VIRGINIA IT AGENCY

2023 Network Infrastructure Report

Virginia Information Technologies Agency

vita.virginia.gov

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THIS REPORT

The Virginia Information Technologies Agency (VITA) is submitting the Commonwealth's network infrastructure report, pursuant to Item 91(E) of the 2023 Special Session I Amendments to the 2023 Appropriation Act, which provides:

> The Virginia Information Technologies Agency shall provide a network infrastructure report to the House Appropriations Committee, Senate Finance and Appropriations Committee, and Joint Legislative Audit and Review Commission by November 1 of each year. The report shall indicate whether the Commonwealth's network infrastructure is adequate to meet the needs of state agencies, and if not, identify any needed upgrades. For each network infrastructure upgrade identified, the report shall specify the estimated cost and whether the upgrade is to the portion of the network maintained by the Virginia Information Technologies Agency or another state agency.

This report covers December 2022 to November 2023. VITA thanks policymakers for this opportunity to report on this subject of utmost importance.

SUMMARY

VITA provides information technology (IT) infrastructure services to the Commonwealth's approximately 65 executive branch state agencies and a workforce of over 65,000 state employees, equipping and empowering executive branch agencies to serve Virginia's 8.6 million residents. Network infrastructure includes software and hardware that helps run and maintain the Commonwealth's IT network. Network infrastructure forms the foundation for almost all government interactions with Virginians. Numerous initiatives have been undertaken to bolster network reliability and performance. These efforts include voice and data modernization, building a zero-trust security framework, private and public cloud migrations, and performance and network monitoring. This report details the progress since the last report and the network infrastructure needs of state agencies.

REPORT

VOICE AND DATA MODERNIZATION

Voice and Data modernization help to foster an agile, secure, and high performing IT landscape. These modernization efforts not only improve efficiency and effectiveness of communication networks but also ensure security and reliability of data and voice services.

Voice Modernization

Microsoft Teams Enterprise Voice is an upcoming service offering aimed at reducing cost for voice services. It allows users with Office 365 G5 licensing to make and receive phone calls on their Microsoft Teams client for desktop and mobile. This service is expected to be available later this calendar year. By utilizing this service, agencies may reduce their

monthly telecommunications expenses compared to current costs for voice services.

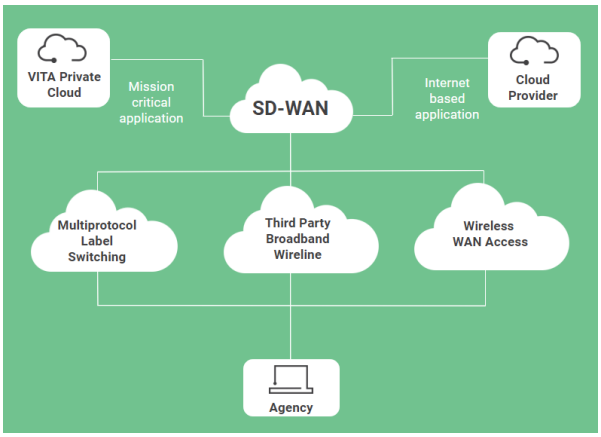
Managed Software Defined-Wide Area Network (SD-WAN)

VITA has commenced an initiative to implement SD-WAN capability for every executive branch agency. SD-WAN allows organizations to leverage many network transportation methods to securely connect users to applications. SD-WAN software responds to real-time network conditions, integrates intelligence at the WAN edge to identify traffic patterns or bottlenecks, and directs applications and services along paths that support their unique performance and security needs, offering improved agility and control.

> **What is SD-WAN?** *SD-WAN stands for Software-Defined Wide Area Network. SD-WAN uses software to route network traffic to allow agencies to efficiently manage and optimize their network operations*

SD-WAN brings several benefits to customer agencies, including enhanced application reliability, capacity, and network security, all without sacrificing performance. When implemented together with adding a lower-cost broadband circuit or other connections, SD-WAN can result in significantly increased bandwidth and performance.

Table 1. Managed SD-WAN



VITA and other state agencies have taken advantage of this technology with circuit upgrades, wireless access devices (Cradlepoint), and broadband circuit installations. Thus far, these efforts have resulted in a significant 57% reduction in hot site reports, with 272 specific sites upgraded in one form or another. (See Appendix A for the full Hot Site Report.)

As SD-WAN continues to be implemented, agencies may require funding to capitalize on its capabilities and to acquire broadband circuits or other connections that enable network optimization. As the project moves forward, there may be cases where construction costs are necessary to provide modern circuits to agency facilities.

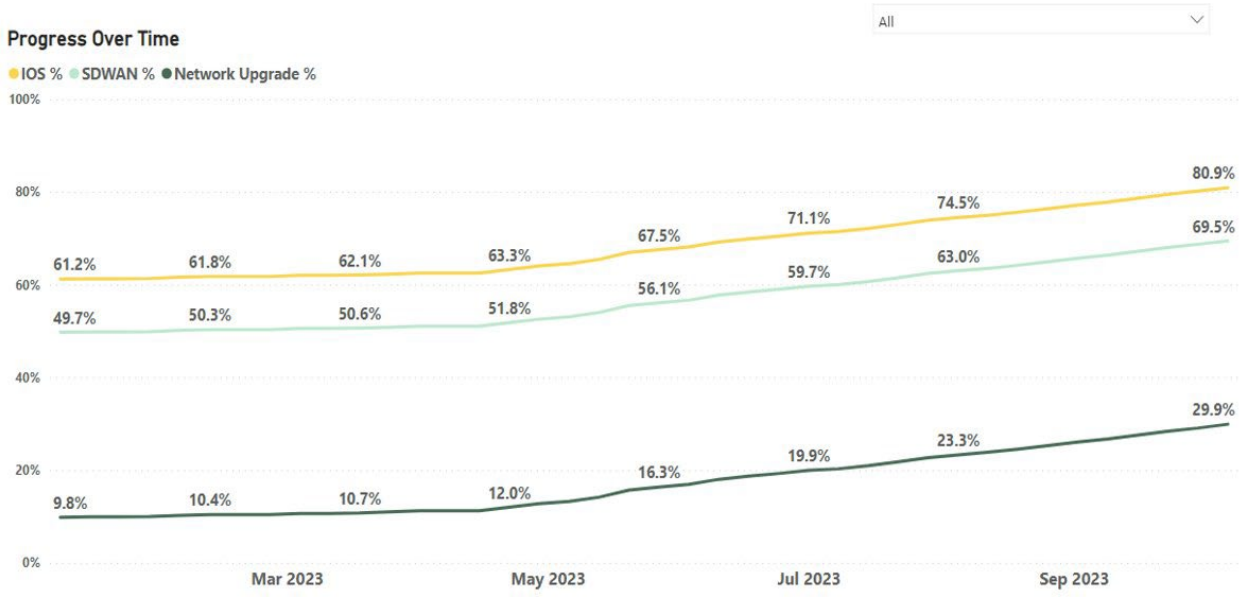


Table 2. SD-WAN and Broadband Circuit Install, as of September 2023.

Dense Wavelength-Division Multiplexing (DWDM)

Dense wavelength-division multiplexing (DWDM) is an optical fiber multiplexing technology that enables different data streams to be sent over a single fiber optic network. DWDM is used to increase the bandwidth of fiber networks, enhance productivity, and improve the overall customer experience. It serves as a modern replacement for the older Synchronous Optical Networking (SONET) technology. VITA has been working on the implementation of DWDM and anticipates doing so in the coming months, pending the resolution of supply chain shortages.

BUILDING A STRONG ZERO-TRUST SECURITY FRAMEWORK

The Commonwealth's hybrid cloud security posture can be enhanced through a zero-trust environment, as applications and services are progressively transitioned to the cloud. Benefits include a reduction of cyber risk by reducing the network attack surface, limiting the ability of attackers to expand out from an initially compromised system, as well as operational efficiencies for policy management.

