

VERO

FIBER NETWORKS



Hillsboro Indep School District Private Fiber Network

An opportunity to upgrade the District's connectivity infrastructure so that every student can take advantage of the promise of the digital learning platform Hillsboro Independent School District provides.

470 # 190001075

November 16, 2018
Prepared for Cindy Darden,
Instructional Technology Director
darden@hillsboroisd.org

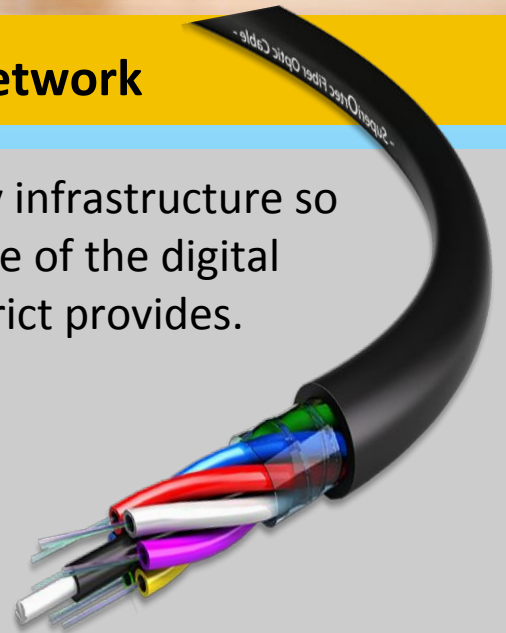


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Why Choose Vero Fiber Networks?

Hillsboro Independent School District's Administrators, School Board, Technology leaders and Teachers have a phenomenal opportunity ahead of them to transform education through digital learning. Your students will go on to prosper and be well equipped for the next chapter of their lives because of the steps you are taking to become leaders in Digital Learning and providing new and innovative resources to your Educators and Students.

Legacy phone and cable companies are not providing the infrastructure services to address the demands these new technologies place on your network. Rather, they continue to repackage consumer-grade services and market them at enterprise price points.

The Vero Fiber Networks' team will be available throughout the entire process to answer any questions that you might have. **John Real**, your dedicated Private Fiber Network expert, has over 25 years of experience in the fiber-based telecommunications industry and can be reached at:

Email: john@veronetworks.com; Phone: (303) 536-1875

Vero Fiber Networks is pleased to assist Hillsboro Independent School District by providing not only High Speed, but High Performance networks at significant price reductions. Over the past decade the team at Vero Fiber Networks has helped **k-12 schools**, Social Media, Web Content and Large Enterprise companies transform into the digital era and we are excited to bring those services and economies of scale to **your** school district networks.

Respectfully,

Matt Erickson

Matt Erickson
CEO Vero Fiber Networks

Evaluation Criteria

Decision Criteria	VERO Private Fiber Network	Traditional Networks
Supports Digital Learning	Supports all applications	Struggles with data intensive applications
Cost	Pennies / Mbps, long-term cost certainty	Very high unit costs, and additional cost for each upgrade
Capacity	Virtually Unlimited	Shared, Capped & Not Guaranteed
Hassle Free	100% Controlled by You	Provider Controlled
Network Throughput	100% Guaranteed	Constantly Variable
Expansion	Extra fibers available for expansion	Limited growth and requires upgrades throughout network
K-12 Experience	Vero Fiber Networks hands-on, proven management team	Call centers and departmental hand-offs

Hassle Free

We assume you have better things to do than spend endless hours on the phone with tech support reps that do a few “tests” and then say “all clear on our end”.

That is why we will make this promise to you. If ever you are not **100% satisfied** with our support or services, please call our **CTO and CEO**.



To back up our commitment, we are working to turn the telecom world on its head by providing the most reliable service offering available.

We hope to redefine how you think about service providers and raise the bar for what you should expect relative to traditional providers. Ironically, removing all of the complexity in a network is what makes it really reliable and improves performance. Unlike other companies we don’t share fiber, equipment and resources across 100s or even 1,000s of customers. Rather, we provide dedicated, private solutions that will last decades. This method creates a truly reliable and high performance service, and we think that highly satisfied customers are the key to running a sustainable, successful business.

So, if you don’t have to worry about your networks performance, what will you do with the extra time?

Although we are currently too small to be ranked by JD Powers we strive to get perfect ratings from our customers. Below is a chart from JD Powers for “wireline” telecommunications services for small and medium sized businesses which is most similar in size and needs to your school District. **You no longer have to settle for overpriced, poor service.**



*Please note that JDPower.com Power Circle Ratings may not include all information used to determine J.D. Power awards. Learn more about how J.D. Power Ratings are calculated.

Source: <http://www.jdpower.com/business/ratings/study/Business-Wireline-Satisfaction-Study/4330ENG/Small-and-Midsize-Business/1440>

Lasting Solution

A Private Fiber Network will last the District at least 20 years.

Fiber optic cables are the backbone of the internet and will be the underlying technology for many, many decades to come. Because Vero Fiber Networks' solution utilizes brand-new, dedicated fiber between your school locations, we can say with 100% confidence that the network we install for your District will be a workhorse for many decades. We also include free upgrades for the optronics needed to light the equipment so that you can increase the speed at any point during the contract or contract extensions.

Regardless of the term you select, Vero Fiber Networks will offer voluntary renewal options that extend to the year 2039 or beyond.

This could very well be **the last time you need to go through the E-Rate bid process** and by choosing Vero you get the most cost effective, reliable solution available.



Lowest Price Solution

Vero's solution will be the best, long-term, total cost of ownership proposal you'll receive.



How does Vero Fiber Networks make such a bold statement?

The answer starts with how most service providers view their customers and prices:

- The need for bandwidth (speeds) increases year-over-year
- Most providers, especially publicly traded companies, measure their revenues in ARPU (Average Revenue Per User)
- Many providers try to trap their customers in a continuous upgrade cycle as bandwidth needs have historically jumped to the next capacity tier every 3 years.
- That means every 3 years you “need” more bandwidth, and therefore, price increases are effectively built in into the upgrade.

Vero Fiber Networks on the other hand isn't interested in charging for upgrades and thus “increasing ARPU.” In fact, we want our District customers to use as much bandwidth as they need without paying any more.

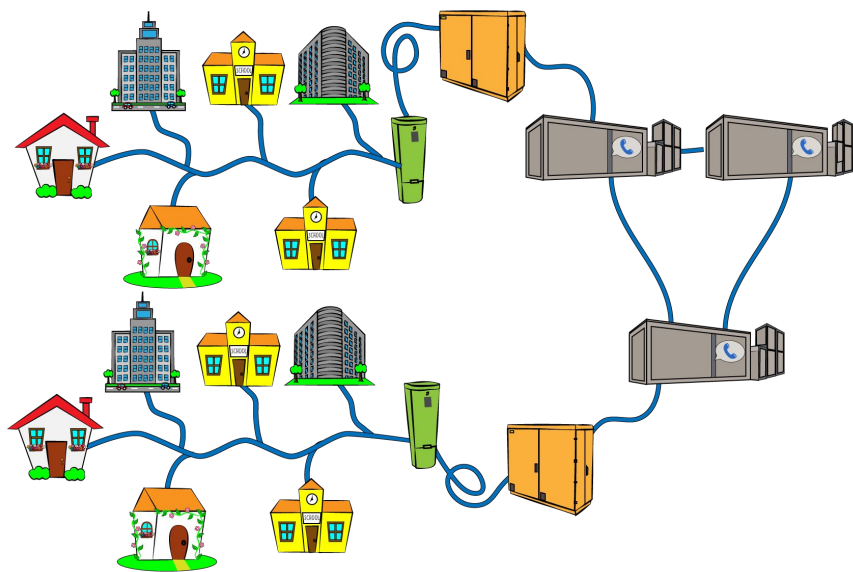
We measure our business success in long-term, valuable relationships with our customers. That is why we are able to offer very aggressive pricing and exceptional service, which we believe will ensure that you will be a happy customer for many years to come.

Public vs Private Fiber Network?

Shared Networks (phone or cable company)

Shared networks aggregate traffic for economies of scale, but introduce risk to security, reliability and performance.

- Have you ever noticed the internet seems to be a bit slower at peak times? Maybe 9am when the typical office employee starts to conduct heavier workloads?
- This is because the network is often oversubscribed by traditional providers, meaning they sell more bandwidth on each connection than is available across the network.



Private Dark or Lit Fiber Network

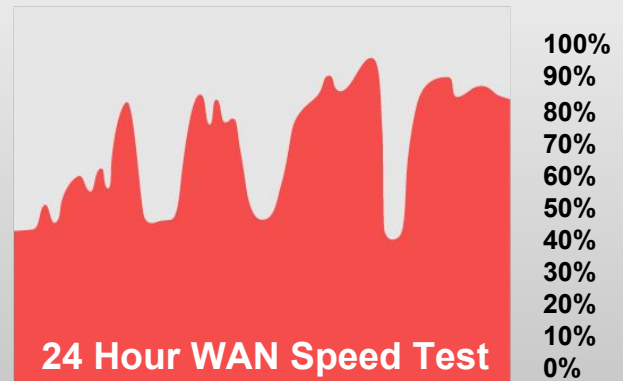
Dedicated resources remove common points of failure and provide security and scalability.

- With dedicated fiber cable between school facilities, the bandwidth on a Private Fiber Network isn't used by any other customers.
- Your District gets 100% of the bandwidth it pays for, all day, every day.



Are you getting the bandwidth you are paying for?

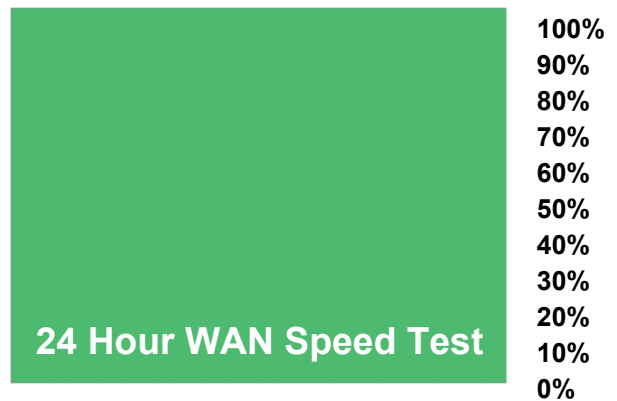
Cable and Phone Companies



Do you know who you are sharing your network with?

