Matrix Design Group Presentation to Halifax Selectboard

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Meeting Date: December 3, 2019

Presenter: Chris Lynch, Matrix Design Group

Attending: Selectboard: Lewis Sumner and Mitchell Green (Brad Rafus was absent)
                        Selectboard Secretary: Robbin Gabriel
                        Tristan Roberts, Stephen Chait, David Jones, Ray Combs

Chris Lynch introduced his firm, Matrix Design Group. This privately held company based in East Hanover, NJ has been in business for 25 years specializing in designing and building fiber optic networks. Matrix has built thousands of miles of fiber optic networks, including a fiber prototype network for Bell Labs and Microsoft; a fiber infrastructure for the campus of Rutgers University; a smart grid for Public Service of New Jersey; various infrastructure buildout projects for Verizon, AT&T, and Level 3 (now CenturyLink); the stateside connection for a transatlantic cable owned by Facebook; a 500 mile long fiber infrastructure for the Vermont Telecommunications Authority; a four town expansion of the Burlington, VT municipal network for its new non-municipal owners [Schurz Communications / Champlain Broadband]; some unspecified scope of work to support a fiber network installation in Shutesbury, MA; and the initial buildout for the first nine towns served by EC Fiber, a non-profit community network in East Central Vermont. Chris stated that Matrix gets 80% of new business from referrals.

Matrix designed, built, operated, and set up the administrative procedures for ECFiber. Matrix was also an early stage investor in the initial network. After Matrix operated this network for three years, several ex-employees formed ValleyNet, the current operations group for ECFiber.

Matrix designed and built a municipal fiber network for Leverett, MA and is currently building a network for Petersham, MA. This network supports 521 homes along 47 miles of road. Chris Lynch felt this was roughly comparable to Halifax's geography. He noted, however, that 82.5% of the town land is non-taxable, primarily because it includes the Quabbin Reservoir and the Harvard Forest as well as some privately owned but non-taxable parcels. [Therefore, the populated areas are more dense than the town as whole.]

Matrix has previously presented to the Selectboards of Stamford, Readsboro, Whitingham, and Marlboro. Chris Lynch used a summary of Matrix's proposal to Stamford as the basis for discussion. This proposal was presented last week.

Matrix criteria for selecting target communities are

- No existing vendor – underserved, e.g., not in sections of Wilmington where Duncan Cable is present;

- 500 or more existing homes (the minimum needed to make an onsite technician economically feasible);

- Density of at least 6 subscribers per mile of fiber on average (not necessarily for each and every mile);

Lewis Sumner pointed out there were about 500 homes in Halifax but 70 miles of road, making the density lower than in Petersham. Chris Lynch said that the network scope could be limited in order to satisfy the necessary criteria, for example by eliminating some road miles without homes from the routes of fiber to be build or eliminating rarely used camps from the list of homes to be supported.

In Matrix's proposal to Stamford, the town is responsible for make-ready costs and end-users are responsible for one-time installation costs and ongoing subscription costs. Matrix is responsible for the cost to build, operate, and administrate the network. Matrix is awarded a 20-year contract to operate the network. The town can buy out Matrix's interest in the network after three years at progressively diminishing cost.

Make-ready costs cover:

- Surveying the pole infrastructure, identity poles that do not meet the necessary standard, and replace these poles;

- Securing the right-of-way to use these poles; and

- Providing a facility to house the network equipment and electrical infrastructure.

Make-ready costs are approximately one third of the total one-time cost. Matrix would invest the other two thirds to design and build out the network.

End user costs would include:

- $95/month subscription fee for 50Mbps up/down or $135/month for 100Mbps up/down;

- $20/month fee for optional VOIP (voice over internet protocol) service;

- One-time installation cost of $400 per network connection at existing homes, $200 of which is paid up front and $200 of which can be financed over 12 months;

- One-time installation cost of $500 per optional VOIP connection at existing homes, $250 of which is paid up front and $250 of which can be financed; and

- The cost of installing underground conduit for homes not within 300 ft. of a pole.