VITA has begun the work to update the Commonwealth security model to a zero-trust environment. This updated approach will protect the Commonwealth's IT resources from the next generation of cyber threats and provide a secure architecture and best practices for cloud, artificial intelligence and third-party services regardless of what network a system is on. Improvements to remote access, content filtering, privileged access management, identity and access management and multi-factor authentication all play a pivotal role in establishing a zero-trust environment.

Secure Remote Access

VITA continued its project of rolling out a new remote user access tool, Prisma GlobalProtect. This tool enables individuals to access Commonwealth of Virginia (COV)

resources using a virtual private network (VPN) when working remotely. It has been rolled out to 58 of the planned 62 agencies and commissions. (Two deployments are being delayed until solutions are completed for specific use cases. The other two entities were recently added to the project scope.) This initiative replaces the legacy VPN technology, Cisco AnyConnect, due to inconsistent access and performance issues during high volumes of remote access demand.

To facilitate remote access from various devices, VITA has introduced an improved Virtual Desktop Infrastructure (VDI) service. This cloud-based VDI enables authorized remote workers to securely use any device. VDI technology hosts desktop environments on a centralized server and deploys them to end users as needed via secure internet networking. The service enhances application security, life cycle management, and user mobility while reducing per-user costs compared to the previous generation VDI.

Malicious Content Filtering

VITA has successfully migrated users from the on-premises web proxy to a cloud-based web proxy. The gateway, or web proxy, provides protection for COV assets against malicious internet websites and files. Moving the proxy to the cloud eliminates the single point of failure of a physical data center and also protects workstations regardless of the network used.

Privileged Access Management (PAM)

In alignment with VITA's commitment to bolstering internal controls and security, the Privileged Access Management (PAM) tool, CyberArk, has been extended to relevant agency personnel. PAM is used to securely manage, store, and rotate administrative credentials for all agency account administration, workstation location administration rights, and server administrators.

Single Sign-On and Multi-factor Authentication:

The use of Single Sign-on (SSO) relieves the burden of users needing to remember passwords for multiple applications and streamlines access for end users. VITA leverages SSO through the Okta platform, the enterprise single sign-on solution. The Okta platform enables VITA to pursue Multi-factor Authentication (MFA) for all users and systems with over 600 application integration instances, including external organizational users such as local government. Additionally, combining CyberArk with Okta has strengthened MFA enforcement, reduced stolen credentials, and improved security. VITA is in the process of upgrading the platform to leverage phishing-resistant MFA with additional services, such as Okta Verify for Mobile and Desktop Clients, Desktop MFA, and YubiKey integration. VITA SSO and MFA services are key to the Commonwealth's zero trust strategy and enable agencies to comply with payment card industry (PCI) requirements, Health Insurance Portability and Accountability Act (HIPAA) standards and other strict regulations.

Identity and Access Management

The implementation of SailPoint IdentityNow as the identity governance cloud solution allows agencies to view access roles and policies for all users, human and non-human, as well as objects across LaaS (licensing as a service) environments. This solution

automates access provisioning, monitors for inappropriate access, and enforces policies based on roles and activities. It also facilitates automated access reviews, reports, and historical views for auditing and compliance purposes.

COV Active Directory has integrated data feeds from Cardinal and the COV Enterprise Resource Planning (ERP) management system to enhance the data quality and consistency of employee identities, accounts, and attributes. This data is incorporated into automated processes such as account onboarding and offboarding, which continue to be improved.

PRIVATE & PUBLIC CLOUD SERVICES

Secondary Data Center

As reported last year, VITA has successfully completed the migration from the CESC data center to QTS, a Private Cloud, and the public cloud. This past year VITA completed the move of its secondary data center, primarily used for disaster recovery services, in Manassas, Va. to a facility in Ashburn, Va. The move enabled VITA to provide updated capabilities that closely aligned VITA's primary data center in Sandston, Va. These enhanced capabilities included Software Defined Data Center Networking, remote SAN-to-SAN replication, and multi-site workload clustering.

Previously, disaster recovery services focused on an all-or-nothing failover, rather than on high availability, which aligns with the Commonwealth's current usage of cloud-based services. VITA is collaborating with suppliers to identify the specific needs for supporting production workloads, high availability services, cyber resiliency, and cloud enabled-disaster recovery services. A fully highly available (HA) hybrid cloud production environment will prove more productive than the prior strategy of trying to construct a disaster recovery bubble.

Public Cloud Access

VITA has engaged SAIC, the multi-sourcing service integrator (or MSI), to implement the CloudScend tool, which adds the Cloud Broker Technology Integrator (CBTI) role to their responsibilities. CloudScend provides a consolidated view and set of services across multiple cloud platforms, offering automated provisioning of cloud resources, agency self-service and management, improved cloud billing information, and cloud resource utilizing and planning.

VITA released a request for proposals (RFP) to transform how public cloud services are provided in the Commonwealth, covering Microsoft Azure, Oracle Cloud Infrastructure (OCI), and Google Cloud Platform (GCP). Amazon Web Services (AWS) will continue to be supported by the incumbent supplier, Unisys, in alignment with the RFP. VITA is transitioning from utilizing a single managed cloud services (MCS) environment supporting all cloud environments to a model where each MCS will support a single cloud environment. These efforts will allow VITA to procure cloud services through a reseller, moving towards a consumption model for cloud billing, versus utilizing a "resource-unit" based approach. In this new model agencies will pay for only what resources they consume.

VITA is establishing an AWS Government cloud environment with added security for workloads that utilize “regulated” data, such as criminal justice data, healthcare, social security, and financial information.

Private Cloud Improvements

VITA is introducing a consumption-based billing model for the Private Cloud, aligning with the Public Cloud billing model. This simplifies billing and offers flexibility to agencies to turn down workloads when they are not needed. Also known as usage-based pricing, these models reduce costs by allowing agencies to pay only for the resources they consume. The consumption-based Private Cloud billing model will closely align with VITA’s Public Cloud billing model, simplifying and standardizing billing to the Agencies.

VITA’s current Private Cloud server offerings are based on fixed, predetermined configurations at a fixed cost per month. This pricing model has proven to be problematic, resulting in many servers being overprovisioned. This overprovisioning means Agencies are paying for virtual memory capacity and processor power that are not being used; by changing to a consumption-based billing model, VITA will enable agencies to properly scale their servers and provide them with a monthly cost savings.

Ransomware Protection

VITA is currently piloting a ransomware solution called Cyber Vault, a solution designed to defend against ransomware and malware. The Cyber Vault Solution (CVS) creates a secure, air-gapped “vault” where VITA-managed agencies can maintain mission-critical business data and technology configurations that can be used to recover from a cyber-attack. Daily data snapshots are saved and vaulted over consecutive days to enable data recovery to the point before an intrusion. The data saved by CVS, once vaulted, cannot be altered (immutable) by any means. The use of an ‘air gapped’ system makes vaulted data impervious to attack and protects saved data by virtually isolating it from the network.

An initial pilot test of several agencies will be initiated to test the ability to recover from vaulted critical business data by unvaulting isolated data and recovering clean data at a past point of time – demonstrating the Cyber Vault Solution as a viable defense against cyber-attacks. Data vaulted using this solution is separate from the current daily backups that run on managed agency servers and data stores.

PERFORMANCE AND NETWORK MONITORING

VITA has an “end to end” monitoring initiative to isolate, identify, and remediate issues impacting network performance. In conjunction with suppliers, VITA is creating oversight and due diligence initiatives in five areas: network capacity, reliability, architecture, latency and user experience, and operational capability.

Network Monitoring Tools

In 2023, VITA partnered with Cisco and suppliers to implement a proof-of-concept model with the ThousandEyes tool. Alongside this, VITA has been working diligently to provide agencies with comprehensive visibility into their entire network infrastructure ecosystem, utilized to deliver IT services. VITA is in the process of completing roll out of an internal

networking monitoring tool, LiveNX, by adding more data for analysis and making it available to its agency customers. LiveNX allows agencies to have a network visibility and monitoring tool to highlight their agency's network performance, bandwidth consumption, and applications utilization. The combination of the two tools will enable agency visibility into internal and external aspects of the customer network experience.