Shared networks deliver really inconsistent results. As more people get online, speeds really suffer and are usually the worst when you really need it.

Vero Private Fiber Networks



Vero Private Fiber Networks don't share any fiber or equipment with other users and have 100% reliable performance.

District Bandwidth Evaluation

For the 2017-2018 school year and beyond, both the FCC and State Educational Technology Directors Association (SETDA) recommend scalable WAN capacity of at least 10 Gbps per 1,000 students. A Vero Fiber Networks Private Network Solution meets this recommendation and is upgradable to meet virtually any new bandwidth recommendations in the future. The table below reflects Vero’s analysis and recommendation based on the guidance provided by both the FCC & SETDA, and positions the District well for any increasing demands on its bandwidth infrastructure.

FCC 2017-2018 WAN Capacity Target (10 Gbps / 1000 Users)

2. WAN/Last-Mile (Order ¶¶ 39-44)
The Order adopts as a target for WAN connectivity the total number of schools that have a connection capable of providing a dedicated data service scalable to the SETDA long-term WAN target of 10 Gbps per 1,000 students. For libraries, the Order concludes that the record is not sufficiently developed to establish a performance measure and a WAN connectivity target at this time. However, to the extent that libraries are connected by a WAN, the FCC will measure the total number of libraries that have a connection capable of providing a data service scalable to at least 10 Gbps. Similar to Internet access, the FCC will measure the affordability of WAN connections by tracking pricing as a function of bandwidth.

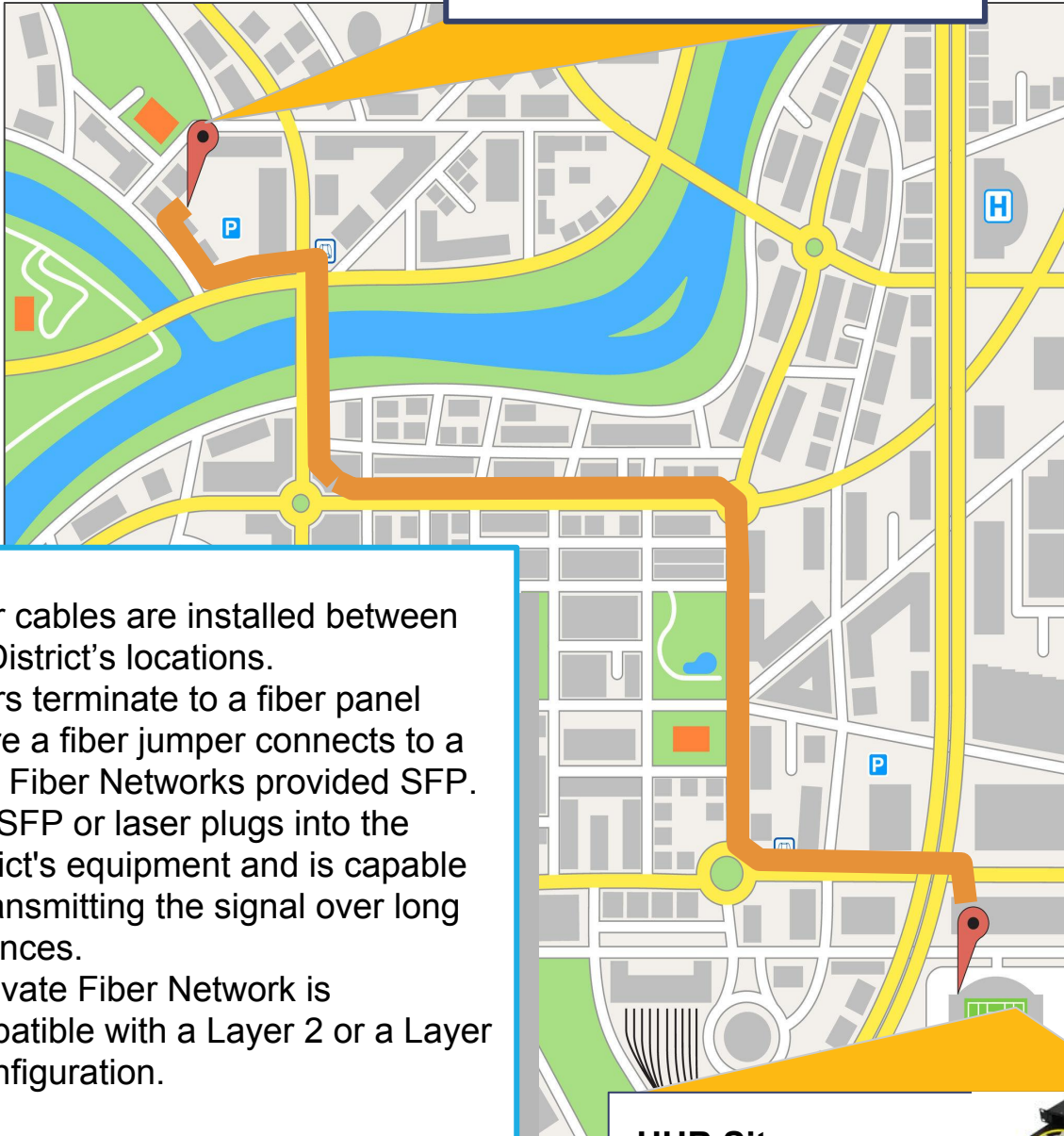
SETDA 2017-2018 WAN Capacity Target (10 Gbps / 1000 Users)

WAN RECOMMENDATIONS	
School Year	2017-18 Targets
Connections to each school to link to the internet via a district aggregation point and for in-house administrative functions	At least 10 Gbps per 1,000 users
*User: students, teachers, administrators, staff, and guests	

Bandwidth Recommendation

School Site	Full Time Students	SETDA / FCC Recommendation	Vero Fiber Networks Solution
Hillsboro Junior High School	437	5 Gbps	10 Gbps +
Franklin Elementary School	188	2 Gbps	10 Gbps +
Hillsboro Elementary School	454	5 Gbps	10 Gbps +
Hillsboro Intermediate School	478	5 Gbps	10 Gbps +
Hillsboro High School	547	6 Gbps	10 Gbps +

What is a Private Fiber Network?



- Fiber cables are installed between the District's locations.
- Fibers terminate to a fiber panel where a fiber jumper connects to a Vero Fiber Networks provided SFP.
- The SFP or laser plugs into the District's equipment and is capable of transmitting the signal over long distances.
- A Private Fiber Network is compatible with a Layer 2 or a Layer 3 configuration.

This a very simple, yet highly effective system.



Switch → SFP → Fiber Jumper → Patch Panel → Outdoor Fiber Cable → Patch Panel → Fiber Jumper → SFP → Switch

Service Description

Vero Fiber Networks is pleased to provide the District with a 100% E-Rate compliant, comprehensive proposal for a Dedicated, Private Lit Fiber Network. Vero Fiber Networks' proposal includes all requested bandwidth levels as well as a Private Dark Fiber Network option.

The proposed purpose-built network is uniquely designed for the District and is therefore not encumbered by many of the constraints associated with networks provided across shared infrastructure. The network includes multiple home run fiber strands in a "hub-and-spoke" configuration (*see Network Maps section*) from the District's hub site to each district location. This configuration greatly simplifies bandwidth upgrades and increases security.

Vero Fiber Networks will hand off SFP connections to the District at each "end location" and will hand-off multiple connections (one connection for each end location) at the hub site rather than an aggregated hand-off. In addition, Vero Fiber Networks can also provide the switches for the network solution at the election of the District. If elected, the type (make and model) of the switches will be determined in the engineering phase.

