

Palmyra-Macedon Central School District

In-School Internet Connectivity

JULY 2022



OFFICE OF THE NEW YORK STATE COMPTROLLER
Thomas P. DiNapoli, State Comptroller

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Report Highlights

Palmyra-Macedon Central School District

Audit Objective

Determine whether the Palmyra-Macedon Central School District (District) used resources to ensure the District's Internet connectivity meets the Federal Communications Commission's (FCC) recommended bandwidth.

Audit Results

The District's Internet connectivity met the FCC's recommended bandwidth of 100 Megabits per second (Mbps) per 1,000 students, as guided by New York State Education Department (NYSED). When tested, the average wireless Internet download speed was 232 Mbps, and the average ethernet cable Internet download speed was 564 Mbps.

The District's contracted bandwidth totaled 1.0 Gigabits per second (Gbps) for Internet service.

Overall, of the 20 teachers surveyed (11 percent of the population), 19 were satisfied with their Internet connectivity.

Additionally, the District monitored bandwidth usage and provided a system for users to submit Internet connectivity issues for resolution.

Our audit focused on the Internet connectivity in school buildings and did not look at the surrounding community's Internet connectivity. No recommendations resulted from this audit.

Background

The District is located in Ontario and Wayne Counties and is governed by an elected nine-member Board of Education (Board).

The Board is responsible for the general management of the District.

The Superintendent serves at the Board's direction and is responsible for the day-to-day management.

The Director of Instructional Technology (Director) oversees the Information Technology (IT) department and is responsible to plan for and provide the District's technology, infrastructure and data systems.

The District contracts with Genesee Valley / Wayne-Finger Lakes Educational Technology Service (EduTech), a Regional Information Center, to provide broadband Internet access. EduTech contracts with an Internet Service Provider (ISP) to provide Internet services to its component districts.

See Appendix A for select technical definitions.

Quick Facts

2020-2021 School Year

Staff	384
Students	1,781
School Buildings	4

Audit Period

July 1, 2020 – February 18, 2022

In-School Internet Connectivity

Access to broadband Internet connectivity has become essential for all students in all levels of education and is now a vital component of K-12 school infrastructure. When school districts adopt and integrate digital learning technologies into their curriculum, teachers and students may use these tools for increased learning opportunities, such as posting content to school district learning management systems, accessing e-textbooks and assignments online, downloading streaming media or conducting online assessments. Additionally, they may use videoconferencing to interact with other classes or with subject area experts.

To enable the use of digital learning tools, school districts need to extend Internet access to every classroom and instructional space. The ongoing increase in new digital learning technologies and the need to connect students to information has led to a steady rise in demand for high-speed broadband Internet capabilities. Our audit focused on the Internet connectivity in school buildings and did not look at the surrounding community's Internet connectivity.

What Is the Recommended In-School Internet Connectivity Speed?

NYSED guides the use of resources in enhancing Internet connectivity and meeting the FCC's current recommended Internet connectivity speed. The FCC adopted standard Internet connectivity speeds of 100 Mbps per 1,000 students and staff (users). NYSED guides school districts' student digital learning infrastructure, as a best practice, to use the FCC recommended internet connectivity speed for students only.¹

Further, an FCC guide for households shows that a student should have a minimum of 5 to 25 Mbps of Internet download speed depending on their online activities. Guidelines provided for typical online activities by the minimum download speed in Mbps needed for adequate performance for each activity is shown in Figure 1.

Figure 1: Minimum Download Speeds for Selected Online Activity (in Mbps)^a

General Browsing and Email	1
HD Video Teleconferencing	6
File Downloading	10
Streaming Ultra HD 4K Video	25
Student	5-25

a) FCC household guideline speeds and are not based on surveys or experiments conducted. See <https://www.fcc.gov/consumers/guides/broadband-speed-guide>

¹ Standard Internet connectivity speeds of 100 Megabits per second (Mbps) per 1,000 students.