Past network reports have discussed the complexity of network troubleshooting and how network issues are not necessarily caused by problems with the network. Accordingly, VITA is piloting application monitoring and diagnostic tools. Collaborating with agencies such as DMV, the tool is providing valuable insight into application performance.

Application Monitoring

In some cases, network issues are not responsible for an application's latency and performance deficiencies. Working with Cisco, an application diagnostic tool has been procured for a proof of concept to provide an inside-out analysis of an application. While this tool requires significant resources, it has provided agencies insights on specific upgrades needed or other issues within their application stack.

Uninterruptible Power Supply (UPS) Service

VITA is developing a new service, expected to launch in late 2023, offering a simple rack uninterruptible power supply (UPS) service. The goal is to eliminate urgent service tickets and equipment repairs in the event of power outages, thus minimizing damaged hardware and increasing availability at affected locations.

Tiger Team Network Optimization

VITA and suppliers have formed a 'tiger team' to carry out operational tasks aimed at enhancing the customer experience. In spite of changes to the COV network, agency and data center changes, and ongoing network routing maintenance, the tiger team has made substantive strides. Their efforts created an efficient environment, improving customer performance. The tiger team eliminated terabytes of non-essential network traffic originated by non-COV third parties and cleaned up duplicate protocol paths. Within VITA's continuous improvement model, they enabled clients to be updated from local clients (peer caching), eliminated over one thousand older firewall rules, and contributed to a smoother network experience.

UPGRADES AND ASSOCIATED INVESTMENTS NEEDED

While VITA is making crucial improvements to ensure the reliability and performance of the Commonwealth's network infrastructure, it is essential to acknowledge where further work can enhance efforts. These areas encompass upgraded network circuits, expanding redundant networking, circuit modernization, strengthening network access and security, facilitating private and public cloud migrations, streamlining data center elimination, optimizing disaster recovery, bolstering ransomware protection, and elevating performance monitoring.

Upgrading network circuits for agency sites

Additional funding would enable agencies to take advantage of the capabilities of SD-WAN by procuring broadband circuits or other connections, enabling network traffic optimization through SD-WAN. As the project moves forward, it may identify locations where construction costs are necessary to provide modern circuits to an agency facility.

Where network circuit utilization is showing oversaturation, and where current circuit size does not meet VITA's recommended network bandwidth per user standard, upgrading is recommended to reduce congestion and to meet the standard. VITA is implementing SD-WAN at every agency to leverage cost efficient broadband circuitry compared to MPLS circuits. As stated, as each agency and location are evaluated for bandwidth upgrades, agencies can choose from broadband, MPLS, or wireless enhancements. Some agencies may need construction funding to extend service to specific locations. VITA provided bill credits to agencies in FY23, totaling $13.5M, to be used on making sites ready for the network upgrade activity. VITA has included, and DPB has approved, an additional $12.8M in expected spend on SD-WAN/network upgrades in FY24.

Expanding redundant networking

Redundant network connections provide multiple paths for traffic. This ensures an organization's uninterrupted online presence, even in the event of a network failure. Redundant network connections can boost performance through improved traffic routing and management. For critical sites identified to VITA, such as hospitals and traffic operations centers, VITA and agencies have already worked together to ensure redundant network connections. This is accomplished by utilizing two or more circuits or through implementing broadband backup to traditional circuits. The definition of critical sites could be broadened to include:

1. Every agency headquarters, given that all agencies depend on the network for their business, and
2. Every site where agencies and members of the public interact in-person in a way that cannot be fully replaced by online transactions, such as Department of Motor Vehicles offices.

VITA recommends agencies review the locations in need of redundant network connections.

Circuit modernization

In line with initiatives such as SD-WAN, overutilization of circuits should be remediated. SD-WAN can decide the best route (circuit) to be used, but in instances where one of the circuits fail, the remaining circuit may not be able to accommodate the business workload. For example, a DMV site may have had a T1 circuit (one MB throughput) and via SD-WAN a 100MB circuit was added. If the broadband circuit fails, the T1 circuit does not have the necessary capacity to support DMVs business. There should be investment in modernizing circuits to ensure their capacity aligns with workloads. Priority should be given where outdated technologies reside (such as T1s), or where site location build outs are needed, all within agency business support models.

Network access and security

Due to the many network access and security projects that are being rolled out, agencies' use may require agency planned budgeting. For example, to enable authentication to external users for an application, licenses and ongoing support will be part of the project. VITAs ongoing efforts with a zero-trust implementation is based on organic growth of existing products and continued roll out of products such as SailPoint, Okta, and various other products such as micro-segmentation.

Additional implementation opportunities are driven by tool replacements, new implementations of software, new suppliers being integrated, and product updates that will enable VITA to achieve a zero-trust model.

Private & public cloud services public cloud migrations

To continue migrating workloads to the public cloud, VITA needs to continue to eliminate reliance on any physical data center. Workload backups, application availability, varieties of disaster recovery services can all be ascertained within the public clouds and those initiative are outlined above.

As VITA continues to transform public cloud services in the Commonwealth, through initiatives such as the implementation of CBTI and the integration of additional MCPs as suppliers, it is imperative that VITA internalizes the necessary skills to not only oversee and govern the changing environments, but to have the technical knowledge to own and lead the services going forward. Additional resources to serve as service owners as well as architects are needed for VITA to align these changing and expanding services with the agencies' vision.

Eliminating Data Center

As stated above, many initiatives are in flight to eliminate the secondary data center and reduce footprint in the primary data center. The driver behind eliminating the secondary data center is the migration of servers to the cloud. Agency investment in applications that support high availability or migrating their application to the public clouds may require additional funding.

Modernized Disaster Recovery

To modernize disaster recovery services, the Commonwealth must have the ability to failover to other production sites. These sites can include physical and/or Public Cloud data centers. This requires VITA to design and build a robust network infrastructure to provide resilient communications pathways to the alternative sites for use in case of a disaster declaration. VITA is currently architecting a robust multi-cloud connection strategy complete with applicable security controls.

Ransomware Protection

Depending on the outcomes of the proof of concept, implementation of the ransomware project, the Cyber Vault Solution, will raise a question of what data is chosen to be protected. Protected data may be selected agency application data or the entire enterprise backup environment. Such decisions and the adaptation of cloud processing and backup

methodology will drive future funding requests.

Performance Monitoring

With the objective of an “end to end” network support, it is recommended that VITA and agencies have the ability to assemble a team focused on the many parts of the network(s) and to work with accountable parties to remediate known/foreseeable issues. Ensuring the proper tools are used to diagnose and monitor in the complex COV network is essential. Additionally, staffing a team that can identify, escalate, and address security issues is increasingly important. VITA will continue to work on building a comprehensive Network Operations Center (NOC) team.

CONCLUSION

The comprehensive initiatives undertaken to enhance the Commonwealth’s IT infrastructure mark VITA’s commitment to future-ready technological capabilities. The efforts underway are essential to the evolving demands of public service delivery while ensuring data security and disaster recovery readiness. By identifying and acting on areas of improvement, the Commonwealth is poised to advance its IT landscape and ensure efficient, secure, and reliable services to citizens and customer agencies. VITA thanks policymakers for this opportunity to report on this subject of vital importance.