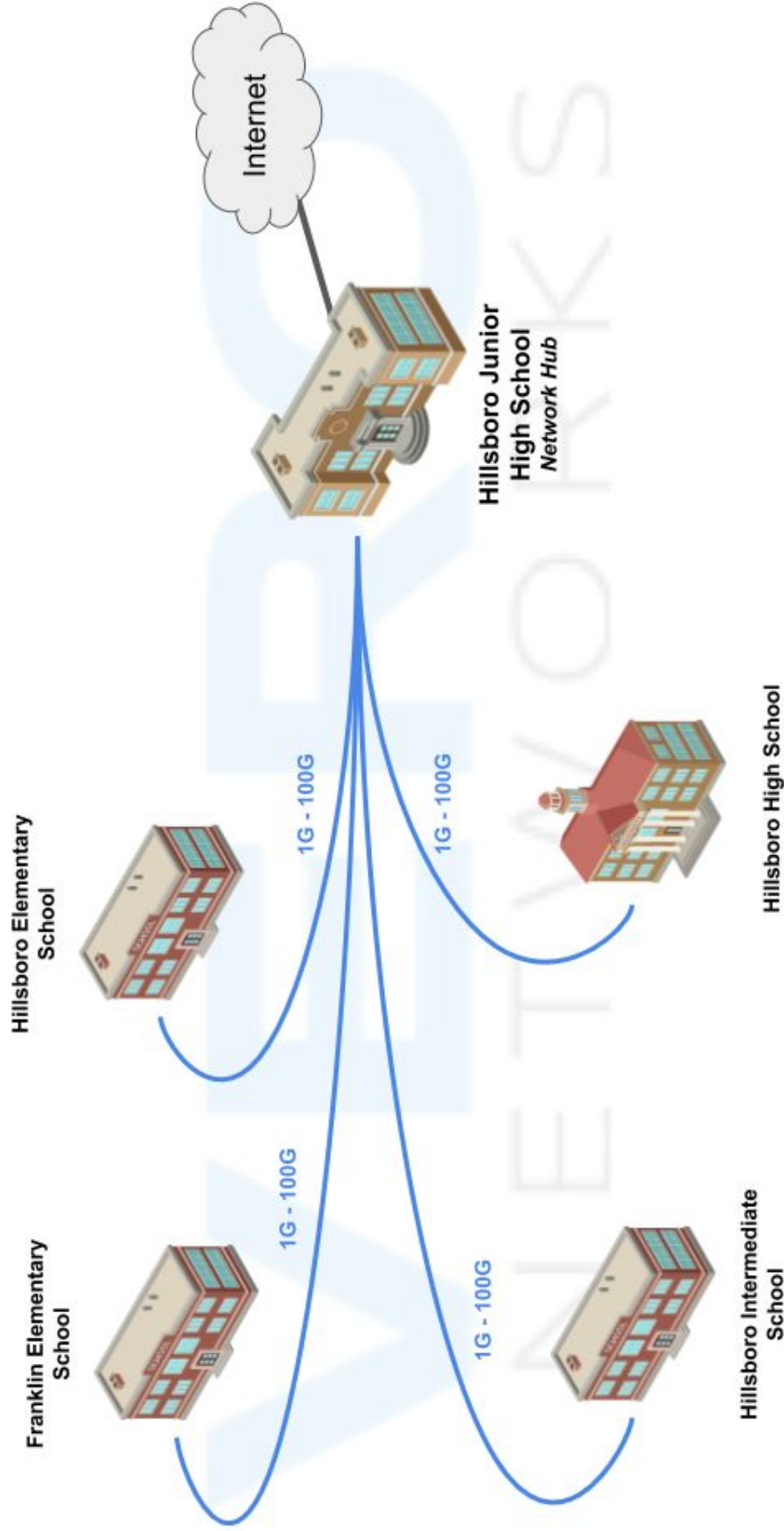
Proposal Highlights

- *Dedicated:* Fiber capacity is 100% dedicated to the District with no shared networks elements or oversubscription. The District always gets the full contracted bandwidth.
- *Purpose-Built:* The Vero Fiber Networks solution is specifically designed and optimized for the District to maximize performance and minimize service impacts.
- *Scalable:* Upgradable to 100 Gbps at no incremental cost to the District.
- *Cost Certainty:* Voluntary renewal pricing and long-term contract options provide cost certainty to the District and demonstrate Vero Fiber Networks' desire to build a lasting relationship with the District.
- *Lit Service Qualified:* Network modules are included in this bid to light the fiber and qualify Vero Fiber Networks' solution as a lit leased service under USAC's Category One service.
- *State of the Art:* Newly constructed network, using brand new fiber ideally suited for bandwidth scaling to comfortably exceed the District's bandwidth needs for decades to come.
- *Minimal Latency:* The network will be built using a direct fiber path to minimize loss and latency.
- *Warranty:* The warranty for any of the equipment supplied by Vero Fiber Networks will last for the full life of the contract and any subsequent renewals.
- *Project Management:* A designated Project Manager for the duration of the project implementation.
- *Operation & Maintenance:* Locate service and routine maintenance is included.
- *Optionality:* Vero Fiber Networks' proposal includes options for various contract lengths and lit service bandwidth, as well as options for a Private Dark Fiber Network.

Network Diagram

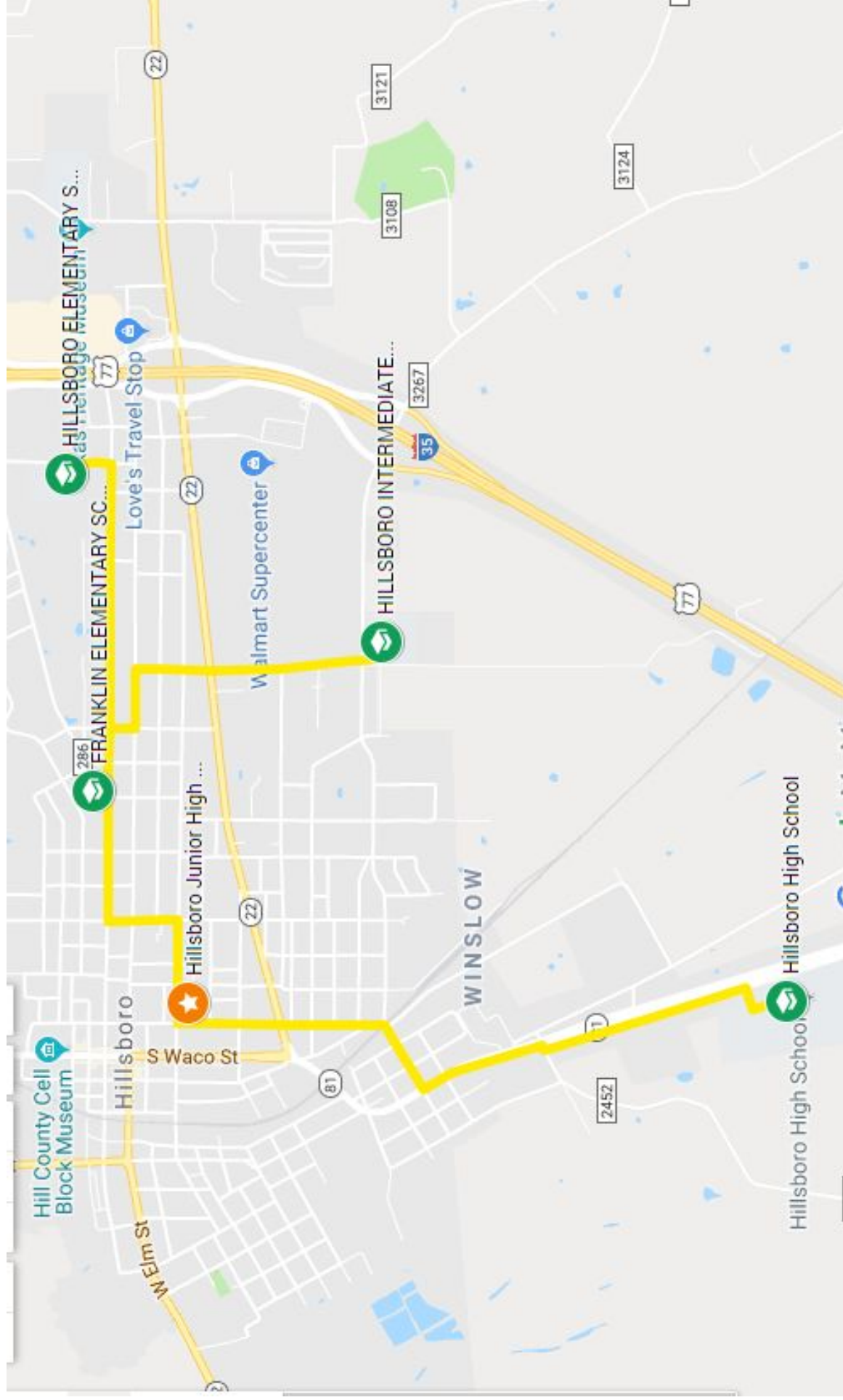
Hillsboro Independent School District

Dedicated fibers in a home run configuration from each school site to the District Hub (Head-End).