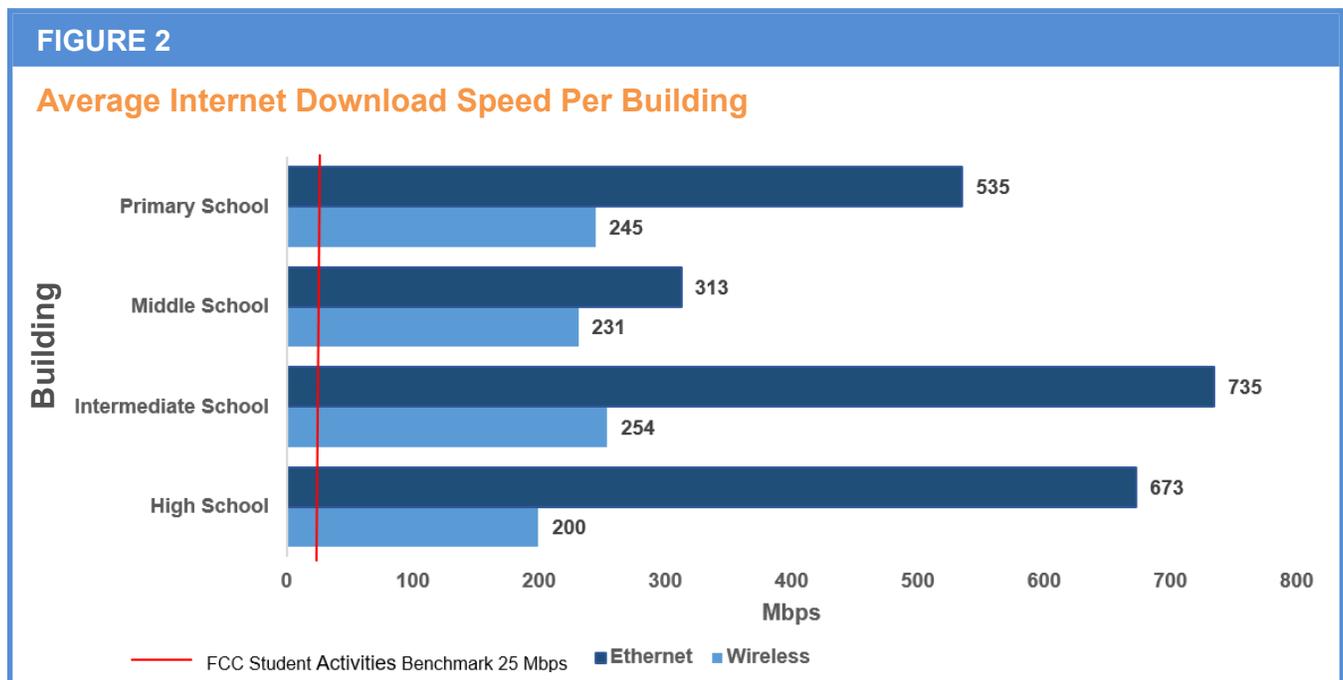
School districts should monitor and review comprehensive and accurate bandwidth usage information to ensure that contracted bandwidth is received, adequate speed is available for student learning and educational needs are met. School districts should provide a tool for users to submit Internet connectivity issues to the IT department for resolution.

The District Met the FCC Recommendation and Officials Monitored Connectivity

Internet Connectivity: The District contracted through EduTech for bandwidth of 1 Gbps. The ISP incoming Internet download speed was reasonable with an average of 930 Mbps for the contracted service of 1 Gbps.

Students and teachers utilize bandwidth through wireless access points located in classrooms, along with teachers being connected through the use of an ethernet cable, for instructional and educational purposes.

The District met the FCC’s recommended bandwidth amount, 100 Mbps per 1,000 users, or students. Both the wireless and ethernet cable Internet download speeds were well above the FCC defined minimum download speeds needed for typical household student online activities, as shown in Figure 2. The District-wide average wireless Internet download speed was 232 Mbps, and the per-building average speeds ranged from 200 Mbps to 254 Mbps. The District-wide average ethernet cable Internet download speed was 564 Mbps, and the per-building average speeds ranged from 313 to 735 Mbps.