Appendix A - Hot Site Report (as of 8/31/2023)

Agencies	Location Street, Location City	Current Speed	Recommended Circuit Bandwidth	Utilization - 95 Percentile	Utilization In - 95 Percentile	Utilization Out - 95 Percentile	Utilization In - Maximum	Utilization Out - Maximum
ACS	272 ACADEMY HILL RD , WARRENTON VA	3.07 M	Recommended Circuit Bandwidth 10 M	89.95%	89.95%	14.95%	97.70%	88.52%
COM	900 NATURAL RESOURCES DR STE COM -080, CH	50.00 M	Recommended Circuit Bandwidth 200 M	77.51%	73.39%	77.51%	85.79%	89.60%
	600 N 5TH ST , RICHMOND VA	100.00 M	Recommended Circuit Bandwidth 300 M	70.50%	70.50%	19.70%	75.64%	60.57%
DBHDS	26317 WASHINGTON ST , PETERSBURG VA	150.00 M	Recommended Circuit Bandwidth 500 M	82.72%	82.72%	11.31%	85.59%	67.68%
	26317 WASHINGTON ST , PETERSBURG VA	220.00 M	Recommended Circuit Bandwidth 500 M	80.38%	80.38%	9.17%	95.37%	22.43%
DBS	514 E BEVERLEY ST , STAUNTON VA	4.61 M	Recommended Circuit Bandwidth 20 M	73.07%	73.07%	11.65%	99.67%	93.98%
DBVI	397 AZALEA AVE STE DRS-042, RICHMOND VA	100.00 M	Recommended Circuit Bandwidth 300 M	76.53%	76.53%	11.79%	92.33%	62.14%
DFP	471 JAMES MADISON HWY , CULPEPER VA	1.54 M	Recommended Circuit Bandwidth 10 M	95.29%	95.29%	20.23%	98.50%	97.36%
DJJ	315 SCHOOL ST , TAZEWELL VA	1.54 M	Recommended Circuit Bandwidth 10 M	98.14%	98.14%	30.27%	98.64%	92.89%
DJJ	368 DESHAZOR DR STE DJJ -072, NEWPORT NEW	1.54 M	Recommended Circuit Bandwidth 10 M	97.95%	97.95%	39.09%	98.58%	98.21%
DJJ	20 S RANDOLPH ST , LEXINGTON VA	1.54 M	Recommended Circuit Bandwidth 10 M	92.85%	92.85%	25.08%	98.67%	87.59%
DJJ	7000 LUCY CORR BLVD STE DJJ -108, CHESTERFIE	6.14 M	Recommended Circuit Bandwidth 20 M	90.23%	90.23%	43.69%	97.72%	97.28%
DJJ	18 E MARKET ST STE DJJ -112, LEESBURG VA	3.07 M	Recommended Circuit Bandwidth 10 M	88.03%	88.03%	21.79%	99.58%	87.73%
DJJ	26 WINE ST STE DJJ -066, HAMPTON VA	1.54 M	Recommended Circuit Bandwidth 10 M	81.83%	81.83%	21.68%	98.69%	56.73%
DMV	94 ALEXANDRIA PIKE , WARRENTON VA	1.54 M	Recommended Circuit Bandwidth 10 M	96.55%	96.55%	50.02%	97.48%	86.43%
DMV	2348 YORK CROSSING DR , HAYES VA	1.54 M	Recommended Circuit Bandwidth 10 M	95.51%	95.51%	45.37%	97.69%	84.51%
DMV	300 N VIRGINIA ST , FARMVILLE VA	1.54 M	Recommended Circuit Bandwidth 10 M	95.02%	95.02%	41.79%	96.99%	80.33%
DMV	2039 HAMILTON BLVD , SOUTH BOSTON VA	1.54 M	Recommended Circuit Bandwidth 10 M	94.73%	94.73%	39.88%	97.39%	95.57%
DMV	1301 MAIN ST , ALTAVISTA VA	1.54 M	Recommended Circuit Bandwidth 10 M	93.86%	93.86%	48.29%	98.65%	86.35%
DMV	103 COMMONWEALTH BLVD , EMPORIA VA	1.54 M	Recommended Circuit Bandwidth 10 M	93.78%	93.78%	37.37%	97.38%	62.08%
DMV	1128 E LYNCHBURG SALEM TPKE STE DMV -036,	2.00 M	Recommended Circuit Bandwidth 10 M	91.83%	91.83%	40.24%	93.41%	100.87%
DMV	1017 TAZEWELL AVE , TAZEWELL VA	1.54 M	Recommended Circuit Bandwidth 10 M	90.20%	90.20%	42.07%	97.42%	65.04%
DMV	1968 GALLOWS RD STE DMV -071, VIENNA VA	1.54 M	Recommended Circuit Bandwidth 10 M	89.66%	89.66%	34.07%	97.01%	89.16%
DMV	4050 VALLEY PIKE , WINCHESTER VA	1.54 M	Recommended Circuit Bandwidth 10 M	89.63%	89.63%	47.83%	97.60%	89.24%
DMV	385 ARBOR DR , CHRISTIANSBURG VA	3.07 M	Recommended Circuit Bandwidth 10 M	88.97%	88.97%	34.13%	100.70%	89.92%
DMV	110 DMV DR , KILMARNOCK VA	1.54 M	Recommended Circuit Bandwidth 10 M	87.61%	87.61%	38.88%	97.55%	74.49%
DMV	5235 JOHN TYLER HWY , WILLIAMSBURG VA	3.07 M	Recommended Circuit Bandwidth 10 M	87.14%	87.14%	32.72%	93.92%	85.91%
DMV	5700 SOUTHPOINT CENTRE BLVD , FREDERICKSE	4.61 M	Recommended Circuit Bandwidth 20 M	87.04%	87.04%	26.36%	95.23%	75.38%
DMV	874 GARRISONVILLE RD , STAFFORD VA	3.07 M	Recommended Circuit Bandwidth 10 M	86.65%	86.65%	31.20%	96.37%	82.08%
DMV	305 TANYARD RD , ROCKY MOUNT VA	1.54 M	Recommended Circuit Bandwidth 10 M	86.24%	86.24%	42.21%	97.46%	84.78%