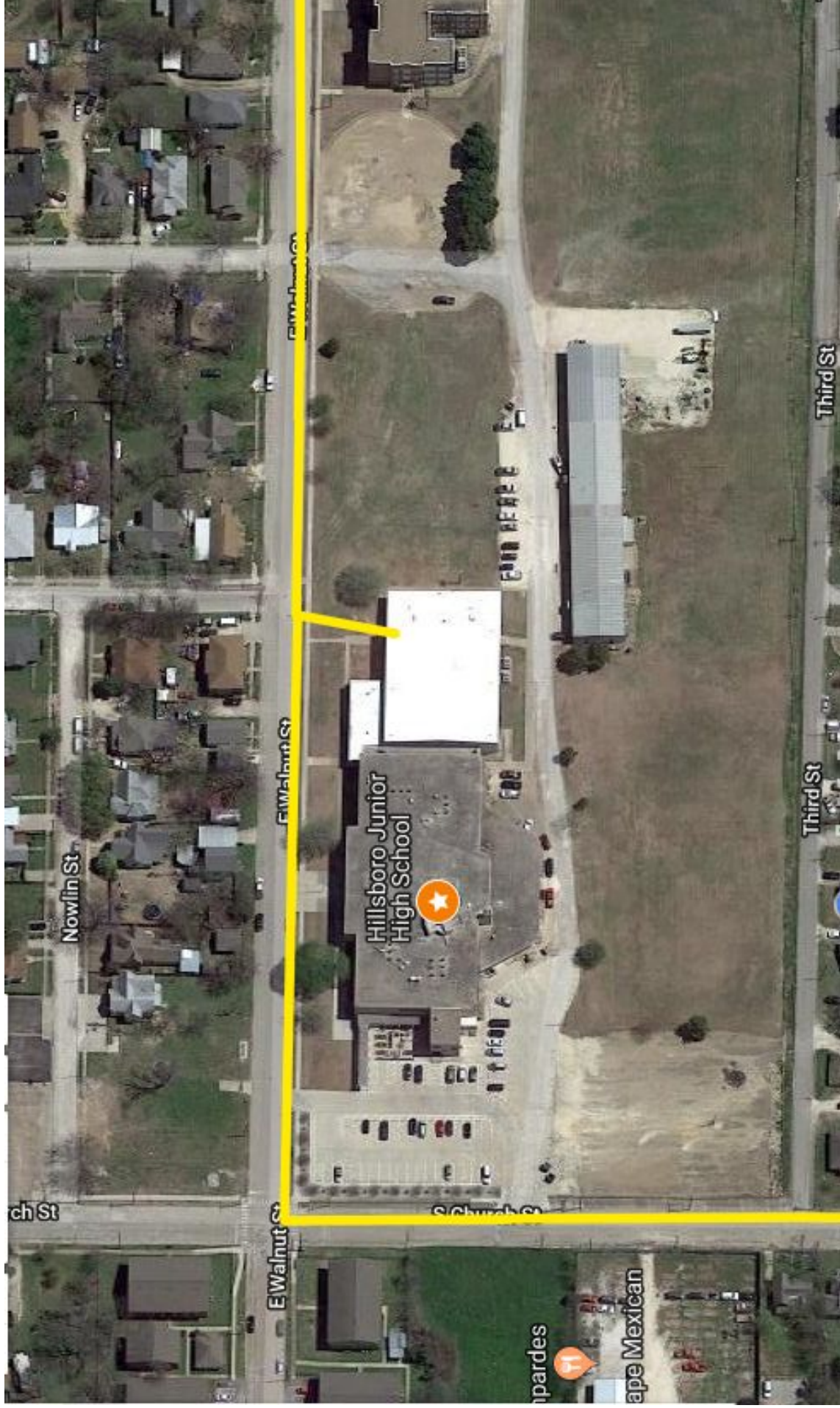


	Doc: Private Fiber WAN
	Revision: 1.0
Vero Networks, LLC	Engineer: nmcginn

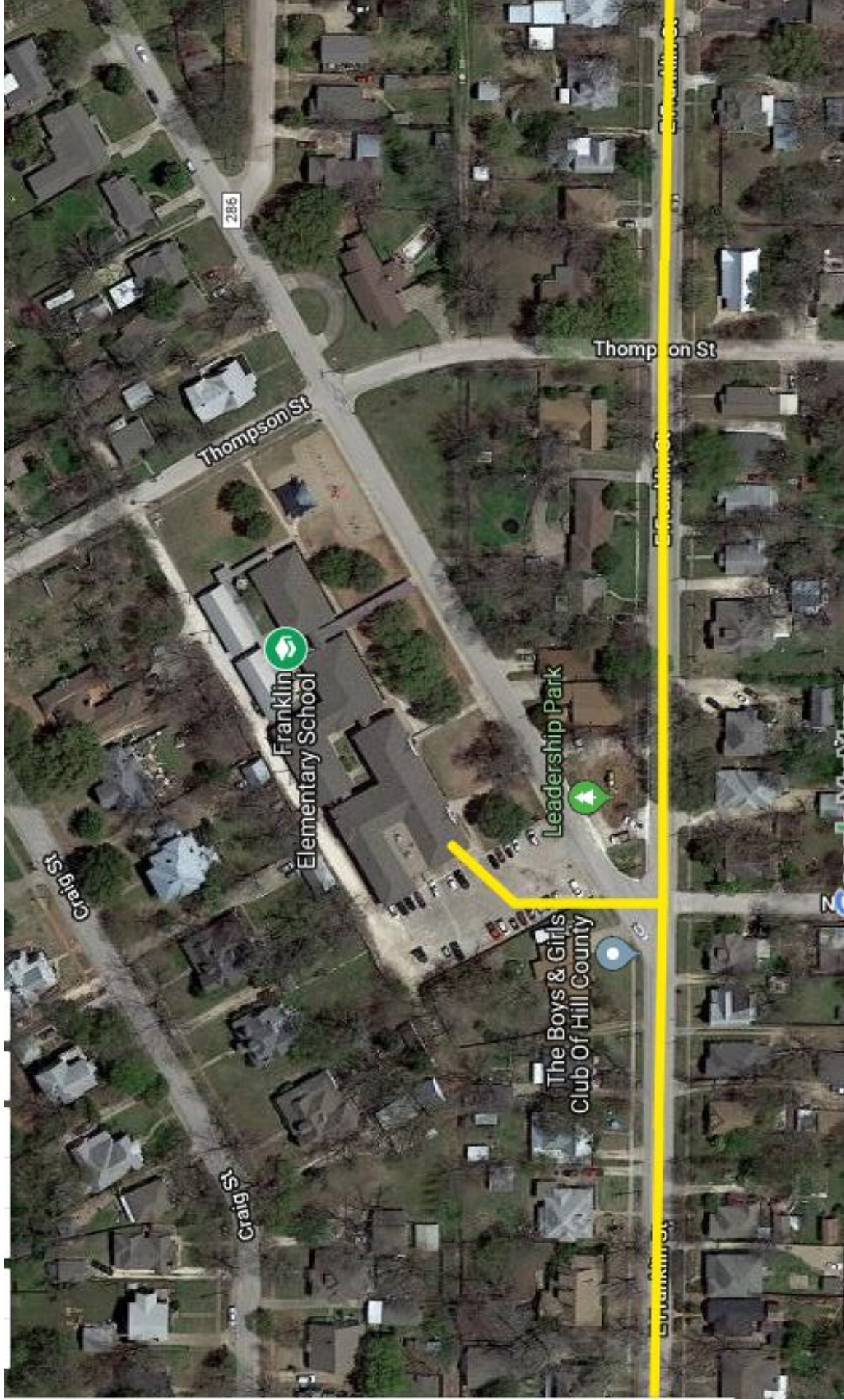
Solution Overview Map



Hillsboro Junior High School



Franklin Elementary School



Hillsboro Elementary School



Hillsboro Intermediate School












Hillsboro High School



Bandwidth at a Fraction of the Price!

Vero Fiber Networks is excited to offer dedicated and scalable bandwidth at a fraction of the per Mbps price that the District is currently paying. On the following pages we offer numerous pricing options & terms to fit with the needs of the District.

Lowest Corresponding Pricing below is for a Private Fiber Network solution that includes 4 dedicated fibers in a home run configuration from all school sites to the District Hub site. All school laterals are constructed with at least 12 fibers to simplify future expansion. Additionally, the District can upgrade at anytime to a faster speed for no additional monthly costs or contract extension.

Cost per Mbps	
\$1.17	
\$1.04	
\$0.91	
\$0.78	
\$0.65	
\$0.52	
\$0.39	
\$0.26	
\$0.13	

13x
Less
Expensive!

Current Price

(\$1.16 / Mbps)

Vero Fiber Networks Price*

(\$0.09 / Mbps)

* Price per Mbps for 120 month term with Special Construction reimbursement.

Private Network Pricing Summary

Option 1: 5-Year with Install Charges

Pricing Includes 3 x 5-Year Renewals @ \$3,407 per month (10.0% Discount)

	Per Site		Total	
	Install Cost	Monthly	Install Cost	Monthly
Total Charges	\$ 20,263	\$ 757	\$ 101,314	\$ 3,785
E-Rate Discount (90.0%)	\$ 18,237	\$ 681	\$ 91,183	\$ 3,407
State Discount (10.0%)	\$ 2,026	\$ 76	\$ 10,131	\$ 379
After E-Rate Discount(s)	\$ -	\$ -	\$ -	\$ -

Lowest Corresponding Price (LCP)*

Option 2: 10-Year with Install Charges

Pricing Includes 1 x 10-Year Renewals @ \$3,281 per month (10.0% Discount)

	Per Site		Total	
	Install Cost	Monthly	Install Cost	Monthly
Total Charges	\$ 20,263	\$ 729	\$ 101,314	\$ 3,645
E-Rate Discount (90.0%)	\$ 18,237	\$ 656	\$ 91,183	\$ 3,281
State Discount (10.0%)	\$ 2,026	\$ 73	\$ 10,131	\$ 365
After E-Rate Discount(s)	\$ -	\$ -	\$ -	\$ -

Lowest Corresponding Price (LCP)*

Option 3: 15-Year with Install Charges

Pricing Includes 1 x 15-Year Renewals @ \$3,105 per month (10.0% Discount)

	Per Site		Total	
	Install Cost	Monthly	Install Cost	Monthly
Total Charges	\$ 20,263	\$ 690	\$ 101,314	\$ 3,450
E-Rate Discount (90.0%)	\$ 18,237	\$ 621	\$ 91,183	\$ 3,105
State Discount (10.0%)	\$ 2,026	\$ 69	\$ 10,131	\$ 345
After E-Rate Discount(s)	\$ -	\$ -	\$ -	\$ -

Lowest Corresponding Price (LCP)*

Option 4: 5-Year without Install Charges

Pricing Includes 3 x 5-Year Renewals @ \$4,941 per month (10.0% Discount)

	Per Site		Total	
	Install Cost	Monthly	Install Cost	Monthly
Total Charges	\$ -	\$ 1,098	\$ -	\$ 5,490
E-Rate Discount (90.0%)	\$ -	\$ 988	\$ -	\$ 4,941
State Discount (10.0%)	\$ -	\$ 110	\$ -	\$ 549
After E-Rate Discount(s)	\$ -	\$ -	\$ -	\$ -

Lowest Corresponding Price (LCP)*

Option 5: 10-Year without Install Charges

Pricing Includes 1 x 10-Year Renewals @ \$4,253 per month (10.0% Discount)

	Per Site		Total	
	Install Cost	Monthly	Install Cost	Monthly
Total Charges	\$ -	\$ 945	\$ -	\$ 4,725
E-Rate Discount (90.0%)	\$ -	\$ 851	\$ -	\$ 4,253
State Discount (10.0%)	\$ -	\$ 95	\$ -	\$ 473
After E-Rate Discount(s)	\$ -	\$ -	\$ -	\$ -

Lowest Corresponding Price (LCP)*

Option 6: 15-Year without Install Charges

Pricing Includes 1 x 15-Year Renewals @ \$4,032 per month (10.0% Discount)

	Per Site		Total	
	Install Cost	Monthly	Install Cost	Monthly
Total Charges	\$ -	\$ 896	\$ -	\$ 4,480
E-Rate Discount (90.0%)	\$ -	\$ 806	\$ -	\$ 4,032
State Discount (10.0%)	\$ -	\$ 90	\$ -	\$ 448
After E-Rate Discount(s)	\$ -	\$ -	\$ -	\$ -

Lowest Corresponding Price (LCP)*

*Lowest Corresponding Pricing (LCP) above is for a Private Fiber Network solution that includes 4 dedicated fibers in a home run configuration from all school sites to the District Hub site. All school laterals are constructed with at least 12 fibers to simplify future expansion. Additionally, the District can upgrade at anytime to a faster speed for no additional monthly costs or contract extension.

Lower Recurring Cost with Federal Funding

Do you want to lower your recurring operating expenses and get more bandwidth?

If so, USAC has a program to assist. USAC's recent Modernization Act created a phenomenal opportunity for Districts to enable construction of competitive fiber networks by funding new builds through Special Construction. Both Leased Lit and Dark Fiber solutions are eligible.

USAC defines Special Construction charges as the upfront, non-recurring costs of deploying new fiber or upgraded network facilities to eligible entities. These charges are funded at the normal discount rate, but USAC allows applicants to enter into installment payments over 48 months to pay the non-discounted share of costs for special construction.

USAC will examine the costs and the provider must be willing to share additional network construction cost information. Vero Fiber Networks is prepared to provide detailed information to be fully responsive to any questions, from USAC or the District to ensure full compliance with the program.

As with any program, this opportunity may not be available in the future, so we strongly encourage you to take advantage of the program now. Additional information from USAC on Special Construction:

- <http://www.usac.org/sl/applicants/beforeyoubegin/fiber.aspx>
- <http://www.usac.org/sl/about/faqs/faqs-fiber.aspx>

Illustrative Cost Comparison



Why Leverage Special Construction?

- Traditionally, connectivity costs increase as bandwidth demand increases.
- With a Private Fiber Network, costs are much more fixed, ending the continuous upgrade and cost increase cycles.
- Private Fiber Networks enable virtually unlimited, dedicated bandwidth.
- Several states are even offering a match to cover the non-discounted portion of costs.
- USAC will match state programs up to 10%.
 - Districts with an 80% match can get all Special Construction costs covered.
 - Districts with less than 80% match get an additional 20% of their Special Construction covered.



Implementation & Install

The proposed Vero Fiber Networks solution is fully E-Rate compliant under Category 1 funding guidelines.

