So I had to start a telco

Or .. How I finally got high speed internet access to my house in 2020

Jared Mauch - Washtenaw Fiber Properties LLC
@jaredmauch

Background

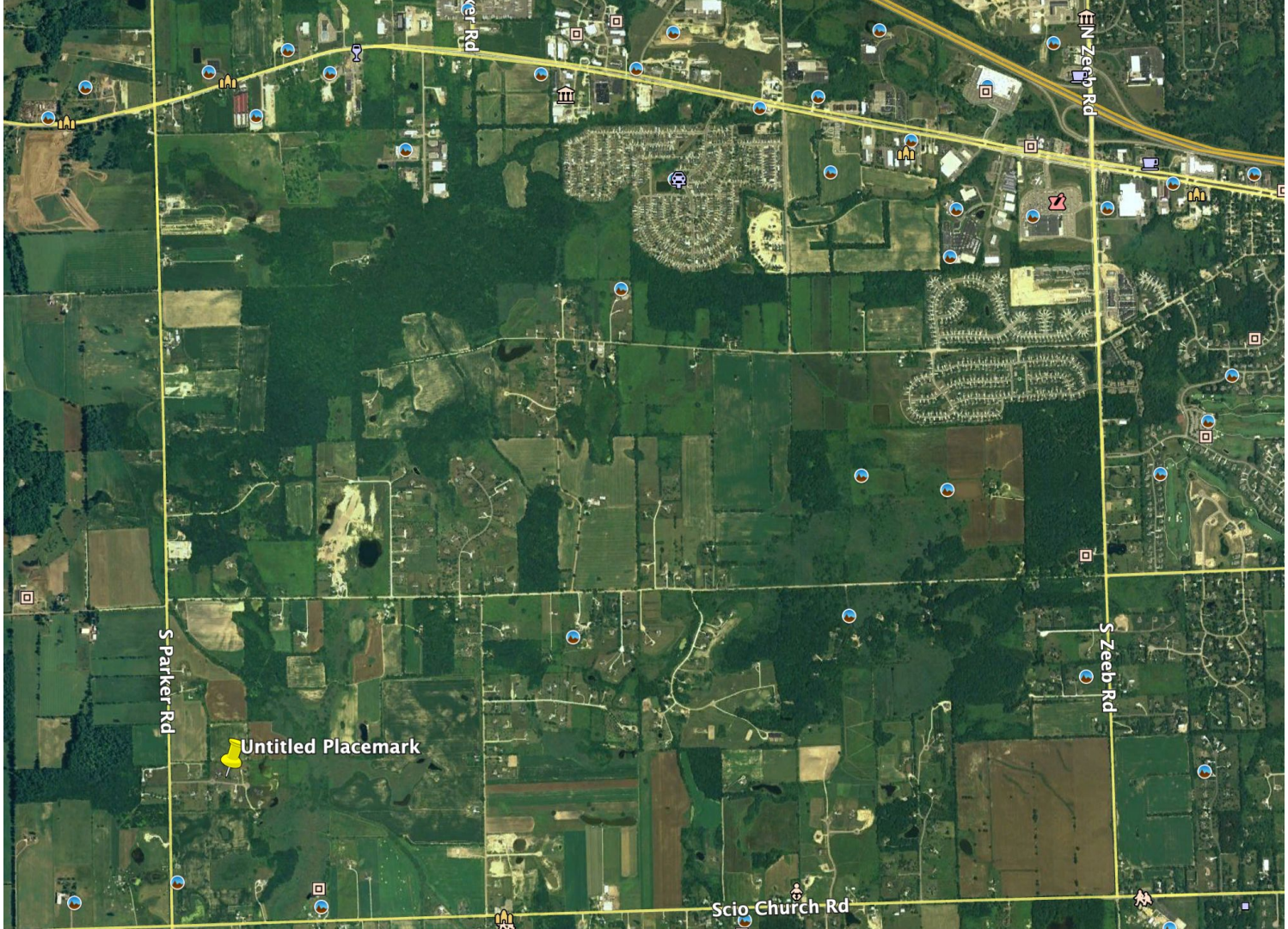
- In 2002 I moved to a new home on the outskirts of Ann Arbor, MI
- My employer at the time provided me a T1 to the local pop
- 1.5Mb/s in 2002 symmetric at home was still decent
- Development in and around Ann Arbor was putting in new subdivisions nearby
- I expected broadband would reach my new home eventually (Cable, DSL, FTTx)
- But.. nothing came
- About 2+ (3.3km) miles away from existing service area
    - 12291ft (3.7km) to my house

Where do I live?

- West side of Ann Arbor, MI
- No .. Further west

Keep going...