Monitoring: The Director monitors the Internet connectivity speeds using several monitoring systems, including an in-house speed test located on the District's website providing students and teachers the ability to determine current network Internet connectivity speeds. EduTech also monitors the bandwidth usage in order to determine the needs of the District. In addition, the District has a help desk system where students and teachers can inform the IT Department of any Internet connectivity concerns or incidents.

The Director told us he believes the District has enough bandwidth to meet the instructional and educational needs of the students and teachers. Our review of utilization data confirmed that the District only uses approximately half of its contracted bandwidth.

Survey: We surveyed 20 of the 185 teachers to learn if they were satisfied with the District's in-school Internet connectivity. Overall, 19 of the 20 teachers (95 percent) we surveyed were satisfied with their Internet connectivity resources.

Conclusion

The District contracted for and provided in-school Internet bandwidth that met the FCC's recommended Internet connectivity speed. As a result, the instructional needs associated with student activities should be met, such as the ability to access multimedia content, participate in online video conferences, and utilize electronic online learning tools during the school day.

Appendix A: Key Technical Definitions

General Definitions

Bandwidth: The maximum amount of data that can be transmitted over a particular connection in a specified amount of time. This is the volume of information that can be sent over a connection in a measured amount of time.

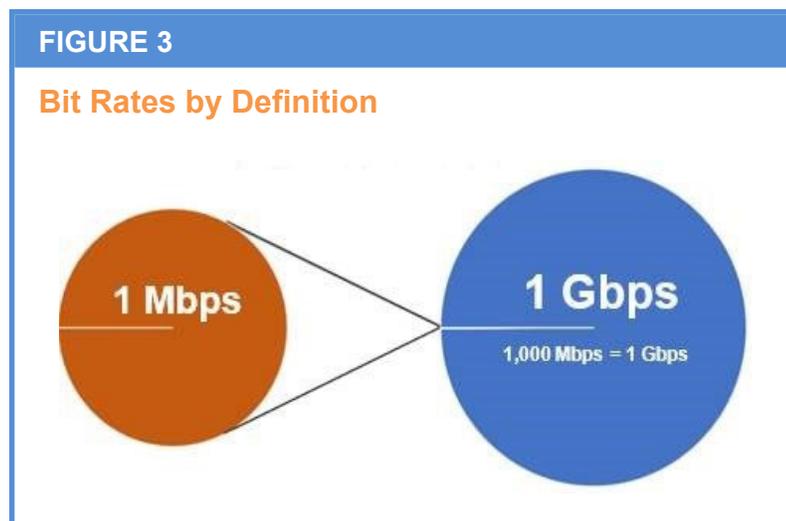
Broadband: High-speed Internet access and advanced telecommunications services for homes, commercial establishments, government, schools and community anchor institutions. In New York State, broadband service is primarily delivered via cable modem, fiber-optic cable, digital subscriber line (DSL) or through mobile wireless (5G/4G LTE), or a combination.

Ethernet: Network technology that enables data exchange and is often referred to as a direct connection.

Internet Service Provider: An organization that provides services for accessing, using or participating in the Internet. These organizations often provide broadband Internet access to their customers.

Bandwidth Speed Definitions

Mbps (Megabits per second) and Gbps (Gigabits per second) are units of measurement to show the speed at which a network or Internet connection can transfer data (Figure 3). The FCC standard is 100 Mbps per 1,000 students and staff.



Appendix B: Response From District Officials



June 6, 2022

US Mail: Confirmation of Delivery

Office of the New York State Comptroller
Division of Local Government and School Accountability
STATEWIDE AUDIT
Julie Landcastle, Chief Examiner
Utica State Office Building, Room 604
207 Genesee Street
Utica, New York 13501

Emailed Copy to:

Dear Ms. Landcastle:

Thank you for the opportunity to work closely with staff from your office regarding the examination of in-school internet connectivity. Your findings reinforce our confidence in the technology practices of the School District.