Implementation Capabilities & Experience

- The senior executive team at Vero Fiber Networks has collectively built thousands of miles of network for schools, hospitals, national and wireless carriers as well as small and large enterprises in over 30 states throughout the U.S. including Texas.
- The team is well versed in the nuances of constructing networks in all types of terrain and conditions, and has a stellar history of delivering projects on time and on budget.
- Vero Fiber Networks believes strongly in marrying the best project management practices with current technology and local focus to drive efficiencies and minimize project risk.
- Vero Fiber Networks uses Zoho Projects, PC Magazine's 2017 pick for "Best Project Management Software" to manage its fiber deployments. Over the course of hundreds of fiber deployments, we have learned many lessons, among them is that the tools and systems used to manage projects matters. We strongly believe that our team's adoption of leading edge technology gives us a great advantage over competitors that remain anchored to systems and processes from 30 years ago.

Deployment Overview

- **Design**: Preliminary design is approximately 5.1 miles of construction to connect 5 locations: two elementary schools, one intermediate school, one high school, and the junior high school head-end building (final design subject to relevant permit approval).
- **Handoff**: Vero Fiber Networks will hand off SFP connections to the District at each "end location" and will hand-off multiple connections (one connection for each end location) at the hub site rather than an aggregated hand-off. In addition, Vero Fiber Networks can also provide the switches for the network solution at the election of the District. If elected, the type (make and model) of the switches will be determined in the engineering phase.
- **Timeline**: The MRC billing will start after completion of the network based upon the agreed upon timeline. This billing will not start before July 1st, 2019. Vero Fiber Networks intends to have all locations tested and operational prior to acceptance by the District. As Vero Fiber Networks will be building the district a brand new state of the art fiber network it is possible that all components will not be complete before the new funding season begins on July 1st, 2019. As such, Vero Fiber Networks recommends that the District file a form 470 for existing services on a month to month basis until the new network is completed. Vero Fiber Networks will work with the District and the existing provider to ensure a smooth transition and continuity of service.
- **Reporting & Updates**: Specific timing milestones will be developed and periodic meetings will be arranged. Vero Fiber Networks recommends weekly meetings with District representatives after construction has begun to facilitate a smooth transition to the new Private Fiber Network solution.

Deployment Milestones

Design & Engineering

During this phase, Vero Fiber Networks will be optimizing the route design for cost, latency and speed of deployment. The team will survey the entire route. From this survey, the team will determine routing and complete aerial and underground engineering in preparation for the application/permit submittal process and construction. The team will also conduct site visits to each school location confirm building entrances and requirements.

Aerial Construction

Vero Fiber Networks will obtain necessary pole attachment agreements that include “make ready” requirements for attaching fiber optic cables to the poles. In some cases, a secondary pole attachment agreement with a local phone service provider or Cable TV company may be required. During the make ready phase, Vero Fiber Networks will complete any pole load/reinforcement modifications and coordinate with existing pole tenants as to timing of fiber placement. Once make ready is complete in accordance with the pole attachment agreement(s), fiber will be placed on the designated running lines.

Underground Construction & Building Entrances

Vero Fiber Networks will obtain all necessary right of way (ROW) agreements, traffic control and other special permits for completing underground construction. Vero Fiber Networks will commence placement of conduit and fiber in the approved ROW as soon permits are secured. Concurrent with, or possibly before, underground and aerial construction, Vero Fiber Networks will complete construction of verified building entrances out to the public right of way.

Splice, Test & Delivery

Upon completion of the aerial or underground fiber placement, all fiber connections will be spliced and each segment will be bi-directionally OTDR tested, i.e. the endpoint user equipment at the end locations will be installed and tested back to the head-end site and vice versa to ensure the integrity and ability of the completed fiber link to deliver the intended services.

Existing services will be replaced on a per site basis once the head-end location is operational and all OTDR and equipment testing is complete. A “cut over” time will be established with the District for each site as it comes online. Vero Fiber Networks' turn up time, once advance work has been completed, is literally minutes as Vero Fiber Networks works with the District to remove the current WAN to LAN connection and replace it with the new WAN connection and jumper.

Vero Fiber Networks will work with the District to minimize interruption with normal school hours and to perform this work after hours or on weekends if so desired by the District.

Deployment Milestones

Home
Feed
Projects
Consolidated SD

12%

TE-21

Consolidated SD


Time Lag

Start Date
08-27-2018

Due Date
10-31-2018

57 Days to go

Task Status Keep track of the tasks in your project.



Open **34**

Closed **5**

Total **39**


Top 5 Go-getters Users with maximum closed tasks

Nathan McGinn	4
george.cassidy	1


Task Status View your team's overall work status here

Users	Tasks			Issues		
	Overdue	All Open	Today's	Overdue	Today's	All Open
chris.butler	0	27	0	0	0	0
Dave Jones	0	0	0	0	0	0
george.cassidy	0	5	1	0	0	0
Nathan McG...	1	0	1	0	0	0

Milestone Status Keep track of the milestones




Overdue Work Items View the work items that are past their due date




Good job! No overdue work item(s) for now.

Weekly Digest Week 2 Select a week to view its overall work status



Upcoming Events For current week only




No upcoming event(s) for now.

Today's Work Items Know what's in store for your team today

- Create Project Reporting Views ✓
- Campus Walkouts - Manhole Tie-In Review ✓
- Secure Private Easement (Get More Detail) ✓

Task Status Keep track of the tasks in your project.



Open **34**

Closed **5**

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Dave Jones	0	0	0	0	0	0
george.cassidy	0	5	1	0	0	0
Nathan McG...	1	0	1	0	0	0

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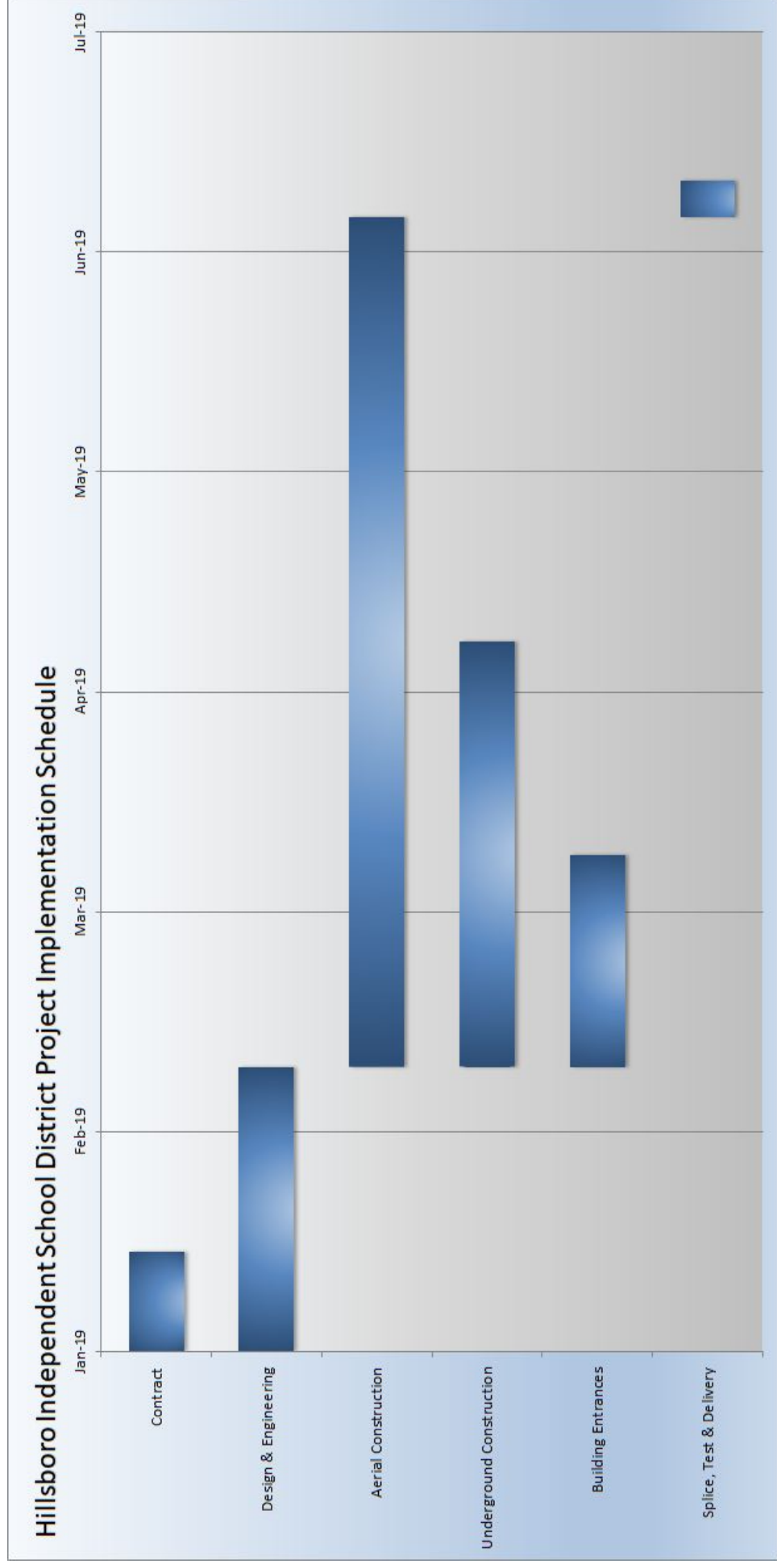
Today's Work Items Know what's in store for your team today

- Create Project Reporting Views ✓
- Campus Walkouts - Manhole Tie-In Review ✓
- Secure Private Easement (Get More Detail) ✓

Estimated Project Schedule

Vero Fiber Networks uses state-of-the-art cloud-based project management tools to manage fiber network deployments. Project milestones, tasks, issues and all vendor updates are managed in real-time through our cloud platform. Our best in class project management process & technology streamlines communication and de-risks project schedules by illuminating issues & corrective actions before they cause delay.

Below is an illustrative view of a typical private fiber network deployment schedule and key milestones.