- Ok, can I describe it as farm adjacent?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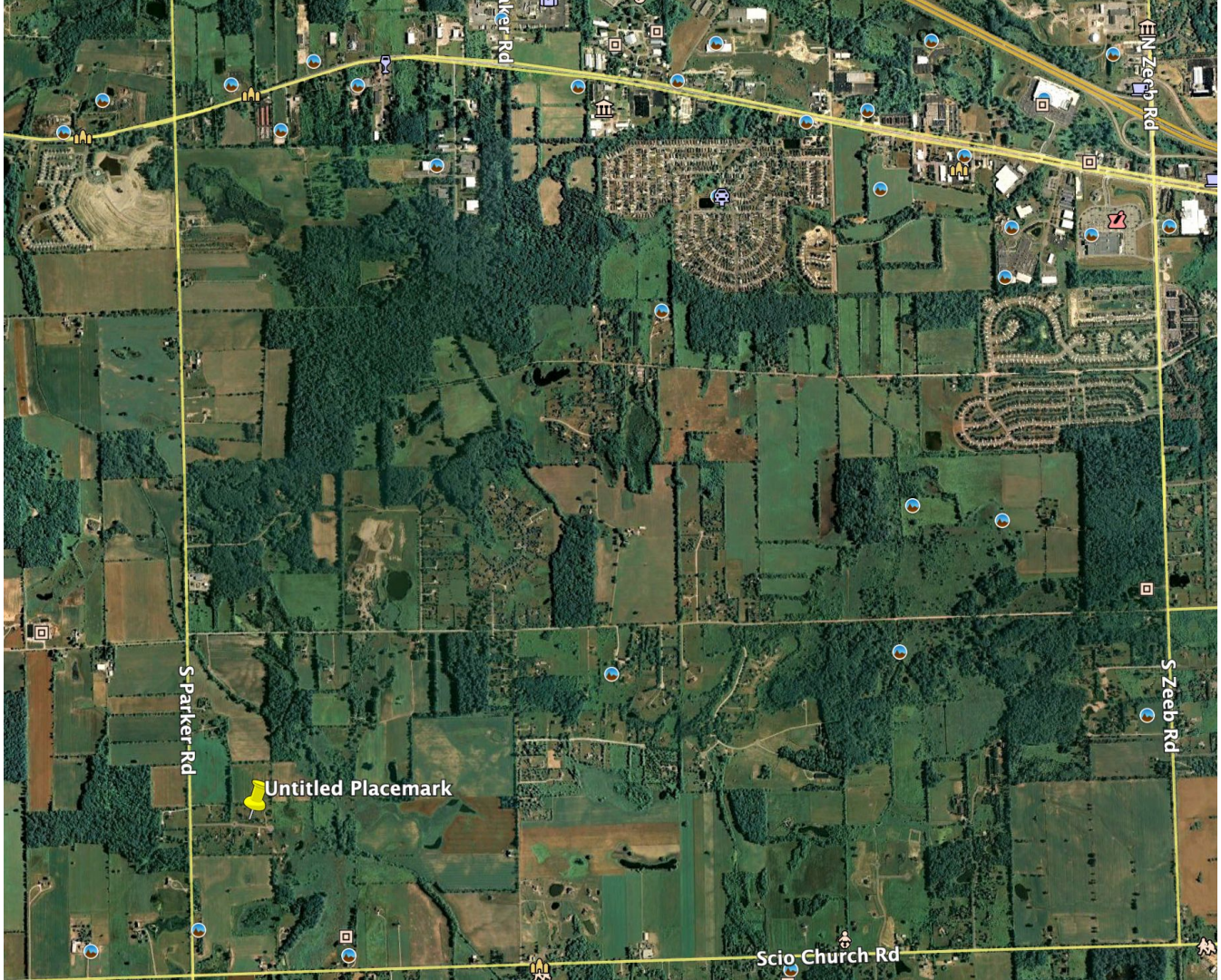
S Parker Rd
Untitled Placemark
S Zeeb Rd
Scio Church Rd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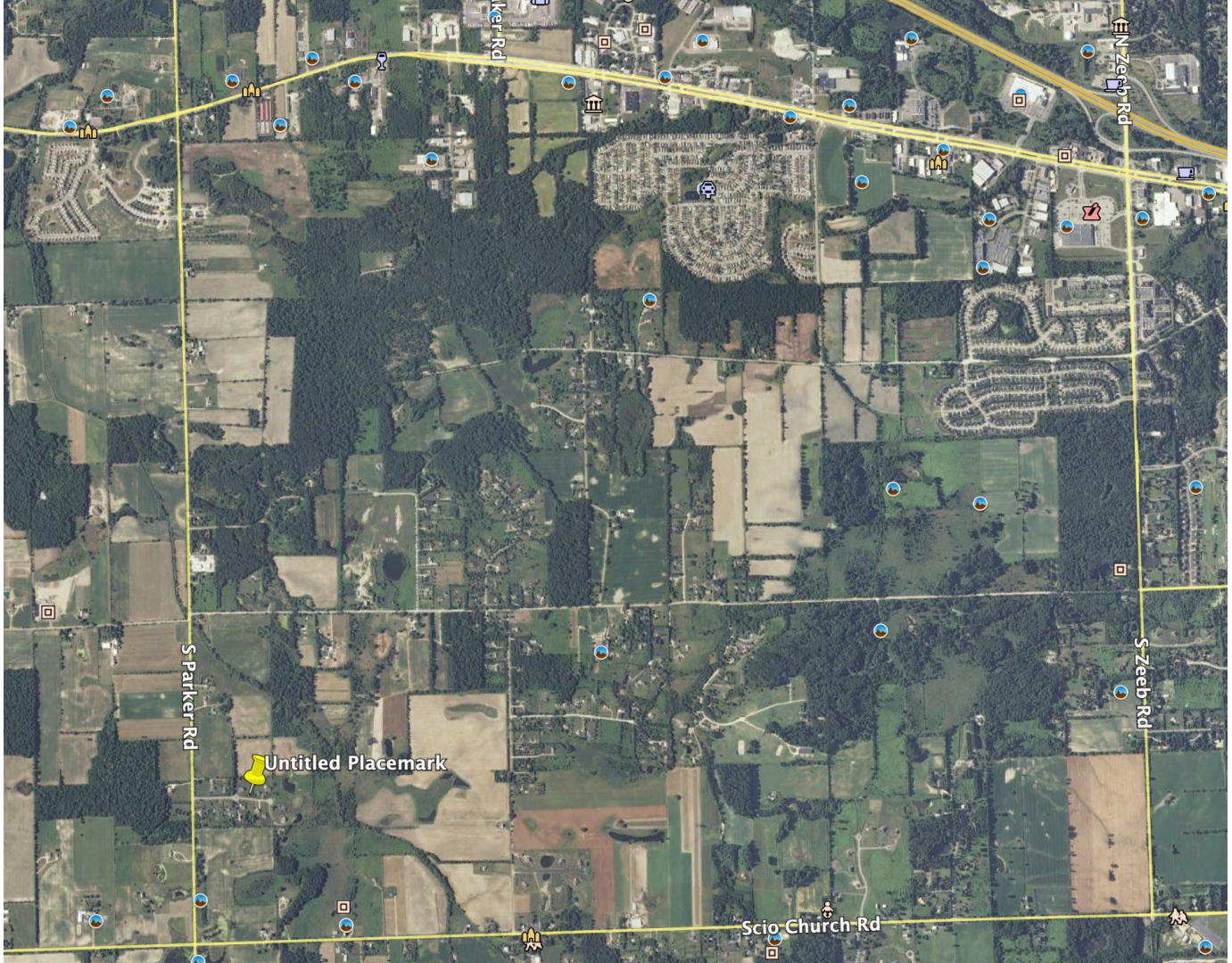