- The cost for installation at new homes on routes not already built out will be $1,500.

Service would be provided from a wireless router provided to each home. The router has a theoretical service area of 4,000 sf. Mesh extenders can be used to widen the coverage area.

The timeframe for delivering service after a decision to proceed is reached is about 10 months – 6 months to survey the pole infrastructure and complete necessary remediation and 4 months to build out the network. Buildout proceeds at an average rate of 1 mile of fiber per business day. One crew builds the fiber; a second crew follows behind to install the end-user equipment at subscribers' homes.

The basic network design is hub and spokes. The hub is the centrally located facility housing the network equipment; the spokes are fiber routes extended from the hub.

For Halifax, the costs incurred by Matrix are likely to be in the range of $2 million and the costs to be incurred by the town would be in the range of $800 thousand. Grants or subsidized VEDA loans could pay unspecified portions of the town's cost. Capital leases could finance the remainder. Note: David Jones pointed out that the town has no financial responsibility if it joins a Communications Union District (CUD) because the CUD contracts to obtain the network and, by law, this cannot be funded by general obligations of participating towns.

Matrix offers a buyout cost to the town after three years of operation. The buyout price decreases over time until, after 20 years, the cost is effectively zero.

Matrix will prefer to contract with towns rather than contracting with a CUD. Chris Lynch stated a belief that a CUD's capacity to decide and act will be hampered by disagreements between the participating towns. He noted the implosion of a multi-town collaboration in Western Massachusetts, Wired West, a few years ago. If agreement was possible, time would be needed to conduct an RFP process to engage vendors; he estimated this could take six months. He also noted that a CUD would be unlikely to obtain financing through revenue bonds until after a network was already built and operating; philanthropy or other fundraising would be needed to get a CUD off the ground. But Matrix will work with a CUD if it is asked to bid.

When asked why the speed of the fiber network was limited to two tiers of 50 or 100 Mbps up/down, Chris Lynch stated that the limiting factor would be the capacity of the backhaul connections, not the quality of the network components. Matrix will guarantee to provide the FCC standard for minimum broadband speed as that standard increases over time. The current standard is 25Mbps down, 3Mbps up. He noted that the upcoming introduction of 8K video and increasing use of currently available 4K video will make the current FCC standard obsolete within a few years because these standards will require two to four times more bandwidth speed.

When asked how to best determine the demand for service in a town, Chris Lynch stated that survey results are often inaccurate. He said the best method is to call a town-wide public meeting to announce a prospective plan and get support through a town vote for the cost to implement the plan.

Other points:

- Green Mountain Power (GMP) is easy to work with.

- 80% of problems reported to Matrix's help desk are in-home WiFi problems, not problems with the network cabling or equipment.

- If there is a fiber infrastructure issue, the power utility is given priority to fix electrical issues before the telecom provider can find and fix the fiber issue.

- The housing for the network and electrical equipment can be as simple as a climate-controlled area in the basement of an existing building. Matrix will provide support for writing the RFPs needed to contract for the construction of this area.

- Fiber networks are likely to have a long useful life. Fiber is the infrastructure that underlies 5G wireless expansion. Large providers like Verizon are divesting copper infrastructure.

- Alternate technologies like low earth orbit satellites would require a dish at each home and the availability of satellite connections may be limited by the number of satellites that can be placed into orbit without creating an impractical volume of space junk.

- Matrix supports Net Neutrality, e.g., Matrix does not selectively alter the speeds of some content providers in exchange for compensation and does not sell end-user information to third parties.

Following Chris Lynch's presentation, the Selectboard agreed to invite volunteers to join the Broadband Committee. This committee still exists on paper but the previous members resigned when there seemed to be few practical avenues to pursue. The Selectboard will request responses by the first week of January and will name the committee members in the meeting of January 7.