Agencies	Location Street, Location City	Current Speed	Recommended Circuit Bandwidth	Utilization - 95 Percentile	Utilization In - 95 Percentile	Utilization Out - 95 Percentile	Utilization In - Maximum	Utilization Out - Maximum
DMV	121 MALL RD , COVINGTON VA	1.54 M	Recommended Circuit Bandwidth 10 M	85.58%	85.58%	39.53%	98.66%	79.67%
DMV	2300 W BROAD ST STE DMV -088, RICHMOND V	4.61 M	Recommended Circuit Bandwidth 20 M	83.48%	83.48%	32.66%	95.34%	98.58%
DMV	4150 S FOUR MILE RUN DR , ARLINGTON VA	4.61 M	Recommended Circuit Bandwidth 20 M	83.10%	83.10%	37.16%	86.61%	88.38%
DMV	22478 INTERSTATE 85 , ALBERTA VA	1.54 M	Recommended Circuit Bandwidth 10 M	82.18%	82.18%	29.43%	98.61%	91.08%
DMV	15 WATER ST , FRONT ROYAL VA	1.54 M	Recommended Circuit Bandwidth 10 M	81.66%	81.66%	46.63%	97.43%	92.01%
DMV	998 HOPEMAN PKWY , WAYNESBORO VA	1.54 M	Recommended Circuit Bandwidth 10 M	81.11%	81.11%	39.05%	97.60%	79.96%
DMV	1595 N MAIN ST , MARION VA	1.54 M	Recommended Circuit Bandwidth 10 M	80.43%	80.43%	38.03%	97.43%	94.14%
DMV	310 STARLING AVE , MARTINSVILLE VA	3.07 M	Recommended Circuit Bandwidth 10 M	80.11%	80.11%	30.95%	95.52%	97.22%
DMV	3930 JAMES MADISON PKWY , KING GEORGE VA	1.54 M	Recommended Circuit Bandwidth 10 M	77.30%	77.30%	35.36%	97.90%	70.42%
DMV	154 INTERSTATE 95 HWY N , WOODBRIDGE VA	1.54 M	Recommended Circuit Bandwidth 10 M	74.67%	74.67%	16.80%	98.27%	43.63%
DMV	850 WIDGEON RD , NORFOLK VA	3.07 M	Recommended Circuit Bandwidth 10 M	74.36%	74.36%	28.67%	92.96%	88.04%
DMV	1600 AIR FORCE DR , ARLINGTON VA	1.54 M	Recommended Circuit Bandwidth 10 M	72.81%	72.81%	17.12%	98.54%	61.42%
DMV	126 SANDY CT , DANVILLE VA	4.61 M	Recommended Circuit Bandwidth 20 M	72.73%	72.73%	57.37%	93.49%	88.08%
DMV	7714 GUNSTON PLZ STE DMV -073, LORTON VA	3.07 M	Recommended Circuit Bandwidth 10 M	71.33%	71.33%	22.83%	94.19%	64.36%
DMV	2681 MILL RD STE DMV -074, ALEXANDRIA VA	4.61 M	Recommended Circuit Bandwidth 20 M	70.74%	70.74%	28.03%	96.48%	90.69%
DMV	2300 W BROAD ST STE DMV -001, RICHMOND V	155.00 M	Recommended Circuit Bandwidth 500 M	70.67%	70.67%	39.09%	97.96%	76.57%
DMV	11270 BULLOCH DR , MANASSAS VA	6.00 M	Recommended Circuit Bandwidth 20 M	70.36%	70.36%	25.75%	96.95%	60.12%
DMV	27426 SOUTHAMPTON PKWY , COURTLAND VA	1.54 M	Recommended Circuit Bandwidth 10 M	70.27%	70.27%	40.60%	98.60%	94.61%
DOC	30A W WATER ST , HARRISONBURG VA	3.07 M	Recommended Circuit Bandwidth 10 M	137.27%	137.27%	41.41%	145.98%	146.50%
DOC	11 WATER ST , FRONT ROYAL VA	1.54 M	Recommended Circuit Bandwidth 10 M	98.12%	98.12%	36.03%	98.88%	56.08%
DOC	1650 PARK AVE SW , NORTON VA	1.54 M	Recommended Circuit Bandwidth 10 M	96.14%	74.04%	96.14%	98.21%	100.39%
DOC	100 PREMIER PL , WINCHESTER VA	6.14 M	Recommended Circuit Bandwidth 20 M	93.32%	93.32%	34.48%	99.07%	94.21%
DOC	12240 COFFEEWOOD DR , MITCHELLS VA	1.54 M	Recommended Circuit Bandwidth 10 M	92.48%	92.48%	23.52%	98.66%	90.08%
DOC	329 DELLBROOK LN, INDEPENDENCE	44.00 M	Recommended Circuit Bandwidth 200 M	91.26%	91.26%	33.28%	98.72%	88.61%
DOC	137 FUGATE ST , DUFFIELD VA	4.00 M	Recommended Circuit Bandwidth 20 M	90.93%	90.93%	15.63%	98.41%	74.39%
DOC	901 CORRECTION WAY , JARRATT VA	50.00 M	Recommended Circuit Bandwidth 200 M	89.22%	89.22%	28.94%	96.02%	64.39%
DOC	10060 HUSKE RD , STONY CREEK VA	1.54 M	Recommended Circuit Bandwidth 10 M	87.02%	87.02%	29.94%	98.37%	57.83%
DOC	18155 AL PHILPOTT HWY , RIDGEWAY VA	3.07 M	Recommended Circuit Bandwidth 10 M	85.60%	85.60%	11.78%	96.39%	77.29%
DOC	750 HARRIS ST , CHARLOTTESVILLE VA	6.14 M	Recommended Circuit Bandwidth 20 M	85.14%	85.14%	49.08%	96.06%	79.98%
DOC	425 W WASHINGTON ST , SUFFOLK VA	4.61 M	Recommended Circuit Bandwidth 20 M	84.52%	84.52%	22.46%	97.00%	76.68%
DOC	3300 FAIRFAX DR , ARLINGTON VA	6.00 M	Recommended Circuit Bandwidth 20 M	82.30%	82.30%	42.43%	98.43%	79.55%
DOC	20 S ROANOKE ST , FINCASTLE VA	6.00 M	Recommended Circuit Bandwidth 20 M	81.20%	81.20%	14.48%	84.48%	94.14%
DOC	4740 EISENHOWER AVE , ALEXANDRIA VA	6.14 M	Recommended Circuit Bandwidth 20 M	80.80%	80.80%	33.68%	99.23%	79.83%
DOC	2892 SCHUTT RD , BURKEVILLE VA	50.00 M	Recommended Circuit Bandwidth 200 M	80.52%	80.52%	38.46%	84.94%	76.31%
DOC	479 CAMP NINE RD , RUSTBURG VA	1.54 M	Recommended Circuit Bandwidth 10 M	79.67%	79.67%	24.69%	95.31%	98.93%
DOC	5244 OLDE TOWNE RD , WILLIAMSBURG VA	6.14 M	Recommended Circuit Bandwidth 20 M	79.24%	79.24%	37.55%	87.15%	88.02%
DOC	70 E 1ST ST , CHRISTIANSBURG VA	1.54 M	Recommended Circuit Bandwidth 10 M	78.48%	78.48%	25.23%	98.26%	77.78%
DOC	1213 E CLAY ST , RICHMOND VA	7.00 M	Recommended Circuit Bandwidth 20 M	78.26%	78.26%	5.87%	93.54%	30.67%
DOC	471 MAIN ST , WARSAW VA	3.07 M	Recommended Circuit Bandwidth 10 M	78.15%	78.15%	22.57%	98.33%	76.29%
DOC	32 BRIDGE ST S , MARTINSVILLE VA	6.00 M	Recommended Circuit Bandwidth 20 M	77.91%	77.91%	22.48%	85.40%	63.67%
DOC	245 CIRCLE DR , ROCKY MOUNT VA	6.00 M	Recommended Circuit Bandwidth 20 M	77.76%	77.76%	30.91%	98.56%	90.10%
DOC	1704 BEVERLY HEIGHTS RD , CHATHAM VA	50.00 M	Recommended Circuit Bandwidth 200 M	76.99%	76.99%	38.11%	97.79%	85.94%