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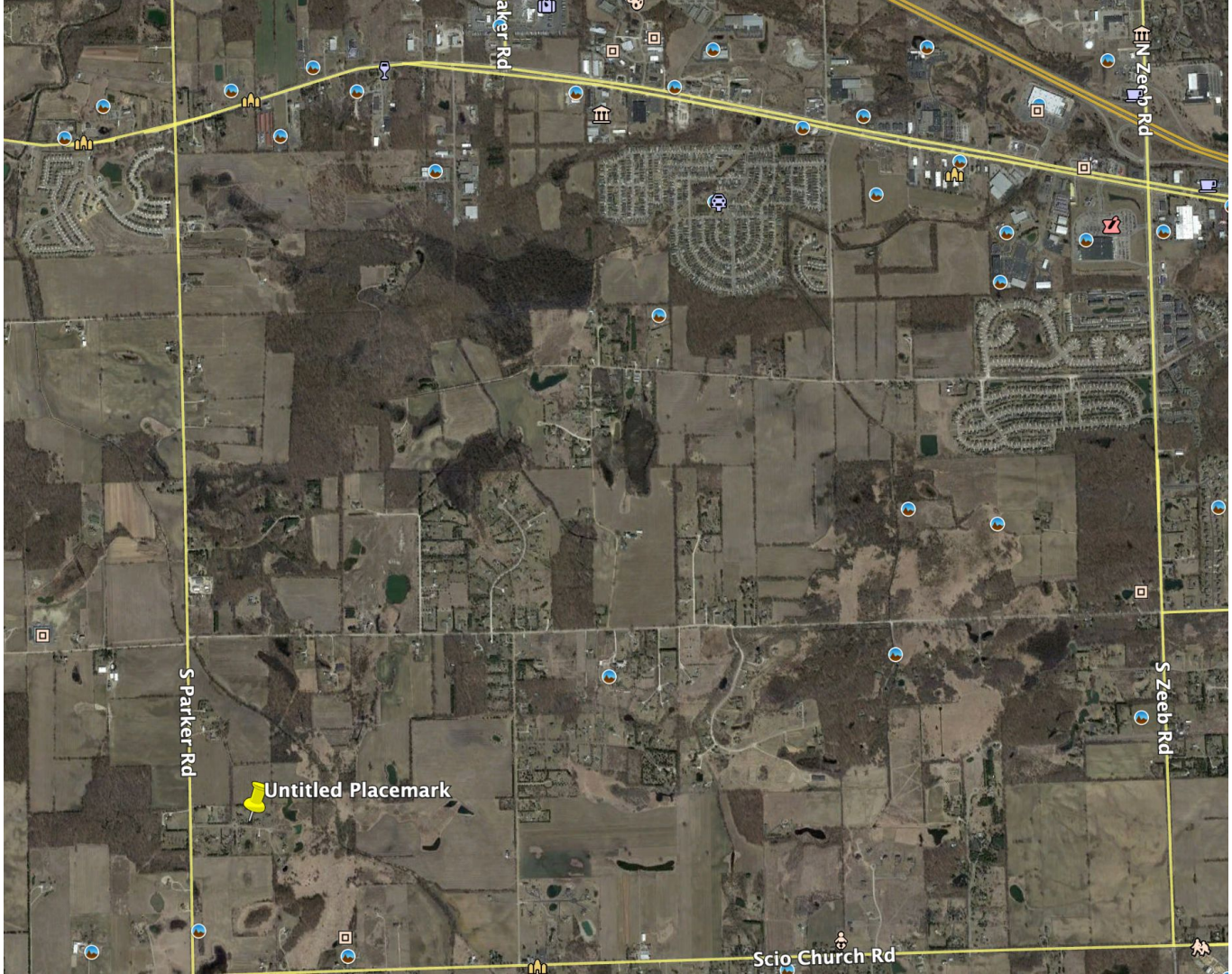
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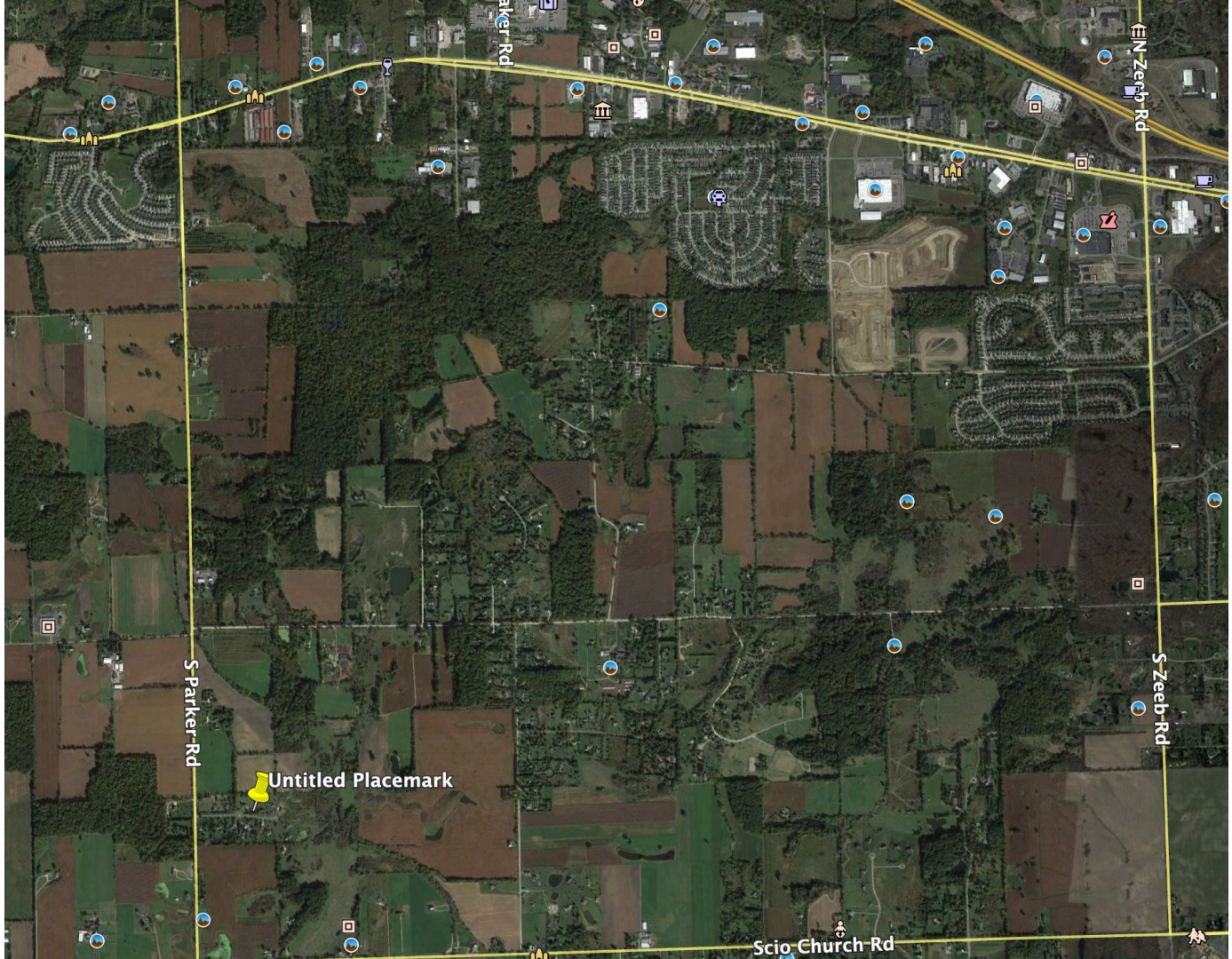
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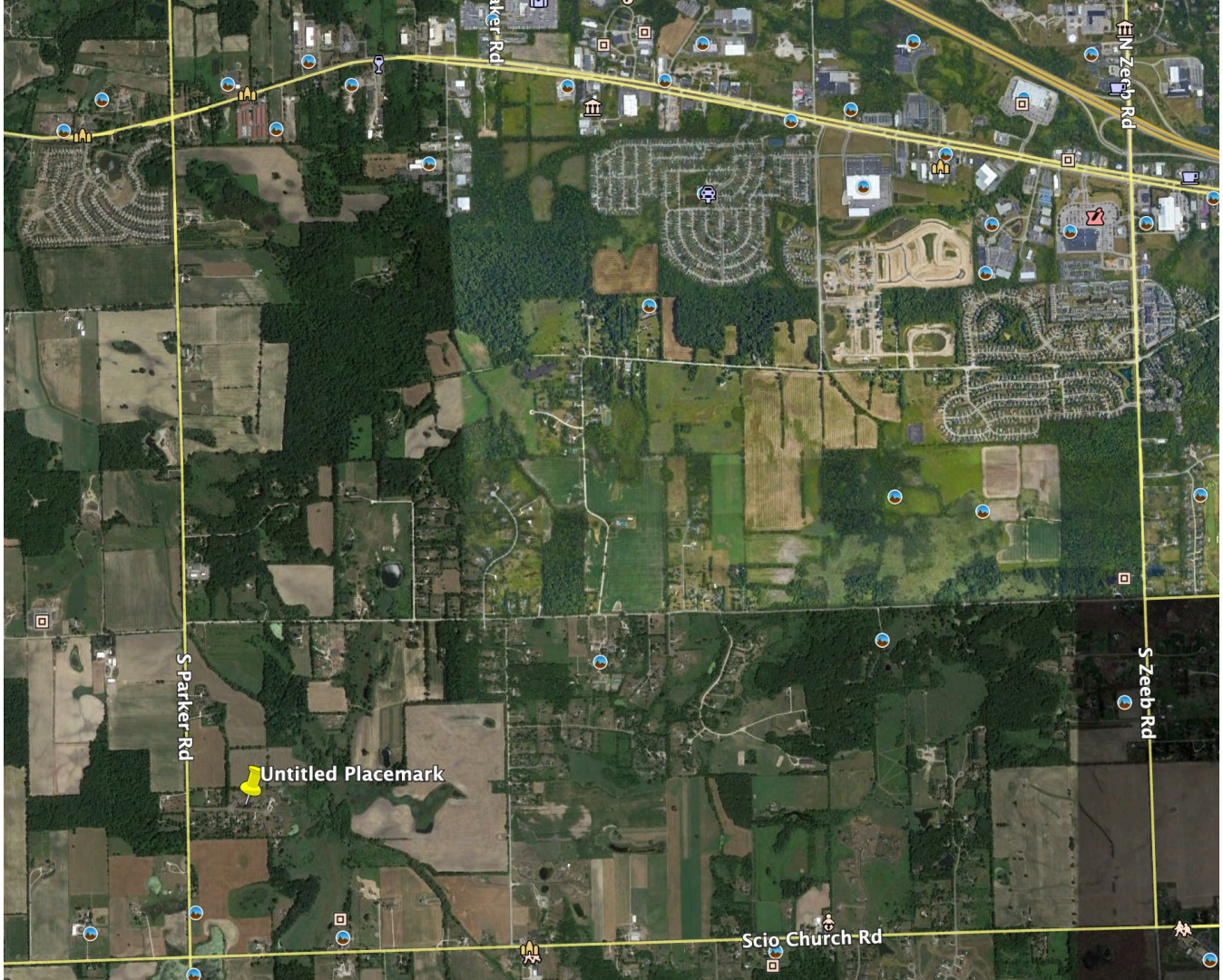
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Untitled Placemark
Scio Church Rd

