule using a corrected, self-reported physical address. As a result, 341 schools were classified as rural among 479 audited schools, and 3 school districts were classified as urban including Anchorage, Fairbanks, and Matanuska-Susitna in the Audited dataset.

---

<sup>21</sup> EED: <http://education.alaska.gov/stats/>.

<sup>22</sup> EED: [http://education.alaska.gov/DOE\\_Rolodex/SchoolCalendar/](http://education.alaska.gov/DOE_Rolodex/SchoolCalendar/).

<sup>23</sup> EED: [http://education.alaska.gov/21cclc/pdf/2013\\_nslp\\_free\\_and\\_reduced\\_eligibility\\_report.pdf](http://education.alaska.gov/21cclc/pdf/2013_nslp_free_and_reduced_eligibility_report.pdf).

<sup>24</sup> USAC: <http://www.siforms.universalservice.org/Form470DownloadTool>.

<sup>25</sup> USAC: <http://universalservice.org/sl/tools/urban-rural-report/default.aspx>.

Race/ethnicity information by school districts was obtained from NCES's School District Demographic System based on 2010 census.<sup>26</sup> With that, it could be addressed regarding racial effect on variation in technology between multiple groups.

In addition, some metrics on a regional basis cannot be directly extracted from the above external resources. This report made a weighted estimate. For example, regional poverty rates were estimated as a weighted average of the region's school district's poverty rates weighted by a school district's total population, the sum of the product of each school district population and poverty rate divided by the sum of each school district's population in a particular region.

The data collected from these external resources and the effective use of information in the existing Connect Alaska database allowed for a greater depth of understanding of Alaska's schools and communities where they are located.

## Needs Assessment Methodology

Connect Alaska, in partnership with the Alaska Department of Commerce, Community, and Economic Development, contracted with Anchorage-based Hays Research, to conduct surveys of Alaska public schools across the state. Hays Research was identified as an expert in data collection on topics related to education in Alaska, and chosen based in-part due to their 13 years of experience focusing on the unique challenges that arise when attempting to collect data from schools and households in remote parts of the state.

Hays Research conducted surveys on behalf of Connect Alaska between November 19, 2014 and December 17, 2014. Surveys were conducted using mixed methodologies, with representatives from Hays Research contacting public K-12 schools across the state by telephone and also offering them the opportunity to provide more in-depth responses online to ensure that time restrictions did not limit the information that school administrators were able to provide. Once respondents agreed to participate, these surveys took approximately ten (10) minutes to complete.

The purposes of this survey were as follows:

1. Determine whether, and/or to what extent, current broadband speeds and availability hamper Alaska schools' ability to provide high quality education to their students;
2. Determine schools' normative, expressed, and perceived broadband needs;
3. Help policymakers determine the costs that would be required to improve school broadband connectivity to normative standards;
4. Determine current uses of broadband and computer technology at Alaska K-12 public schools;
5. Determine school administrators' current expressed and perceived technology needs;
6. Determine school administrators' anticipated technology needs for the near future; and
7. Collect data about broadband-enabled applications or programs that Alaska schools would utilize if higher broadband speeds were deployed.

Multiple attempts were made to contact the principal at each participating school. In instances where the principal was not available, callers asked to speak to the individual at the school with the most

---

<sup>26</sup> NCES: <http://nces.ed.gov/surveys/sdds/ed/index.asp>.

knowledge about incorporating technology into the school's curricula. Contact names and phone numbers were obtained from the Alaska Department of Education and Early Development.

Altogether, representatives of 55 Alaska public schools were contacted, representing a response rate of 9.6% of public schools in the state.