Agencies	Location Street, Location City	Current Speed	Recommended Circuit Bandwidth	Utilization - 95 Percentile	Utilization In - 95 Percentile	Utilization Out - 95 Percentile	Utilization In - Maximum	Utilization Out - Maximum
DOC	418 S MAIN ST , EMPORIA VA	1.54 M	Recommended Circuit Bandwidth 10 M	76.97%	76.97%	27.00%	96.40%	99.57%
DOC	101 S MAIN ST , WOODSTOCK VA	1.54 M	Recommended Circuit Bandwidth 10 M	76.84%	76.84%	25.85%	97.96%	90.45%
DOC	107C TURNPIKE RD , BEDFORD VA	6.14 M	Recommended Circuit Bandwidth 20 M	76.83%	76.83%	18.91%	96.58%	89.96%
DOC	31285 CAMP RD , HANOVER VA	6.14 M	Recommended Circuit Bandwidth 20 M	75.38%	75.38%	17.43%	87.24%	95.68%
DOC	130 FINLEY GAYLE DR , MARION VA	50.00 M	Recommended Circuit Bandwidth 200 M	74.54%	74.54%	22.54%	94.75%	82.18%
DOC	103 GREEN CHIMNEYS CT , ASHLAND VA	6.14 M	Recommended Circuit Bandwidth 20 M	72.52%	72.52%	20.92%	95.27%	98.91%
DOC	1845 ORANGE RD , CULPEPER VA	6.00 M	Recommended Circuit Bandwidth 20 M	72.36%	72.36%	20.87%	98.44%	78.66%
DOC	603 GATE CITY HWY , BRISTOL VA	3.07 M	Recommended Circuit Bandwidth 10 M	70.59%	70.59%	21.70%	94.37%	76.48%
DOC	100 FAIRVIEW DR , FRANKLIN VA	1.54 M	Recommended Circuit Bandwidth 10 M	70.46%	70.46%	24.24%	98.52%	51.76%
DOC	2510 HOUGTON AVE , SOUTH BOSTON VA	6.00 M	Recommended Circuit Bandwidth 20 M	70.45%	70.45%	16.40%	76.03%	66.52%
DOC	650 BARNFIELD RD , WARSAW VA	50.00 M	Recommended Circuit Bandwidth 200 M	70.30%	70.30%	27.08%	83.29%	85.40%
DOC	751 MILLER DR SE , LEESBURG VA	4.61 M	Recommended Circuit Bandwidth 20 M	70.18%	70.18%	12.48%	96.34%	79.08%
DOC	960 PRISON RD , BOYDTON VA	1.54 M	Recommended Circuit Bandwidth 10 M	70.06%	70.06%	7.03%	94.02%	83.27%
DOF	751 OAK HILL RD , CUMBERLAND VA	1.54 M	Recommended Circuit Bandwidth 10 M	93.70%	93.70%	24.09%	98.28%	66.07%
DOLI	3013 PETERS CREEK RD NW , ROANOKE VA	10.00 M	Recommended Circuit Bandwidth 40 M	85.68%	85.68%	25.20%	493.63%	219.75%
DOT	701 VDOT WAY , CHARLOTTESVILLE VA	10.00 M	Recommended Circuit Bandwidth 40 M	157.81%	157.81%	48.34%	801.83%	217.09%
DOT	21671 AZEN RD, DAMASCUS	1.54 M	Recommended Circuit Bandwidth 10 M	98.34%	98.34%	21.26%	98.86%	77.85%
DOT	268 STATE DR , TROUTVILLE VA	1.54 M	Recommended Circuit Bandwidth 10 M	98.27%	98.27%	14.87%	98.91%	83.23%
DOT	33 DONAHUE LN , ROSELAND VA	1.54 M	Recommended Circuit Bandwidth 10 M	97.50%	97.50%	28.53%	97.95%	81.54%
DOT	22448 HILLTOP DR , MC KENNEY VA	1.54 M	Recommended Circuit Bandwidth 10 M	97.16%	97.16%	44.73%	98.34%	84.60%
DOT	371 VDOT LN , LUNENBURG VA	1.54 M	Recommended Circuit Bandwidth 10 M	96.75%	96.75%	35.33%	97.76%	90.52%
DOT	5507 THOMAS JEFFERSON RD , FOREST VA	1.54 M	Recommended Circuit Bandwidth 10 M	96.11%	96.11%	35.41%	97.78%	55.25%
DOT	9495 REEDY CREEK RD , BRISTOL VA	1.54 M	Recommended Circuit Bandwidth 10 M	93.88%	93.88%	12.47%	98.70%	73.02%
DOT	17493 RAILROAD AVE , CAPRON VA	1.54 M	Recommended Circuit Bandwidth 10 M	92.77%	92.77%	12.72%	99.00%	27.31%
DOT	200 S KENTUCKY AVE , VIRGINIA BEACH VA	1.54 M	Recommended Circuit Bandwidth 10 M	84.87%	84.87%	28.97%	97.54%	49.37%
DOT	8159 MEETZE RD , WARRENTON VA	3.07 M	Recommended Circuit Bandwidth 10 M	83.26%	83.26%	22.39%	99.45%	91.53%
DOT	12526 NICKELSVILLE HWY , NICKELSVILLE VA	1.54 M	Recommended Circuit Bandwidth 10 M	80.93%	80.93%	29.09%	98.05%	40.96%
DOT	164 WYCHE RD , STAFFORD VA	1.54 M	Recommended Circuit Bandwidth 10 M	80.63%	80.63%	27.35%	97.42%	115.07%
DOT	66882 D WOODROW BIRD MEMORIAL HWY , RC	6.00 M	Recommended Circuit Bandwidth 20 M	74.15%	74.15%	9.19%	98.38%	38.21%
DOT	14381 ENTERPRISE RD , ABINGDON VA	10.00 M	Recommended Circuit Bandwidth 40 M	71.44%	71.44%	11.23%	97.42%	27.91%
DOT	11276 JAMES MADISON HWY , PALMYRA VA	10.00 M	Recommended Circuit Bandwidth 40 M	70.15%	70.15%	10.32%	97.19%	93.25%
DOT	2430 PINE FOREST DR , COLONIAL HEIGHTS VA	50.00 M	Recommended Circuit Bandwidth 200 M	70.13%	70.13%	8.32%	85.43%	57.34%
DRS	100 N COLLEGE DR , FRANKLIN VA	100.00 K	Recommended Circuit Bandwidth 10 M	109.88%	98.78%	109.88%	1917.99%	600.20%
DSS	106 RUCKER ST , STUART VA	1.54 M	Recommended Circuit Bandwidth 10 M	97.75%	97.75%	43.31%	100.59%	95.61%