So .. problem.. Conflict

- No high speed internet
- Move?
  - US generally seller pays commission based on sale price, significant cost to move
  - Home devalued as no high speed available
- WISP (Wireless ISP) to temporary rescue
- What's a geek to do?

I know…

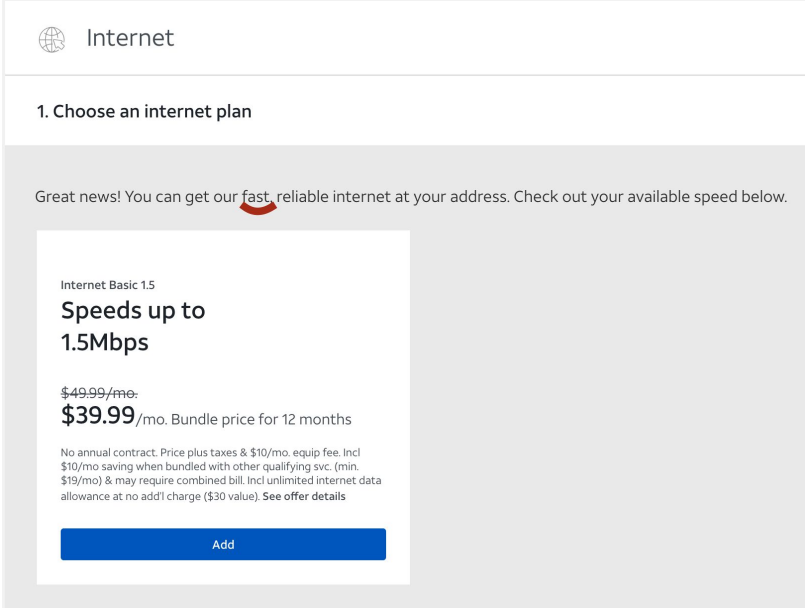
- Start a telco!
- File a tariff - https://washftth.com/tariff/
- …
- Profit?