Service Level Agreement

VIRTUALLY ZERO Downtime

Network Statistic	VERO Fiber Networks	Cable or Phone Company
Availability	99.99%. Vero proposes a custom built network that is designed for maximum uptime and performance. Vero's design is hyper efficient both in terms of network path as well as points of failure	Availability potentially impacted by: the numerous points of failure in the network, shared or common equipment, extra network splices and unnecessary extra route distance due to how the network was built years ago.
Latency	<10ms per link. Amazingly fast because the Vero solution doesn't add unnecessary physical network distance or equipment; latency is only limited by the speed of light through fiber.	Usually provide an SLA around 50ms, but no meaningful penalty for not meeting. For reference, light travels through fiber at > 100 miles / millisecond, so a 50 ms commitment is virtually meaningless. Traditionally carriers use higher latency SLA so that they can route the District's traffic on <i>any</i> route, not the <i>best</i> route.
Packet Loss	Extremely low - Virtually Zero (<0.25%) Packet loss is most often experienced in congested networks (content is arriving at a greater rate than it can be sent by a router). Vero provides homerun circuits from the head-end location to each end site location so there are no areas that are subject to bottleneck situations.	Typically incumbent carriers will aim to maximize how many customers they provision on a network which can create capacity constraints. In these complex or old networks there can be bottlenecks in areas of the network where demand for capacity is highest. This can overload gear such that the only option is to drop packets. Additionally packet loss can occur when network latency is long.
Jitter	Very low - Virtually Zero (<1ms) Jitter is caused when some packets are queued or delayed in the network while others are not. The Vero solution provides the full channel bandwidth and no queuing will ever be introduced as the District gets its own dedicated fiber paths.	The more shared elements and distance that a packet travels the more likely it is that jitter will occur. Distance and equipment hops can cause variations in latency and can cause packet timing disruptions and jitter.
Throughput	Full Rate. Because there are no shared or common elements in the Vero solution, the District gets the full bandwidth it has ordered. 10G ordered = 10G delivered	In traditional networks capacity may be shared or pooled for <i>many</i> customers, so the District will always be competing for capacity. Throughput is rarely at full rate and can vary day-to-day or minute-to-minute providing an inconsistent experience.
SLA Remedies	Failure to meet relevant SLAs above will result credit equal to 25% of one month's MRC associated with the impacted link.	Traditional carrier contracts typically provide for fairly lenient SLAs and in the event that there is a provision for a monetary remedy, the remedy request window is usually small and the monetary value is de minimis.

Operations & Maintenance

As part of the pricing included in this proposal all of the following operations and maintenance procedures are available at ZERO incremental cost to the District. Vero will work with the District to minimize interruption during normal school hours and to perform this maintenance after hours or on weekends if so desired, subject to the discretion of the District. The Network Trouble and Reporting Resolution Procedures page of this document describes the process and timelines for trouble response.

24x7x365 Network Operations Center

Vero Fiber Networks' Network Operations Center is available 24x7x365 to address network concerns.

Local Sparing of network modules

In the unlikely event of a module failure Vero will also spare additional module units at the District's head-end location such that replacing the unit (which is a simple swap) can be done easily and quickly.

Locating Underground Network

Vero will be responsible for ensuring that underground portions of the network are properly located and registered with the necessary state "One-Call" agency.

Emergency Maintenance

Outside plant failures, while rare, are treated on an individual case basis due to the complexity and multiple non-Vero controlled factors (storms, pole damage, cable cuts, accidents) and Vero's locally-based Outside Plant ("OSP") contractors will be on-site within 4 hours. Vero's availability of WAN services to customers will exceed 99.99% up time.

Fiber transition

As a further measure of protection for the District's Private Fiber Network, Vero will also make available additional strands of entrance fibers into each school location and would move the District to a different fiber pair in the unlikely event of recurrent issues.

Vero Fiber Networks experience

The Vero Fiber Networks team has extensive experience building and operating Private Fiber Networks and working through the complexities of the E-Rate process. Further, the team has spent the majority of their careers supporting customers running mission critical applications (e.g. financial services, hospitals, trading and brokerage firms and the largest wireless carriers). Downtime for these firms can result in lost customers, lost revenue and major business disruptions. As such, service availability is part of our operational DNA.

Network Operations Center

Vero Fiber Networks' Network Operations Center monitors a wide array of metrics to ensure that the networks we build are providing a great experience for our school district customers.

Below are a few samples of the metrics our NOC monitors:

NOC Dashboard - used for day-to-day monitoring of network health



NOC Ticket Summary - used for understanding trends and diagnose and eliminate issues

The screenshot shows the VERO NOC Ticket Summary table with the following columns: Ticket ID, DateTime Last Modified, Status, and Title. The table contains several rows of ticket data, including:

Ticket ID	DateTime Last Modified	Status	Title
98-449315	2018-08-14 16:53:34	Closed	Vero Networks Test Ticket - PLEASE IGNORE
98-449355	2018-08-14 18:29:17	Closed	Test Ticket - Alarm Cut
98-449503	2018-08-15 10:54:44	Closed	Test
98-449515	2018-08-15 17:45:48	Closed	Test Ticket - NOC Do NOT HANDLE - Service Request Test
98-449906	2018-08-17 12:33:08	Closed	Test ticket
98-450241	2018-08-20 09:11:15	Closed	***TEST TICKET*** PacketLoss: o=VERO-LakeCitySD (216.241.37.196) Pkts
98-450280	2018-08-20 11:42:54	Closed	Testing NOC
98-450291	2018-08-20 09:56:15	Closed	Testing Maintenance
98-451155	2018-08-25 17:45:07	Closed	Multiple Events:o=VERO-LakeCitySD (216.241.37.196)
98-451428	2018-08-27 04:24:22	Closed	o=VERO-LakeCitySD_upTime o=VERO-LakeCitySD (216.241.37.196) syyalUpTime
98-451457	2018-08-27 09:29:00	Scheduled	Vero Networks - ALM Firmware Update - 8/29/18 11:00 AM - 12:00 PM CDT - Lake County, CO

NOC Ticket Detail - used to manage individual issues for rapid repair and provide updates to customers

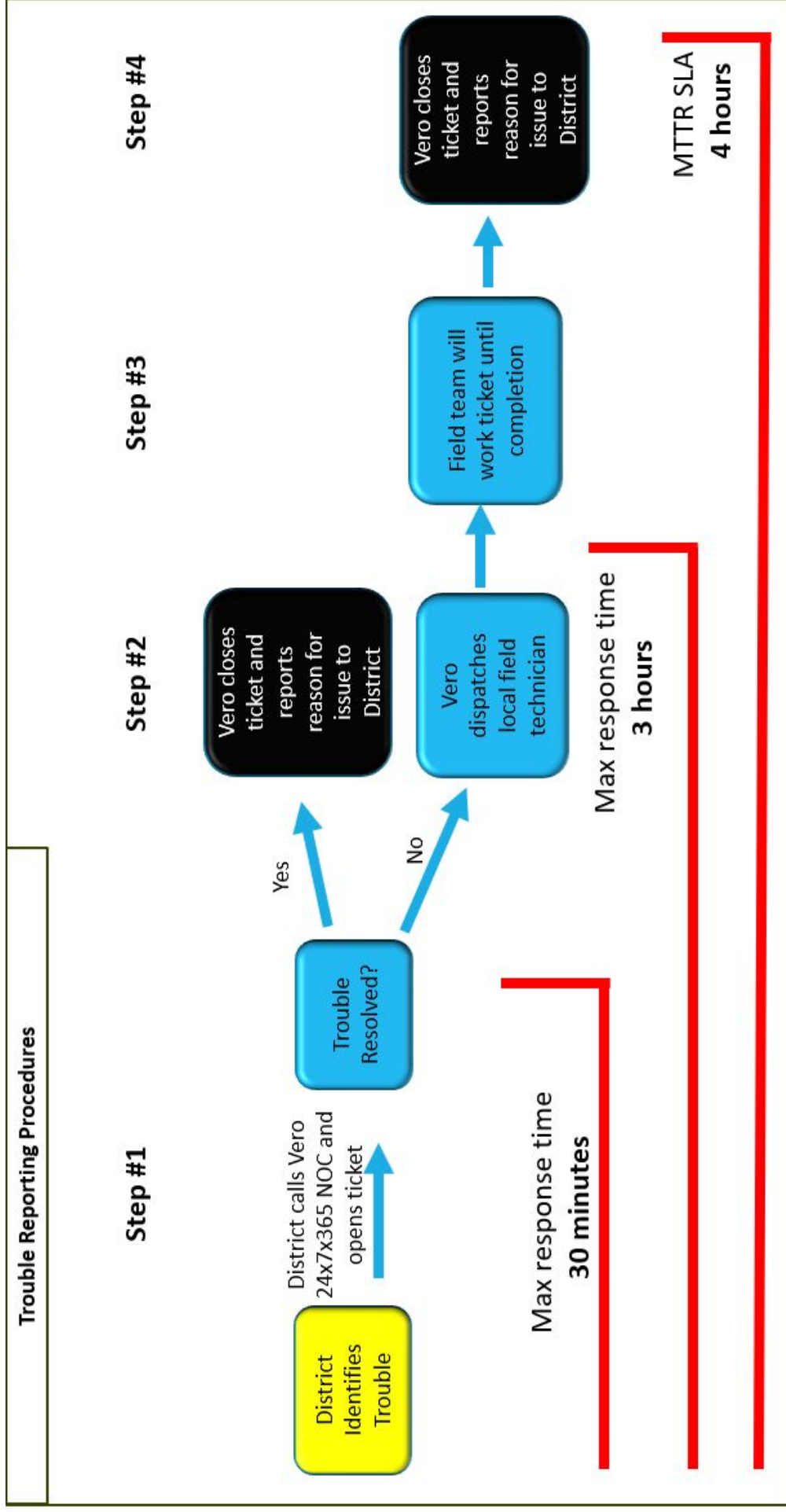
The screenshot shows the VERO NOC Ticket Detail form for ticket 98-451457. The form includes the following fields:

- Title:** Vero Networks - ALM Firmware Update - 8/29/18 11:00 AM - 12:00 PM CDT - Lake County, CO
- Ticket Number:** 98-451457
- Status:** Scheduled
- Date/Time Submitted:** 2018-08-27 09:19:10
- Date/Time Last Edit:** 2018-08-27 09:29:00
- Submitter:** noc_default
- Date/Time of Alarm:**
- Asset Name:**
- IP Address:**
- Location:** Vero_Networks
- Service List:**

Additional information at the bottom of the form:

- 2018-08-27 09:29:00 zmarkowski**
- Status:** Unresolved
- Maintenance Summary:** Vero Networks - ALM Firmware Update - 8/29/18 11:00 AM - 12:00 PM CDT - Lake County, CO
- Update:** Set date/time for this maintenance activity.
- Next Steps:** Deferring until maintenance window

Network Trouble Reporting & Resolution Procedures



Executive Leadership

Matt Erickson

Matt Erickson, is a founding member of Vero Fiber Networks and has served since its inception as Managing Partner. Prior to Vero Fiber Networks he was part of the senior executive team that founded Zayo (NYSE: ZAYO). Matt was at Zayo from 2006-2016. Over his ten years at Zayo, Matt held various roles including Chief Operating Officer, President of Dark Fiber and Mobile Infrastructure Services and SVP of Corporate Strategy and Development. While at Zayo, Matt oversaw the successful construction of ~17,000 route miles of new fiber network. Prior to Zayo, Matt was a member of the senior team that successfully sold ICG to Level 3 Communications in 2006. Earlier in his career, Matt worked at Level 3 Communications and PricewaterhouseCoopers. Matt earned a B.S. (Summa Cum Laude with Honors) in Accounting from Colorado State University.