Sincerely,



Robert R. Ike, Ed.D.
Superintendent

C: Laura Arrington, President, Palmyra-Macedon CSD Board of Education

Appendix C: Audit Methodology and Standards

We conducted this audit pursuant to Article V, Section 1 of the State Constitution and the State Comptroller's authority as set forth in Article 3 of the New York State General Municipal Law. To accomplish our audit objective and obtain relevant audit evidence, our procedures included the following steps:

- We judgmentally selected the District for audit using a random number generator applied to a list of districts, broken out by geographic location.
- We interviewed District officials and employees to gain an understanding of the District's network infrastructure, as well as planning for and monitoring in-school Internet connectivity.
- We reviewed records supporting written plans for network infrastructure, network analysis, and contracts specifically related to in-school Internet connectivity and bandwidth.
- Using a third-party speed test application while connected directly to the ISP connection, we performed three speed tests at the off-peak Internet activity time defined by District officials. We calculated the average Internet download speed and compared to contractually defined bandwidth to determine whether the District's average speed was reasonable (at least 80 percent of the contractually defined bandwidth as defined by the FCC).
- Using a third-party speed test application while connected wirelessly and with an ethernet cable to the District's network, we performed speed tests at a sample of locations within each of the four District school buildings. We calculated the average speed per user, 0.1 Mbps, using the FCC standard of 100 Mbps per 1,000 students and staff (user). We then averaged the Internet download speed results to calculate the District-wide average Internet download speed and compared the results to the FCC defined minimum download speeds needed for typical student online activities.
- We determined the total number of individuals currently employed by the District as of February 15, 2022 by reviewing an employee listing. We judgmentally selected 20 of 185 teachers to send surveys regarding in-school Internet connectivity.
- Using third-party survey software, a survey was sent to the selected teachers regarding their experience with the in-school Internet connectivity, including whether issues were reported to the IT department. We set a survey deadline, and from the responses received we calculated the number and percentage of teachers satisfied and not satisfied with their in-school Internet connectivity.

We conducted this performance audit in accordance with generally accepted government auditing standards (GAGAS). Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective.

We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective.

Unless otherwise indicated in this letter, samples for testing were selected based on professional judgment, as it was not the intent to project the results onto the entire population. Where applicable, information is presented concerning the value and/or the relevant population size and the sample selected for examination.

The Board has the responsibility to initiate corrective action. A written corrective action plan (CAP) that addresses the findings and recommendations in this report must be prepared and provided to our office within 90 days, pursuant to Section 35 of General Municipal Law, Section 2116-a (3)(c) of New York State Education Law and Section 170.12 of the Regulations of the Commissioner of Education. To the extent practicable, implementation of the CAP must begin by the end of the fiscal year. For more information on preparing and filing your CAP, please refer to our brochure, *Responding to an OSC Audit Report*, which you received with the draft audit report. The CAP should be posted on the District's website for public review.

Appendix D: Resources and Services

Regional Office Directory

www.osc.state.ny.us/files/local-government/pdf/regional-directory.pdf

Cost-Saving Ideas – Resources, advice and assistance on cost-saving ideas

www.osc.state.ny.us/local-government/publications

Fiscal Stress Monitoring – Resources for local government officials experiencing fiscal problems

www.osc.state.ny.us/local-government/fiscal-monitoring

Local Government Management Guides – Series of publications that include technical information and suggested practices for local government management

www.osc.state.ny.us/local-government/publications

Planning and Budgeting Guides – Resources for developing multiyear financial, capital, strategic and other plans

www.osc.state.ny.us/local-government/resources/planning-resources

Protecting Sensitive Data and Other Local Government Assets – A non-technical cybersecurity guide for local government leaders

www.osc.state.ny.us/files/local-government/publications/pdf/cyber-security-guide.pdf

Required Reporting – Information and resources for reports and forms that are filed with the Office of the State Comptroller

www.osc.state.ny.us/local-government/required-reporting

Research Reports/Publications – Reports on major policy issues facing local governments and State policy-makers

www.osc.state.ny.us/local-government/publications

Training – Resources for local government officials on in-person and online training opportunities on a wide range of topics

www.osc.state.ny.us/local-government/academy

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