Lets back up now

- Research
- Planning
- Finances
- Pre-builds
  - 2018 - Started to connect WISP customers to fiber
- Customers
- Internet Access
- Construction
- Contractors
- Fiber

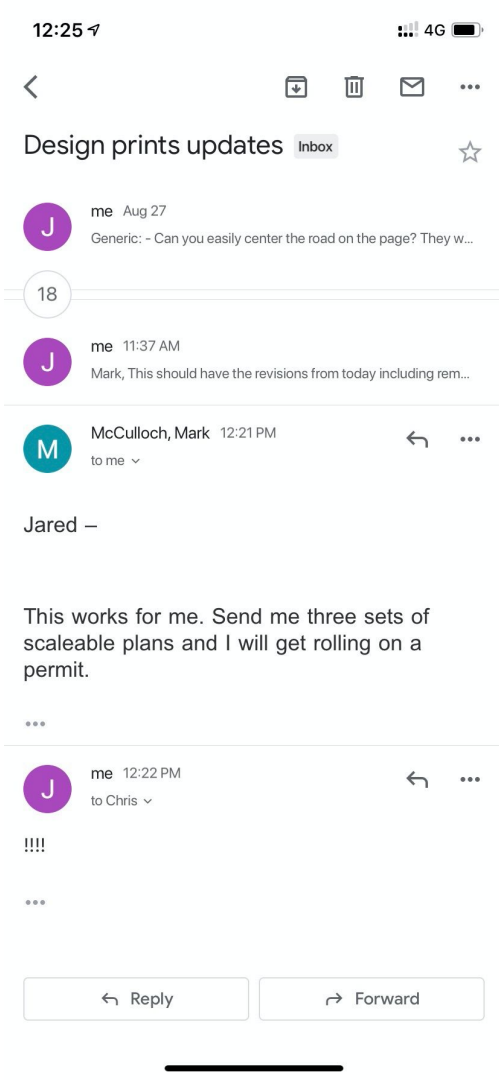
Research

- Access, Costs
  - Tried to get existing providers to build
  - Comcast was most approachable and easy to work with - wanted $50k
  - AT&T was unable to offer anything but DSL
- Technology
  - Active Ethernet
  - GPON (UF-OLT, some drawbacks here)
- Marketing!
  - Talked to many people
  - Mailed letters to potential subscribers
- Talked to many ISPs doing existing FTTH
- Community Groups



Planning

- Purchased fusion splicer in 2016
- Purchased first 2km of Fiber in 2017
- Purchased OTDR in 2018
- Design and Permitting
  - Drew up master plans
  - Filed tarriff with regulators
  - Joined MissDIG (811) system
  - Permit filed for April 2019
  - Issued September 2019
- Time of year pushed schedule into 2020

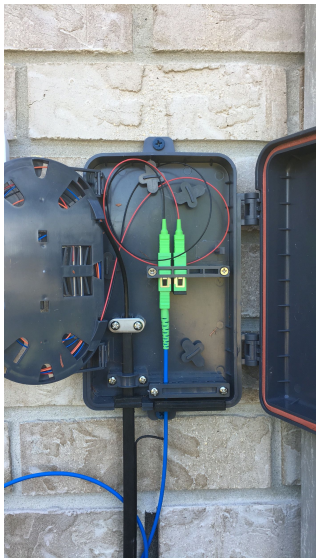


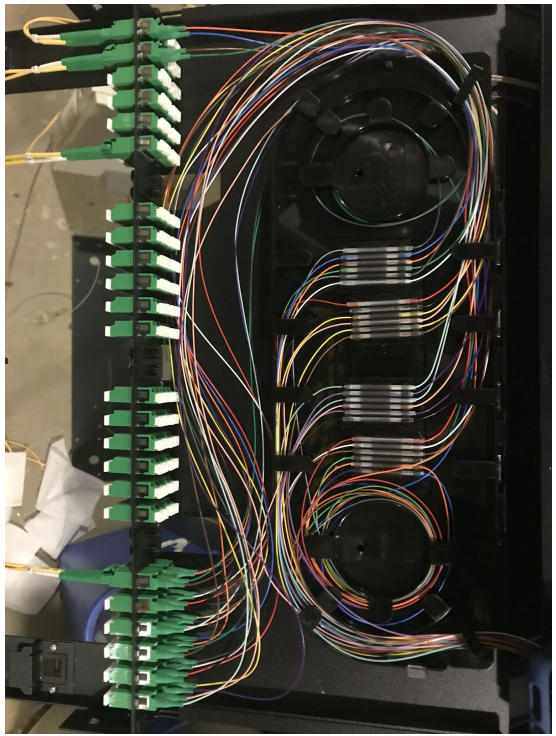
Finances .. or .. start small

- Key was to spread out costs over a longer period of time
- Found distributors for underground supplies
- A little bit here, a little bit there goes a long way
- Planning told me it would be a $60k project (at least)
- Had to line up money, bonus, HELOC, customer payments
- Pre-pay model copied from VBFiber
  - Can pay $5,000 up-front and receive $50 credit for 100 months
  - Stays with property
  - Keeps customer paying something
  - Offset startup costs (£¢$)

Pre-builds

- Worked with existing WISP who had antennas on my house
- Pre-wired neighbors with fiber at my expense
- Pre-wired and pre-constructed my property
- Racks, Fiber distribution, patch panels...





Supplies and Supply runs!

Customer Acquisition

- Local county has tool MapWashtenaw
- Can look at property shapes
- Get owner names
- Sent them a letter
    - In the mail
        - On paper
            - Yes in 2019
                - Really
- Invited to neighborhood meeting
- Construction start letter also went out to people who did not sign up
    - More people signed up
- Around 70% of homes passed signed up

Internet Access

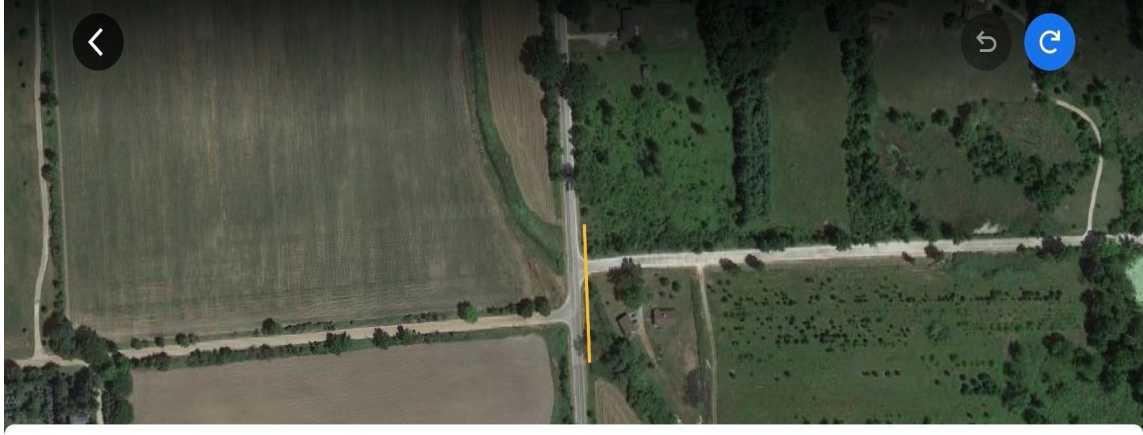
- ACD.net
  - Had to enable IPv6 for me
- 123.net
  - Connection Pending
- Detroit IX
  - Connection Pending
- ARIN
  - Can apply for IPv6 space
  - Can apply for IPv4 space if you have IPv6
  - Already had an ASN