Zach Nebergall

Zach Nebergall is a founding member of Vero Fiber Networks and serves as its COO. Zach has 16 years of experience in the Communications and Internet industries. Before Vero Fiber Networks, Zach worked 7 years at Zayo holding various leadership roles. His role at the time he left Zayo was Senior Vice President of Zayo's largest business segment, the Metro Dark Fiber Group. In this role, he was responsible for managing the full operations and financial activities of the Metro Dark Fiber business, including pricing, capital management, engineering, service delivery, and network planning. Before joining Zayo, Zach held a variety of leadership roles at Level 3 Communications, including oversight of the Enterprise Voice Product Management and VoIP Services Product Management groups. Zach earned a B.S. in Business Administration with an emphasis in Finance from the University of Colorado.

Greg Friedman

Greg joins Vero Fiber Networks after spending 12 years in the telecommunications and Internet industries, and 5 additional years in consulting and financial services. Greg was most recently an Executive Vice President at Zayo Group, where he managed the datacenter and cloud computing businesses. Prior to that, Greg held various leadership roles at Zayo, including CFO for Zayo Fiber Solutions (ZFS) and Sr. Vice President of Zayo's Ethernet business. Prior to Zayo, Greg held management positions at Level 3 Communications, Deloitte, and Cap Gemini. He was also a Principal at FW Group, a multifamily real estate investment group with \$250M in assets under management, where he managed sales and fundraising, and assisted in site selection, analysis and acquisition. Greg received a BS in Economics from the University of Pennsylvania and an MBA from the Wharton School.

Executive Leadership continued

John Real

John Real is a founding member of Vero Fiber Networks and serves as EVP of Sales. Prior to Vero Fiber Networks John spent over 7 years at Zayo holding various executive roles, charged with leading various segments of its enterprise sales channel with specific focus on school districts and E-Rate, data centers, hospitals and universities, public sector as well as enterprises of all sizes. John established a team focused on E-Rate and helped deliver Zayo's first handful of major successes in the school/E-Rate space including: Weld County Schools District 6 in Greeley, Colorado and Tucson Unified School District. John was also responsible for strategic channel relationships for 2 years, creating and fostering Zayo's partnerships with various public and private partners including VARs, Equipment Vendors, Data Centers and Municipalities. During his tenure at Zayo, he also ran the Ethernet Product Group overseeing all strategic product decisions, P&L, implementation, delivery and engineering. Prior to Zayo, John spent 3 years as CEO of VoicePipe, an internet and telephony provider that was acquired by Zayo in 2007. John started his telecom career at ICG Communications.

Dave Jones

Dave Jones is a member of Vero Fiber Networks and serves as its CTO. Dave has 25+ years of technical leadership experience in the fiber and wireless industries. His responsibilities have included network design, implementation, operations, technology assessment, business development, and overall P&L responsibility. Prior to joining Vero Fiber Networks Dave spent five years at Zayo in various leadership roles, the most recent being EVP of Dark Fiber Solutions, where he had overall responsibility for Zayo's Dark Fiber and Mobile Infrastructure product groups. Before joining Zayo, Dave held senior management and technical positions with FiberTower, International Mobile Communications, Formus Communications Europe, Sprint PCS, US WEST, and the US National Telecommunications and Information Administration (NTIA). Dave earned a B.S. in Electrical Engineering and an M. S. in Telecommunications, both from the University of Colorado at Boulder.

Nathan McGinn

Nathan serves as Vero Fiber Networks Vice President of Operations. He has 12 years of experience in the communications infrastructure and commercial real estate industries. Prior to joining Vero Fiber Networks, Nathan spent eight years at Zayo Group holding various leadership positions with focus on operations, construction, network development & client services. Prior to Zayo, Nathan was the Chief Operating & Financial Officer of Palm Beach Title Services. Early in his career Nathan was a PGA Class-A credentialed golf professional in West Palm Beach, Florida. Nathan earned a B.A. (Summa Cum Laude) in Mathematics from the University of Vermont and a JD/MBA from the University of Colorado.

Executive Leadership continued

Gregg Strumberger

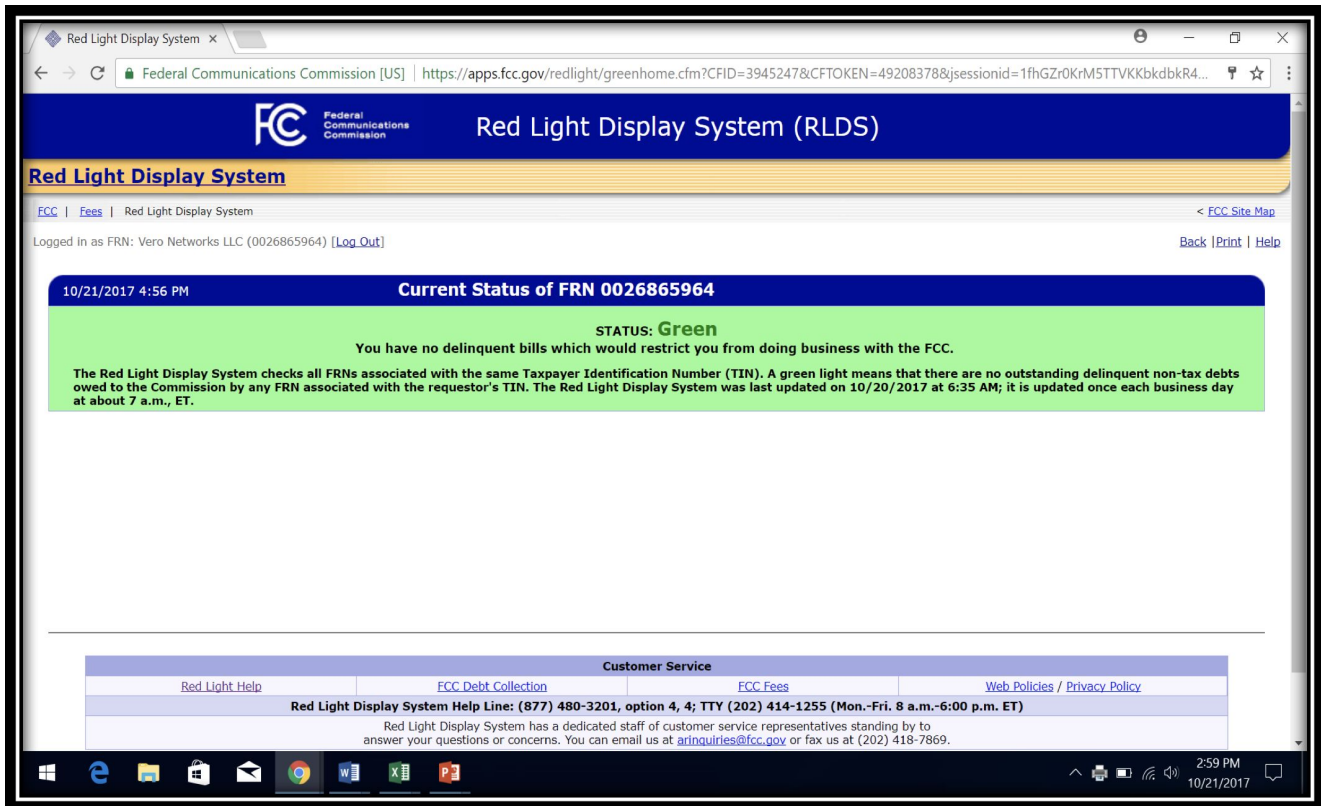
Gregg Strumberger is a Founding Member of Vero Fiber Networks and serves as its CLO. Gregg has over 22 years of experience in the Communications and Internet industries and 19 years of experience as an attorney. Prior to Vero Fiber Networks, Gregg held several leadership roles at Zayo, including General Counsel of Dark Fiber and Mobile Infrastructure Services and General Counsel of Zayo Canada, Inc. During his years at Zayo, Gregg was responsible for legal and business areas including Rights of Way, Procurement, Contracts, M&A, Regulatory, Litigation, Real Estate and Human Resources. Gregg negotiated many of Zayo's most valuable customer deals and oversaw the development of Rights of Way and Vendor Management programs that enabled Zayo to quickly and efficiently build thousands of route miles of new fiber optic network. Prior to Zayo, Gregg served as Corporate Counsel at Level 3. During his early career, Gregg worked at the law firms of Swidler & Berlin and Hughes, Hubbard & Reed. Gregg earned his B.S. at Eastern Michigan University and his J.D. from Boston University School of Law.

Chris Murphy

Chris Murphy joins as member of Vero Fiber Networks serving as EVP of Sales & Business Development. Chris has 22 years of experience in the Communications & Internet industries. Prior to Vero Fiber Networks Chris was part of the original management team that founded Zayo (NYSE: ZAYO). Having joined Zayo at its inception, Chris held various Sr. Sales roles, supported M&A activity & participated in Zayo's funding efforts through the company's debt and equity partners. Most recently Chris served as SVP of the Strategic Customer Group. In that role Chris lead an organization responsible for Commercial Offer Management, Sales and Implementation for the largest Wireless, Carrier, Cable & Content customers. During his tenure the Strategic Customer Group grew to 400M of annualized revenue and enjoyed an annualized growth revenue rate of 17%. Prior to Zayo, Chris held various leadership positions in Sales, Business Development, Product & Carrier Relations, having worked at Level 3 communications, ICG & JATO. Chris began his career at TCG/AT&T, Chris received his B.S in Communications from the University of Colorado Boulder. Both of Chris' parents dedicated themselves and their careers to public education. As such, working to achieve Vero Fiber Networks' goal of providing critical communications infrastructure to enhance public education is a uniquely personal interest of his.