Agencies	Location Street, Location City	Current Speed	Recommended Circuit Bandwidth	Utilization - 95 Percentile	Utilization In - 95 Percentile	Utilization Out - 95 Percentile	Utilization In - Maximum	Utilization Out - Maximum
DSS	211 MAIN ST STE DSS -040, NARROWS VA	3.07 M	Recommended Circuit Bandwidth 10 M	97.70%	97.70%	32.95%	100.49%	91.14%
DSS	17202 RICHMOND TPKE , MILFORD VA	3.07 M	Recommended Circuit Bandwidth 10 M	97.60%	97.60%	37.67%	100.74%	87.28%
DSS	644 PARK AVE NW , NORTON VA	1.54 M	Recommended Circuit Bandwidth 10 M	97.20%	97.20%	22.55%	97.83%	72.17%
DSS	65 COURTHOUSE HILL RD , WARM SPRINGS VA	1.54 M	Recommended Circuit Bandwidth 10 M	97.11%	97.11%	35.82%	97.90%	88.78%
DSS	3174 SLATE CREEK RD , GRUNDY VA	4.61 M	Recommended Circuit Bandwidth 20 M	96.53%	96.53%	30.35%	99.34%	91.07%
DSS	9324 WEST ST , MANASSAS VA	6.14 M	Recommended Circuit Bandwidth 20 M	96.51%	96.51%	59.18%	99.23%	93.25%
DSS	2127 LAKESIDE DR , LYNCHBURG VA	4.61 M	Recommended Circuit Bandwidth 20 M	96.05%	96.05%	65.05%	100.90%	93.25%
DSS	1000 SYKES BLVD , WISE VA	6.00 M	Recommended Circuit Bandwidth 20 M	95.77%	95.77%	33.84%	97.57%	92.85%
DSS	101 S MAIN ST , MADISON VA	1.54 M	Recommended Circuit Bandwidth 10 M	95.38%	95.38%	33.09%	99.80%	82.37%
DSS	494 N MAIN ST , WOODSTOCK VA	4.61 M	Recommended Circuit Bandwidth 20 M	95.29%	95.29%	56.25%	97.48%	85.03%
DSS	21641 RIDGETOP CIR , STERLING VA	3.07 M	Recommended Circuit Bandwidth 10 M	95.27%	95.27%	67.96%	97.78%	95.32%
DSS	69 KABLER LN STE DSS -058, RUSTBURG VA	1.54 M	Recommended Circuit Bandwidth 10 M	94.97%	94.97%	32.67%	97.62%	93.70%
DSS	8880B JAMES MADISON HWY STE DSS -111, FOF	4.61 M	Recommended Circuit Bandwidth 20 M	94.74%	94.74%	32.70%	97.86%	96.38%
DSS	772 RICHMOND BEACH RD STE DSS -070, TAPPA	3.07 M	Recommended Circuit Bandwidth 10 M	94.15%	94.15%	27.28%	97.04%	88.40%
DSS	1610 FOREST AVE , HENRICO VA	6.14 M	Recommended Circuit Bandwidth 20 M	94.15%	94.15%	36.70%	98.55%	95.23%
DSS	400 THOMAS JEFFERSON HWY , CHARLOTTE CO	4.61 M	Recommended Circuit Bandwidth 20 M	93.36%	93.36%	22.80%	98.04%	76.30%
DSS	18849 KINGS HWY , MONTROSS VA	3.07 M	Recommended Circuit Bandwidth 10 M	93.34%	93.34%	51.48%	97.96%	85.19%
DSS	5265 THE HORNES , CAPE CHARLES VA	4.61 M	Recommended Circuit Bandwidth 20 M	93.25%	93.25%	26.49%	97.34%	98.26%
DSS	3908 OLD BUCKINGHAM RD STE DSS -069, POW	4.61 M	Recommended Circuit Bandwidth 20 M	92.80%	92.80%	28.80%	98.10%	99.03%
DSS	1280 BROWNING HOLW , CLINTWOOD VA	5.00 M	Recommended Circuit Bandwidth 10 M	92.75%	92.75%	20.83%	94.20%	87.10%
DSS	316 E CAWSON ST , HOPEWELL VA	4.61 M	Recommended Circuit Bandwidth 20 M	92.64%	92.64%	15.59%	97.23%	55.32%
DSS	608 JACKSON ST , FREDERICKSBURG VA	6.14 M	Recommended Circuit Bandwidth 20 M	92.57%	92.57%	39.26%	97.58%	90.28%
DSS	45 SCHOOL ST , SURRY VA	4.61 M	Recommended Circuit Bandwidth 20 M	91.70%	91.70%	21.40%	126.66%	70.87%
DSS	465 W 15TH ST , FRONT ROYAL VA	3.07 M	Recommended Circuit Bandwidth 10 M	90.78%	90.78%	40.73%	93.35%	94.20%
DSS	121 E MAIN ST , BEDFORD VA	20.00 M	Recommended Circuit Bandwidth 50 M	90.52%	90.52%	28.01%	94.56%	88.18%
DSS	56 SMI WAY , FARMVILLE VA	6.00 M	Recommended Circuit Bandwidth 20 M	90.22%	90.22%	21.20%	93.84%	77.27%
DSS	16360 DUNN ST , AMELIA COURT HOUSE VA	3.07 M	Recommended Circuit Bandwidth 10 M	89.91%	89.91%	28.14%	94.83%	77.97%
DSS	192 BRISTOL EAST RD , BRISTOL VA	5.00 M	Recommended Circuit Bandwidth 20 M	89.39%	89.03%	89.39%	97.78%	96.19%
DSS	2893 GENERAL PULLER HWY , SALUDA VA	3.07 M	Recommended Circuit Bandwidth 10 M	89.10%	89.10%	26.96%	94.41%	94.11%
DSS	401 LAFAYETTE ST , WILLIAMSBURG VA	3.07 M	Recommended Circuit Bandwidth 10 M	89.03%	89.03%	52.59%	96.16%	99.46%
DSS	201 SHARP ST , LAWRENCEVILLE VA	3.07 M	Recommended Circuit Bandwidth 10 M	88.75%	88.75%	42.74%	93.56%	92.25%
DSS	1259 COURTHOUSE RD , STAFFORD VA	3.07 M	Recommended Circuit Bandwidth 10 M	87.87%	87.87%	53.87%	97.13%	95.66%
DSS	24 BAKER ST , WINCHESTER VA	10.00 M	Recommended Circuit Bandwidth 40 M	87.78%	87.78%	49.55%	97.87%	89.68%
DSS	172 COURTHOUSE LN STE DSS -120, KING WILLI	3.07 M	Recommended Circuit Bandwidth 10 M	87.37%	87.37%	33.14%	96.91%	97.75%
DSS	354 GAY ST , WASHINGTON VA	3.07 M	Recommended Circuit Bandwidth 10 M	86.26%	86.26%	26.14%	95.43%	80.60%
DSS	22554 CENTER PKWY , ACCOMAC VA	6.14 M	Recommended Circuit Bandwidth 20 M	85.83%	85.83%	26.13%	96.24%	73.22%
DSS	120 W OXFORD ST STE DSS -112, FLOYD VA	1.54 M	Recommended Circuit Bandwidth 10 M	85.35%	85.35%	10.81%	100.92%	33.86%
DSS	10910 COURTHOUSE RD , CHARLES CITY VA	1.54 M	Recommended Circuit Bandwidth 10 M	84.92%	84.92%	61.20%	101.81%	322.56%
DSS	13360 W JAMES ANDERSON HWY , BUCKINGHA	3.07 M	Recommended Circuit Bandwidth 10 M	84.72%	84.72%	13.26%	100.03%	48.23%
DSS	6450 COURTHOUSE RD BLDG 12, PRINCE GEORG	4.61 M	Recommended Circuit Bandwidth 20 M	84.03%	84.03%	64.12%	86.84%	100.24%
DSS	1030 COWFORD RD , HALIFAX VA	7.00 M	Recommended Circuit Bandwidth 20 M	83.76%	83.76%	28.40%	84.88%	88.90%
DSS	20103 PRINCETON RD , STONY CREEK VA	4.61 M	Recommended Circuit Bandwidth 20 M	83.72%	83.72%	30.86%	87.01%	81.65%
DSS	190 BEECH ST STE DSS -099, GATE CITY VA	4.61 M	Recommended Circuit Bandwidth 20 M	83.70%	83.70%	27.48%	86.33%	98.40%
DSS	320 HOSPITAL DR , WARRENTON VA	6.14 M	Recommended Circuit Bandwidth 20 M	83.46%	83.46%	78.92%	96.59%	95.99%

Agencies	Location Street, Location City	Current Speed	Recommended Circuit Bandwidth	Utilization - 95 Percentile	Utilization In - 95 Percentile	Utilization Out - 95 Percentile	Utilization In - Maximum	Utilization Out - Maximum
DSS	129 DAVIS ST , INDEPENDENCE VA	4.61 M	Recommended Circuit Bandwidth 20 M	83.37%	83.37%	27.37%	124.77%	587.31%
DSS	288 W COURTHOUSE RD , CREWE VA	7.00 M	Recommended Circuit Bandwidth 20 M	83.31%	83.31%	23.86%	85.15%	85.92%
DSS	15068 LEE HWY , BRISTOL VA	6.14 M	Recommended Circuit Bandwidth 20 M	83.17%	83.17%	31.86%	85.47%	78.16%
DSS	135 HIGHLAND DR STE DSS-090, LEBANON VA	10.00 M	Recommended Circuit Bandwidth 40 M	81.88%	81.88%	23.80%	98.66%	66.27%
DSS	105 E CENTER ST , GALAX VA	1.54 M	Recommended Circuit Bandwidth 10 M	81.05%	81.05%	21.32%	97.86%	45.08%
DSS	108 HILL ST , JONESVILLE VA	1.54 M	Recommended Circuit Bandwidth 10 M	80.26%	80.26%	17.11%	97.68%	38.90%
DSS	210 1ST ST SW , ROANOKE VA	6.14 M	Recommended Circuit Bandwidth 20 M	79.13%	79.13%	44.81%	98.86%	85.01%
DSS	146 MADISON RD , ORANGE VA	10.00 M	Recommended Circuit Bandwidth 40 M	77.79%	77.79%	27.48%	93.41%	70.29%
DSS	5579 RICHMOND RD , WARSAW VA	3.07 M	Recommended Circuit Bandwidth 10 M	77.56%	77.56%	20.44%	98.05%	66.75%
DSS	1835 INDUSTRY DR , CULPEPER VA	4.61 M	Recommended Circuit Bandwidth 20 M	76.70%	76.70%	10.43%	98.57%	92.45%
DSS	9990 FAIRFAX BLVD , FAIRFAX VA	4.61 M	Recommended Circuit Bandwidth 20 M	76.10%	76.10%	19.49%	98.12%	88.84%
DSS	9705 LIBERIA AVE STE 301, MANASSAS VA	6.00 M	Recommended Circuit Bandwidth 20 M	72.56%	72.56%	25.38%	96.97%	82.09%
DSS	3701 PENDER DR , FAIRFAX VA	4.61 M	Recommended Circuit Bandwidth 20 M	71.74%	71.74%	16.16%	96.32%	92.88%
DSS	45201 RESEARCH PL STE 110, ASHBURN VA	5.00 M	Recommended Circuit Bandwidth 20 M	70.28%	70.28%	55.46%	92.62%	84.57%
DVS	1601 BROAD ROCK BLVD , RICHMOND VA	50.00 M	Recommended Circuit Bandwidth 200 M	92.71%	92.71%	14.09%	97.86%	41.39%
DWR	1320 BELMAN RD , FREDERICKSBURG VA	1.54 M	Recommended Circuit Bandwidth 10 M	98.15%	98.15%	22.30%	98.62%	95.64%
DWR	517 LEE HWY , VERONA VA	10.00 M	Recommended Circuit Bandwidth 40 M	80.98%	80.98%	17.18%	92.88%	88.54%
ITA	2214 ROCK HILL RD STE ITA -001, HERNDON VA	56.00 K	Recommended Circuit Bandwidth 10 M	88.77%	88.77%	46.18%	96.86%	87.61%
JYF	2207 COLONIAL PKWY , WILLIAMSBURG VA	50.00 M	Recommended Circuit Bandwidth 200 M	81.67%	81.67%	18.94%	84.79%	88.39%
MNH	21 STARLING AVE , MARTINSVILLE VA	10.00 M	Recommended Circuit Bandwidth 40 M	94.95%	94.95%	15.87%	427.77%	111.82%
TAX	600 E MAIN ST STE TAX-002, RICHMOND VA	300.00 M	Recommended Circuit Bandwidth 1 Gbps	95.51%	95.51%	19.67%	98.83%	91.19%
	1957 WESTMORELAND ST , RICHMOND VA	300.00 M	Recommended Circuit Bandwidth 1 Gbps	70.96%	27.81%	70.96%	55.16%	91.48%
VDH	8470 KAO CIR , MANASSAS VA	1.54 M	Recommended Circuit Bandwidth 10 M	192.91%	192.91%	63.47%	198.35%	182.12%
VDH	17202 RICHMOND TPKE , BOWLING GREEN VA	1.54 M	Recommended Circuit Bandwidth 10 M	96.53%	96.53%	52.30%	97.68%	92.41%
VDH	540 INDUSTRIAL DR , LOUISA VA	1.54 M	Recommended Circuit Bandwidth 10 M	96.35%	96.35%	43.64%	98.87%	87.21%
VDH	5 COUNTY COMPLEX CT , WOODBRIDGE VA	1.54 M	Recommended Circuit Bandwidth 10 M	95.98%	95.98%	44.43%	97.29%	97.33%
VDH	1502 WILLIAMSON RD NE , ROANOKE VA	15.00 M	Recommended Circuit Bandwidth 50 M	95.89%	95.89%	61.38%	97.02%	92.94%
VDH	1414 N AUGUSTA ST STE VDH -073, STAUNTON	10.00 M	Recommended Circuit Bandwidth 40 M	95.83%	95.83%	45.96%	98.11%	89.32%
VDH	1739 JEFFERSON DAVIS HWY , STAFFORD VA	1.54 M	Recommended Circuit Bandwidth 10 M	95.80%	95.80%	43.04%	97.62%	93.73%
VDH	801 LAKESIDE DR , LYNCHBURG VA	15.00 M	Recommended Circuit Bandwidth 50 M	95.71%	95.71%	30.04%	97.12%	78.13%