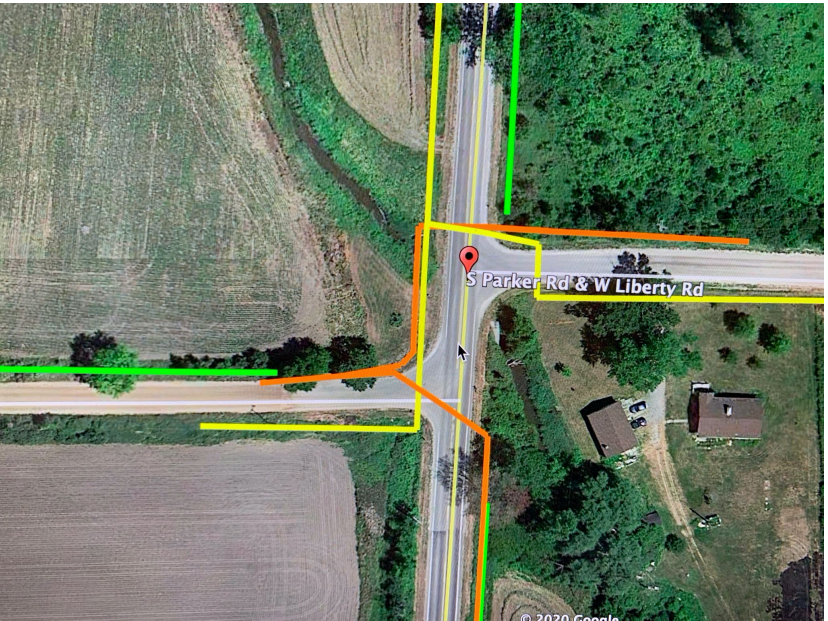
Contractors

- Have a good working relationship with them
- Perhaps buy them food
  - Keep them happy and working
- Resolve issues along the way
- Consider policies for social media posts
- Get a good referral
- Make sure they have all the right equipment

Expect problems

- Cursed corner!





Distance

315 ft

My Equipment

- Purchased Ditch Witch JT820 Drill
  - Vintage - 1995
  - $8,000
- Borrowed cable plow
  - Used to bury service drops
  - Owned by WISP

Theft of equipment!

Marketplace › Mis

Ditch witch z100

Aurora, IL · over a

$6,500

2006 Ditch Witch
boring attachment

Condition

Brand

Seller Informatio

Joined Fa

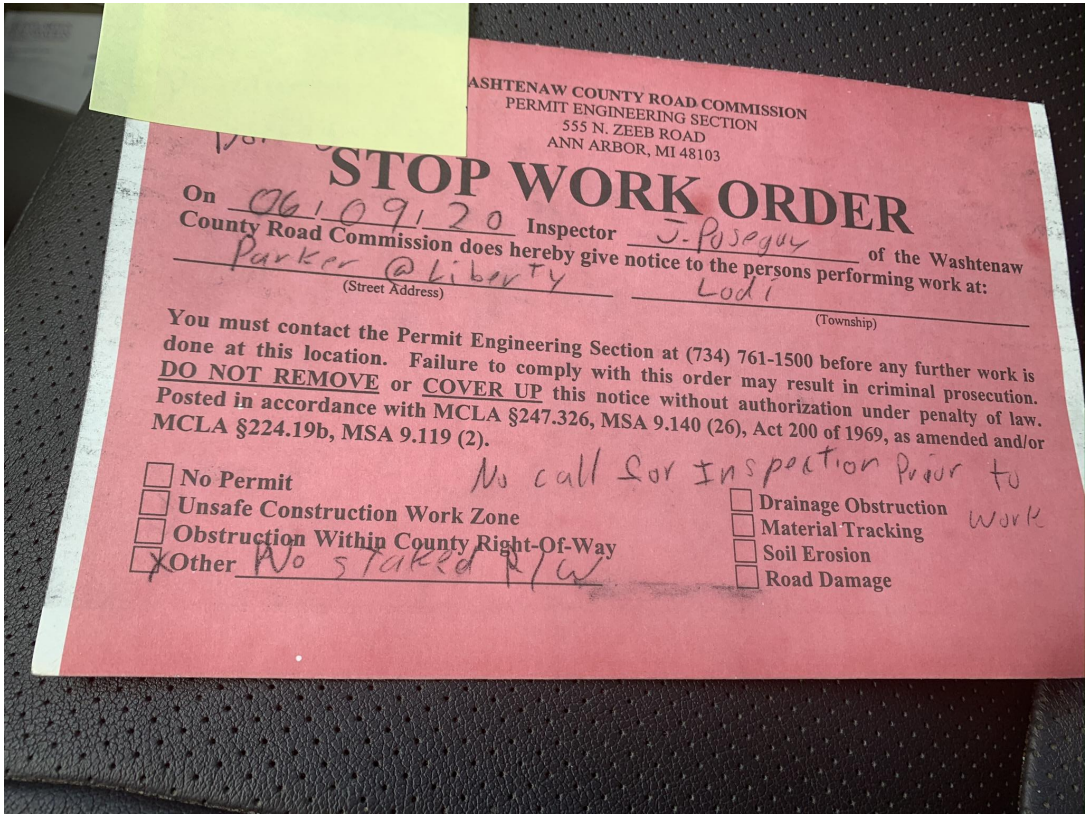
Send seller a mes

Is this avail

Messag

Construction issues

-



ASHTENAW COUNTY ROAD COMMISSION
PERMIT ENGINEERING SECTION
555 N. ZEEB ROAD
ANN ARBOR, MI 48103

STOP WORK ORDER

On 06/09/20 Inspector J. Posegay of the Washtenaw County Road Commission does hereby give notice to the persons performing work at:

Parker @ Liberty (Street Address) Lodi (Township)

You must contact the Permit Engineering Section at (734) 761-1500 before any further work is done at this location. Failure to comply with this order may result in criminal prosecution. DO NOT REMOVE or COVER UP this notice without authorization under penalty of law. Posted in accordance with MCLA §247.326, MSA 9.140 (26), Act 200 of 1969, as amended and/or MCLA §224.19b, MSA 9.119 (2).

- ☐ No Permit — No call for Inspection Prior to work
- ☐ Unsafe Construction Work Zone
- ☐ Obstruction Within County Right-Of-Way
- ☒ Other No staked R/W
- ☐ Drainage Obstruction
- ☐ Material Tracking
- ☐ Soil Erosion
- ☐ Road Damage

Unbudgeted costs

- Survey and staking of right of way
  - $5,000
- Marking wire for conduit to end stop-work order
  - $300
- Employee badges
  - Helpful during COVID-19
- Water
  - $1,500 (may be revised) for directional drill

Other problems

- Unmarked utilities?
- Self-hit on installation!