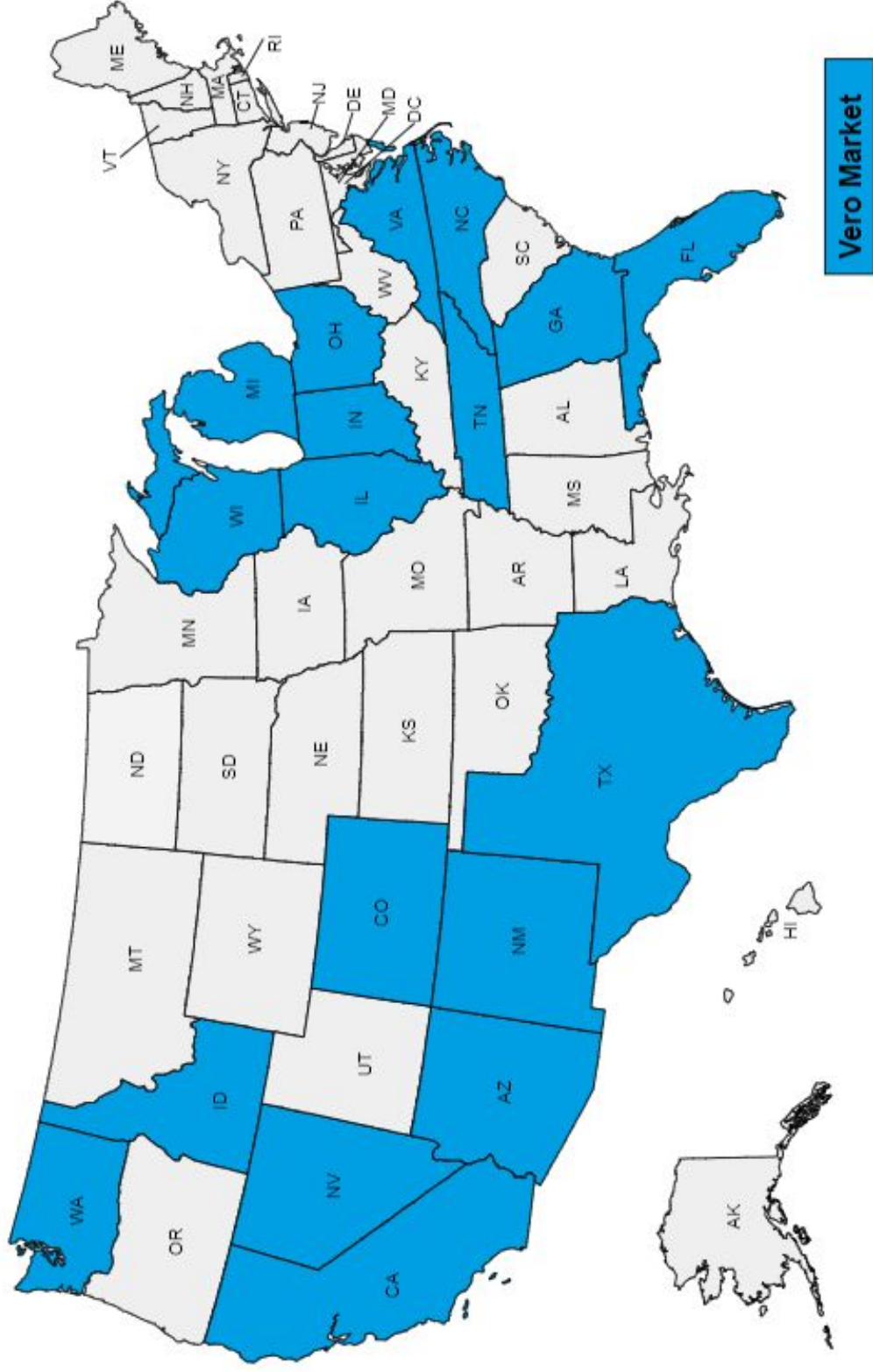
FCC Green Status

Vero Fiber Networks has continuously maintained FCC Green status since its inception.



Vero Fiber Networks Markets

Vero Fiber Networks has built networks for K-12 across the nation.



References

The Vero Fiber Networks team has a successful track record of constructing and operating networks for K-12 schools, hospitals, universities as well as federal and other government entities.

We encourage you to talk with the people below about how they have transitioned their networks from shared and complicated systems to private fiber networks.

Reference Name	Quick Statement	Contact
Jim Fogarty Director of IT Lake County School District	"Having reliable, unlimited bandwidth will make so many things possible. Truly a game changer."	Jim Forgarty Director of IT jfogarty@lakecountyschools.net 719-293-0368
Will Hubbard Brownstown Central Community School Corporation	"Vero made the whole process quick and easy. Now we have a dedicated, private fiber network that is performing beyond our expectations."	Will Hubbard Director of Technology whubbard@btownccs.k12.in.us 812-358-4271
Steve Davis Director of Technology Lemont-Bromberek CSD113A	"With our previous supplier, I never felt like we were getting what we were paying for. Now with Vero we have a full 10 Gig network and it has already made a real positive impact on our District. In addition, the fiber install was really easy and quick."	Steve Davis Director of Technology sdavis@sd113a.org 630-257-2286 x 4354

Vero Team Experience - Pt 1

The Vero Fiber Networks team has extensive experience building and operating mission critical fiber networks for many of the world's leading companies and organizations. Below are publicly available references to the projects the team has been responsible for delivering over the past decade. The press releases name a Vero Fiber Networks partner and the stated project.

2011 - EXPAND MEMPHIS NETWORK TO OVER 425 MILES

<http://bit.ly/2nt8odT>

2011 - EXPANDS FIBER NETWORK IN DALLAS ADDING 5 DATA CENTERS

<http://bit.ly/2Fyv1V1>

2011 - BUILT NEW SAN DIEGO FIBER NETWORK

<http://bit.ly/2nsFL0i>

2011 - Expands Fiber Infrastructure in Cincinnati

<http://bit.ly/2BMTgfG>

2012 - Provided Eaglenet, a Colorado intergovernmental entity, 162 miles of fiber infrastructure to locations from Denver to Burlington in Eastern Colorado

<http://bit.ly/2nvsUL3>

2012 - EXPAND PHOENIX NETWORK 165 MILES AND 123 CELL TOWERS

<http://bit.ly/2DT9Xbo>

2012 - COMPLETES 52 MILE NASHVILLE TENNESSEE FIBER BUILD

<http://bit.ly/2FBfJPo>

2012 - EXPAND NETWORK FROM SPOKANE TO PORTLAND BY 400Gbps

<http://bit.ly/2BManVq>

2012 - BUILD 158 route miles of new network in ALBUQUERQUE, NM

<http://bit.ly/2nt7xKd>

2012 - Industry leading expansion of a network to offer 100G circuits

<http://bit.ly/2E9dbL2>

2012 - MERIDIAN SCHOOL DISTRICT IN IDAHO PUTS NEW DEDICATED NETWORK TO WORK

<http://bit.ly/2s02tlf>

2012 - Build and provide fiber solutions into CoreSite's 9 data centers throughout the US.

<http://bit.ly/2GFINaX>

Vero Team Experience - Pt 2

2013 - Build leading Internet Backbone provider, HURRICANE ELECTRIC a 100G WAVE BACKBONE

<http://bit.ly/2nzxdEl>

2013 - Deployed INDUSTRY LEADING native 100G Wavelength network FROM Memphis to Chicago route.

<http://bit.ly/2FBPUi4>

2013 - BUILT 4 TERRABIT SYSTEM TO SUPPORT Internet2's 100 Gigabit backbone

<http://bit.ly/2E4xLw5>

2014 – 20 YEAR Partnership with I-LIGHT FUTURE

<http://bit.ly/2DW7KQE>

2014 - PRIVATE FIBER NETWORK FOR WELD COUNTY SCHOOL DISTRICT

<http://bit.ly/2nz2R4G>

2014 - Built lowest latency fiber route between the two key NYC financial facilities

<http://bit.ly/2rX44Zh>

2014 - Enabled direct fiber connectivity to Google Cloud Services in 13 data centers throughout the US.

<http://bit.ly/2E814xQ>

2014 - Provided fiber based cloud connectivity to Digital Realty Trust data centers.

<http://bit.ly/2DWfnlG>

2014 - Built diverse entrances into six EdgeConneX data centers in Atlanta, Las Vegas, Memphis, Nashville, Portland, Richmond, Salt Lake City and San Diego.

<http://bit.ly/2rV9y6C>

2014 - EXTEND DARK FIBER NETWORK INTO CONTINUUM DATA CENTERS' NEW WEST CHICAGO FACILITY

<http://bit.ly/2nz9Nir>

2014 - 550 MILE FIBER NETWORK EXPANSION IN NORTHERN CALIFORNIA

<http://bit.ly/2BMSWgY>

2014 - Launched direct fiber connectivity to AWS Cloud

<http://bit.ly/2ntnlfX>

Vero Team Experience - Pt 3

2014 - Deployed Fiber Connectivity to Peak Cloud services

<http://bit.ly/2s0ACkP>

2014 - Provided fiber based cloud connectivity to Digital Realty Trust data centers.

<http://bit.ly/2DWfnlG>

2014 - Built diverse entrances into six EdgeConneX data centers in Atlanta, Las Vegas, Memphis, Nashville, Portland, Richmond, Salt Lake City and San Diego.

<http://bit.ly/2rV9y6C>

2014 - Built fiber network to Bytegrid data centers in Maryland, Virginia, and Washington, D.C. providing connectivity to key federal government customers.

<http://bit.ly/2DVYQTF>

2015 - EXTEND 1,200 MILES DARK FIBER ROUTE FROM PHOENIX TO DALLAS

<http://bit.ly/2GAoDOi>

2015 - ADD 800 MILE DARK FIBER NETWORK FROM SALT LAKE CITY TO SACRAMENTO

<http://bit.ly/2DTbHFw>

2015- BUILD FIBER NETWORK TO REACH 500 CELL TOWERS IN GREATER SEATTLE AREA

<http://bit.ly/2s5ESjp>

2015 - Deployed Industries first Ethernet backbone to offer 100 Gigabit per second (100G) capabilities

<http://bit.ly/2rXvWMJ>