Agencies	Location Street, Location City	Current Speed	Recommended Circuit Bandwidth	Utilization - 95 Percentile	Utilization In - 95 Percentile	Utilization Out - 95 Percentile	Utilization In - Maximum	Utilization Out - Maximum
VDH	3908 OLD BUCKINGHAM RD , POWHATAN VA	1.54 M	Recommended Circuit Bandwidth 10 M	95.60%	95.60%	33.95%	96.78%	47.62%
VDH	123 PARKVIEW RD NE , FLOYD VA	1.54 M	Recommended Circuit Bandwidth 10 M	95.31%	95.31%	55.43%	97.52%	91.64%
VDH	107 N KENT ST STE VDH -087, WINCHESTER VA	1.54 M	Recommended Circuit Bandwidth 10 M	95.19%	95.19%	51.91%	96.14%	72.57%
VDH	606 DENBIGH BLVD , NEWPORT NEWS VA	3.07 M	Recommended Circuit Bandwidth 10 M	94.49%	94.49%	22.74%	97.87%	39.57%
VDH	9311 LEE AVE , MANASSAS VA	10.00 M	Recommended Circuit Bandwidth 40 M	93.78%	93.78%	44.11%	98.25%	85.33%
VDH	400 E JACKSON ST , RICHMOND VA	10.00 M	Recommended Circuit Bandwidth 40 M	92.14%	92.14%	22.22%	97.33%	87.97%
VDH	21 ACADEMY ST , FINCASTLE VA	3.07 M	Recommended Circuit Bandwidth 10 M	90.51%	90.51%	26.70%	100.80%	84.79%
VDH	20103 PRINCETON RD STE VDH -034, STONY CRE	1.54 M	Recommended Circuit Bandwidth 10 M	89.99%	89.99%	44.78%	96.81%	97.56%
VDH	416 J CLYDE MORRIS BLVD , NEWPORT NEWS VA	20.00 M	Recommended Circuit Bandwidth 50 M	88.81%	88.81%	22.68%	97.52%	46.15%
VDH	1041 TECHNOLOGY PARK DR , GLEN ALLEN VA	6.00 M	Recommended Circuit Bandwidth 20 M	83.79%	83.79%	26.87%	85.27%	93.95%
VDH	6730 PUBLIC SAFETY RD , CHESTERFIELD VA	15.00 M	Recommended Circuit Bandwidth 50 M	82.25%	82.25%	28.70%	85.22%	57.71%
VDH	15068 LEE HWY STE VDH -012, BRISTOL VA	10.00 M	Recommended Circuit Bandwidth 40 M	81.73%	81.73%	35.69%	97.36%	86.92%
VDH	7501 ADKINS RD , CHARLES CITY VA	1.54 M	Recommended Circuit Bandwidth 10 M	80.55%	80.55%	35.36%	96.92%	46.84%
VDH	210 PEPPER ST S , CHRISTIANSBURG VA	20.00 M	Recommended Circuit Bandwidth 50 M	80.04%	50.98%	80.04%	97.51%	84.21%
VDH	640 LAUREL ST , CULPEPER VA	10.00 M	Recommended Circuit Bandwidth 40 M	79.76%	79.76%	20.08%	98.56%	61.69%
VDH	1550 TOMCAT BLVD , VIRGINIA BEACH VA	1.54 M	Recommended Circuit Bandwidth 10 M	79.08%	79.08%	36.38%	98.52%	89.05%
VDH	608 JACKSON ST STE VDH -050, FREDERICKSBUR	10.00 M	Recommended Circuit Bandwidth 40 M	75.02%	52.05%	75.02%	75.95%	78.89%
VDH	2131 JEFFERSON DAVIS HWY , STAFFORD VA	1.54 M	Recommended Circuit Bandwidth 10 M	73.79%	73.79%	26.24%	96.88%	52.04%
VDH	7740 SHRADER RD STE VDH-004, HENRICO VA	20.00 M	Recommended Circuit Bandwidth 50 M	72.42%	72.42%	26.81%	238.76%	53.67%
VEC	1300 GREENSVILLE COUNTY CIR , EMPORIA VA	3.07 M	Recommended Circuit Bandwidth 10 M	91.76%	91.76%	23.24%	98.19%	74.86%
VEC	233 COMMONWEALTH BLVD W STE VEC-076, M	5.00 M	Recommended Circuit Bandwidth 20 M	81.70%	81.70%	56.86%	97.51%	84.40%
DVS	335 W MONROE ST, WYTHEVILLE	3.00 M	Recommended Circuit Bandwidth 20 M	126.04%	126.04%	9.50%	340.98%	56.77%
VSP	1740 E PARHAM RD, RICHMOND	10.00 M	Recommended Circuit Bandwidth 40 M	102.00%	102.00%	3.21%	150.97%	12.93%
VSP	600 INDEPENDENCE PKWY , CHESAPEAKE VA	10.00 M	Recommended Circuit Bandwidth 40 M	93.23%	93.23%	9.90%	269.81%	109.99%
VSP	3804 LOREN DR , FREDERICKSBURG VA	5.00 M	Recommended Circuit Bandwidth 20 M	72.19%	72.19%	6.34%	97.95%	29.01%