Fiber Installation

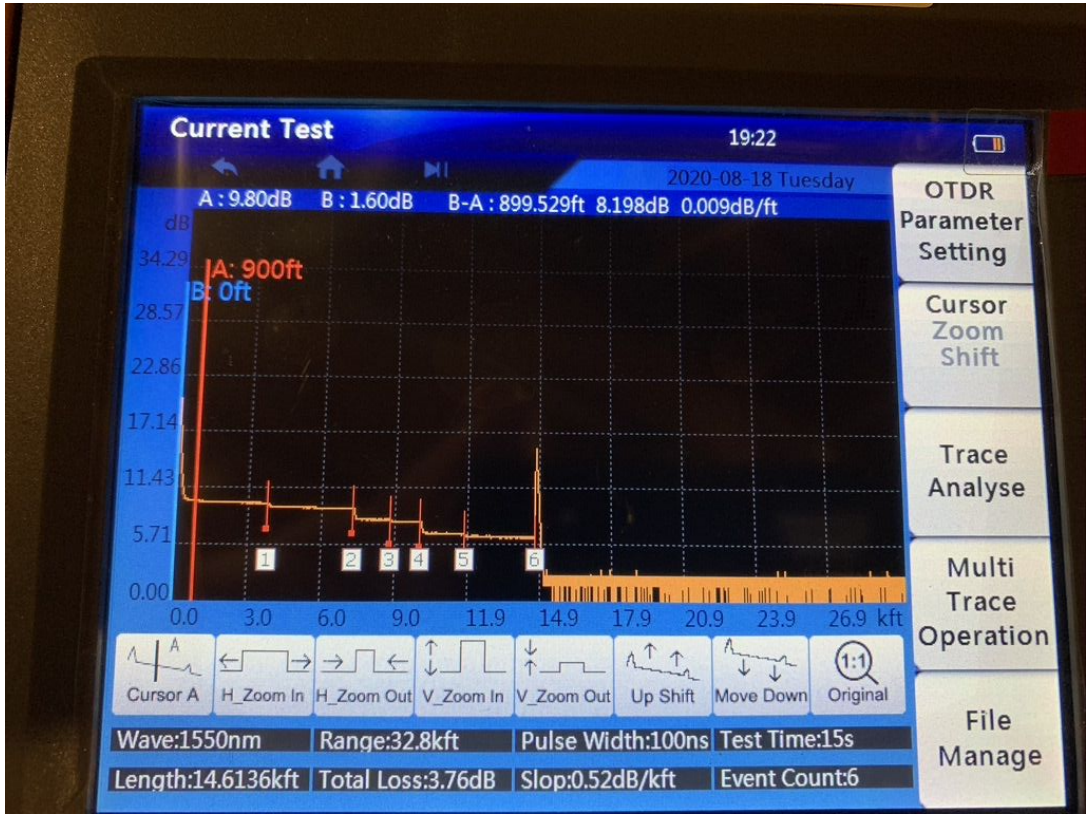
Build your own tools!

- Built a small fiber blower
- Worked decent
- 2,700 (822m) feet without issue

Splicing time!

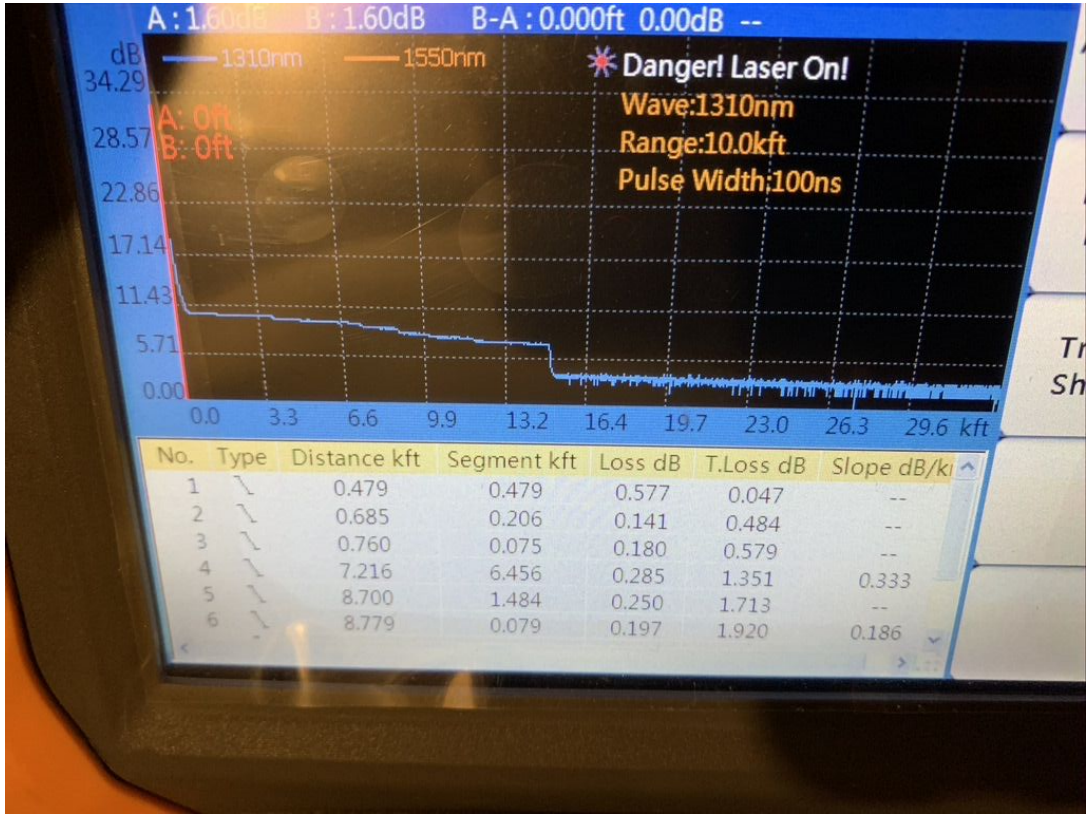
OTDR time!

- Ouch!



Some fixes ...

- Better



Scheduled install

- August 27th
- I know what I’m doing, so turn-up should be easy right? RIGHT?
- HAHAHAHAHHAHAHAHAHAHAHAHAHAHHAHAHAH
- Sorted through a few issues
- Then..
-

Finally link-up!

Aug 29 01:35:04 arista-7050 Ebra: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet49 (TRANSIT: ACD), changed state to up

Aug 29 01:40:24 arista-7050 Ebra: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet49 (TRANSIT: ACD), changed state to down

Aug 29 01:40:28 arista-7050 Ebra: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet49 (TRANSIT: ACD), changed state to up

arista-7050#

Before

jared@Jareds-Desktop-iMac ~ % ping 204.42.254.15

PING 204.42.254.15 (204.42.254.15): 56 data bytes

64 bytes from 204.42.254.15: icmp_seq=0 ttl=54 time=29.590 ms

^C

--- 204.42.254.15 ping statistics ---

1 packets transmitted, 1 packets received, 0.0% packet loss

round-trip min/avg/max/stddev = 29.590/29.590/29.590/0.000 ms

After

arista-7050#ping 204.42.254.15

PING 204.42.254.15 (204.42.254.15) 72(100) bytes of data.

80 bytes from 204.42.254.15: icmp_seq=1 ttl=54 time=8.78 ms

80 bytes from 204.42.254.15: icmp_seq=2 ttl=54 time=8.69 ms

80 bytes from 204.42.254.15: icmp_seq=3 ttl=54 time=8.57 ms

80 bytes from 204.42.254.15: icmp_seq=4 ttl=54 time=8.57 ms

80 bytes from 204.42.254.15: icmp_seq=5 ttl=54 time=8.58 ms

--- 204.42.254.15 ping statistics ---

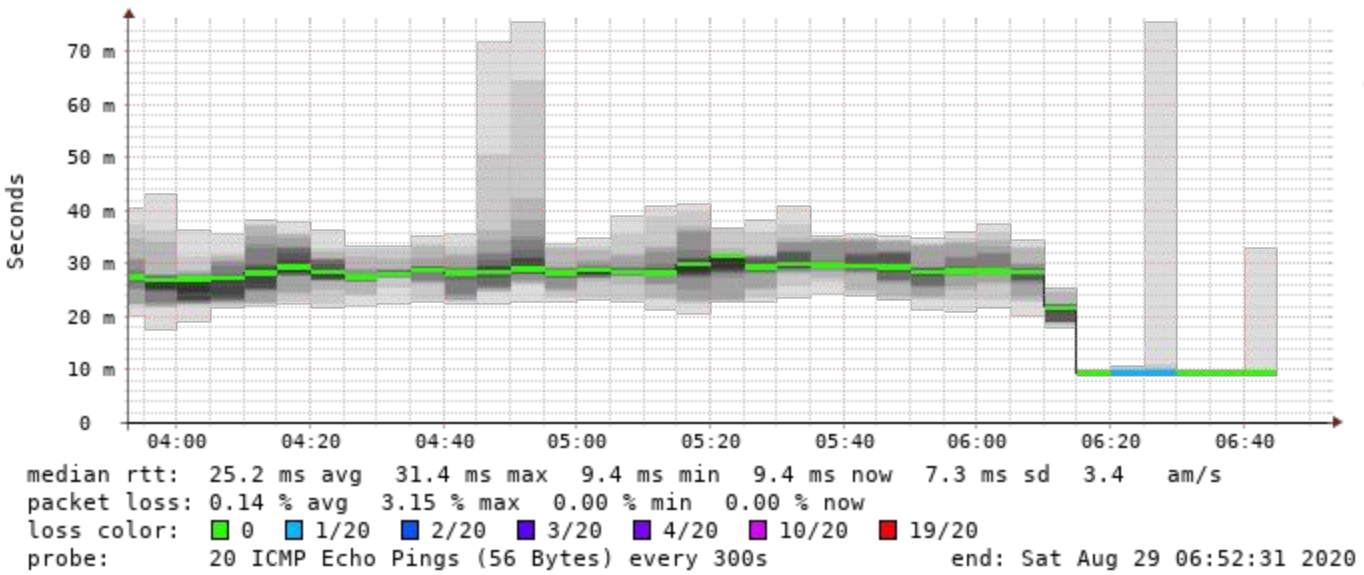
5 packets transmitted, 5 received, 0% packet loss, time 38ms

rtt min/avg/max/mdev = 8.571/8.640/8.784/0.118 ms, ipg/ewma 9.516/8.707 ms

Traceroute

```
arista-7050#traceroute 204.42.254.15
traceroute to 204.42.254.15 (204.42.254.15), 30 hops max, 60 byte packets
 1  207-179-84-221.static.acd.net (207.179.84.221)  0.490 ms  1.263 ms  1.241 ms
 2  gi0-1-0-subint21.router.backbone.jcsnmimn.acd.net (207.179.109.6)  2.662 ms  2.648 ms *
 3  Gi4-1-0-subint21.router.backbone.lnngmimn.acd.net (207.179.109.33)  2.391 ms  2.464 ms
*
 4  gi2-0-0-subint198.level3.acd.net (208.77.128.153)  2.658 ms  2.662 ms  2.640 ms
 5  7-1-19.ear3.Chicago2.Level3.net (4.35.108.129)  7.675 ms  7.676 ms  7.668 ms
 6  * * *
 7  ae-4.r07.chcgil09.us.bb.gin.ntt.net (129.250.8.173)  8.752 ms  8.791 ms  8.859 ms
 8  r204.42.254.15.nether.net (204.42.254.15)  8.589 ms  8.609 ms  8.594 ms
```

Latency reduction



Your Internet speed is

730 Mbps

Unsolicited contact!

- IPv4 Depot
  - We noticed you stopped announcing an ARIN /24
- Cogent
  - Want transit?
    - Called me during a precious mid-day nap
  - We are ranked lower on downdetector than (insert list of competitors)
- HE
  - Want transit?

Costs?

- 2020 had the majority of them
- Major costs breakdown:
  - $126,710
  - $94,866 - Directional boring/conduit installation
  - $31,844 - Misc materials, rentals, equipment
    - $5,000 - Surveying
    - $856 - 185 CFM Air Compressor rental

Maybe still cheaper than moving? And I now have fiber!

Thank You!

- Without many people it would not be possible
- Support of many people who have been there and done that
- Ryan Peel @ VBFiber
- Chris Fabien @Lakenet
- Antawn Parks @ Millenium
- Roy Grove @ EZwisp
- My neighbors on Reese Lane, Pinecross Lane, Liberty and Parker Road
- Great Lakes Directional Boring
- Everyone who put up with me and encouraged me along the way
- ACD.Net & 123.net
- My family
- Many friends who helped with physical labor or other support

Resources

- Facebook!
  - https://www.facebook.com/groups/wisptalk/
  - https://www.facebook.com/groups/fispstuff/
  - https://www.facebook.com/groups/305841453429657/
  -

FIN

Time for questions?

twitter.com/jaredmauch