FLAT WIRELESS, LLC

Sent via email 10/19/2021

October 19, 2021

Mr. Ryan Shackelford
Rshackelford@portageco.com
Portage County, Ohio

Subject: Portage County (Ohio) RF analysis and population metrics

Flat Wireless was contracted by Portage County to produce detailed radio frequency (RF) coverage analysis related to the proposed deployment of a wireless system targeting residential and commercial broadband internet service within Portage County, Ohio. The target service would be to provide broadband internet service with a minimum target speed of 25Mbps Downlink / 3Mbps Uplink to unserved and under-served households, businesses, and community anchor institutions within the county.

For the purpose of the RF study, we proposed to use radio equipment that will operate using the readily available Citizens Broadband Radio System (CBRS) frequencies. The CBRS frequencies consist of 150MHz within the 3.5GHz band. All public and private entities may access these frequencies on a general access licensing basis where the equipment receives a daily grant from the Spectrum Access System broker prior to initiating operation. The base RF study assumed the deployment of commercial CBRS radio equipment from Ericsson that supports 4G/LTE service using three 20 MHz LTE carriers or 60 MHz total bandwidth within the CBRS band. This equipment is 5G/NR capable. Each base site would consist of a base cabinet and power supply/batteries and baseband and will support three radio sectors. Customers would mount an outdoor antenna/radio at their locations that would support the CBRS LTE service. An indoor WiFi router connected to the outdoor radio via Ethernet would give customer access to the services.

As part of the analysis, we have identified unserved and under-served target census blocks using the NTIA – Indicators of Broadband Need mapping application. This map combines FCC coverage datasets, market surveys, and commercial speed test results into a single seamless map showing the state of broadband coverage at a census block level for the entire US. The identified target census blocks show similar results to those identified from the State of Ohio broadband mapping project. We also identified individual customer locations located within the target census block using the LBRS data from the State of Ohio.

Map A shows the target unserved and under-served census blocks and locations identified from the review of datasets. Specifically, the Northeastern part of the county is identified as being

unserved and/or under-served. Based on the RF analysis shown on Map B, we have identified deployment on five sites - four colocations on existing towers and one new tower as being sufficient to cover the vast majority of the target locations at the minimum speed target of 25 Mbps Downlink / 3 Mbps Uplink. As part of the analysis, we were to investigate if there was any benefit to using the proposed new MARCS towers in support of the broadband system. We elected to use the Garrettsville MARCS tower in support of the broadband deployment.

Table 1 identifies the target underserved/unserved and projected covered locations, census blocks, and population data at 100 Mbps, 50 Mbps, and 25 Mbps Downlink speeds.

Table 1: Projected Coverage within Unserved/Underserved areas of Portage County, OH

	Underserved	25 Mbps	50 Mbps	100 Mbps	25 Mbps %	50 Mbps %	100 Mbps %
Locations	2,329	2,297	2,149	1,176	98.6%	92.3%	50.5%
Census Blocks	588	390	319	131	66.3%	54.3%	22.3%
Housing	2,135	2,049	1,814	902	96.0%	85.0%	42.2%
Population	6,142	5,935	5,356	3,028	96.6%	87.2%	49.3%

A good ballpark estimate for the purchase of the radio and related equipment and deployment runs ~$200K per site. For five sites this would run right at $1M. There would be additional costs related to the construction of the new MARCS tower. All radio equipment would need to be connected back to an LTE core location run by the partner commercial entity that would operate this system.

Map C reflects projected RF coverage of the entirety of Portage County. This would require the deployment of radio equipment on 23 sites – 19 colocations on existing towers and 4 new MARCS towers. Table 2 identifies the target full county projected covered locations, census blocks, and population data at 100 Mbps, 50 Mbps, and 25 Mbps Downlink speeds.

Table 2: Projected Coverage within the entirety of Portage County, OH

	Full County	25 Mbps	50 Mbps	100 Mbps	25 Mbps %	50 Mbps %	100 Mbps %
Locations	68,099	67,897	63,561	30,367	99.7%	93.3%	44.6%
Census Blocks	5,671	5,612	5,169	2,387	99.0%	91.1%	42.1%
Housing	67,472	66,575	60,862	26,507	98.7%	90.2%	39.3%
Population	161,419	159,139	145,985	65,525	98.6%	90.4%	40.6%

The full County study was provided for reference. Our expectation is that with further input from local sources, additional areas within the county that are in reality unserved or underserved will be identified and additional sites added into the mix above the initial five identified. The full county study will give some idea of the increased site counts needed to provide coverage in the additional areas.

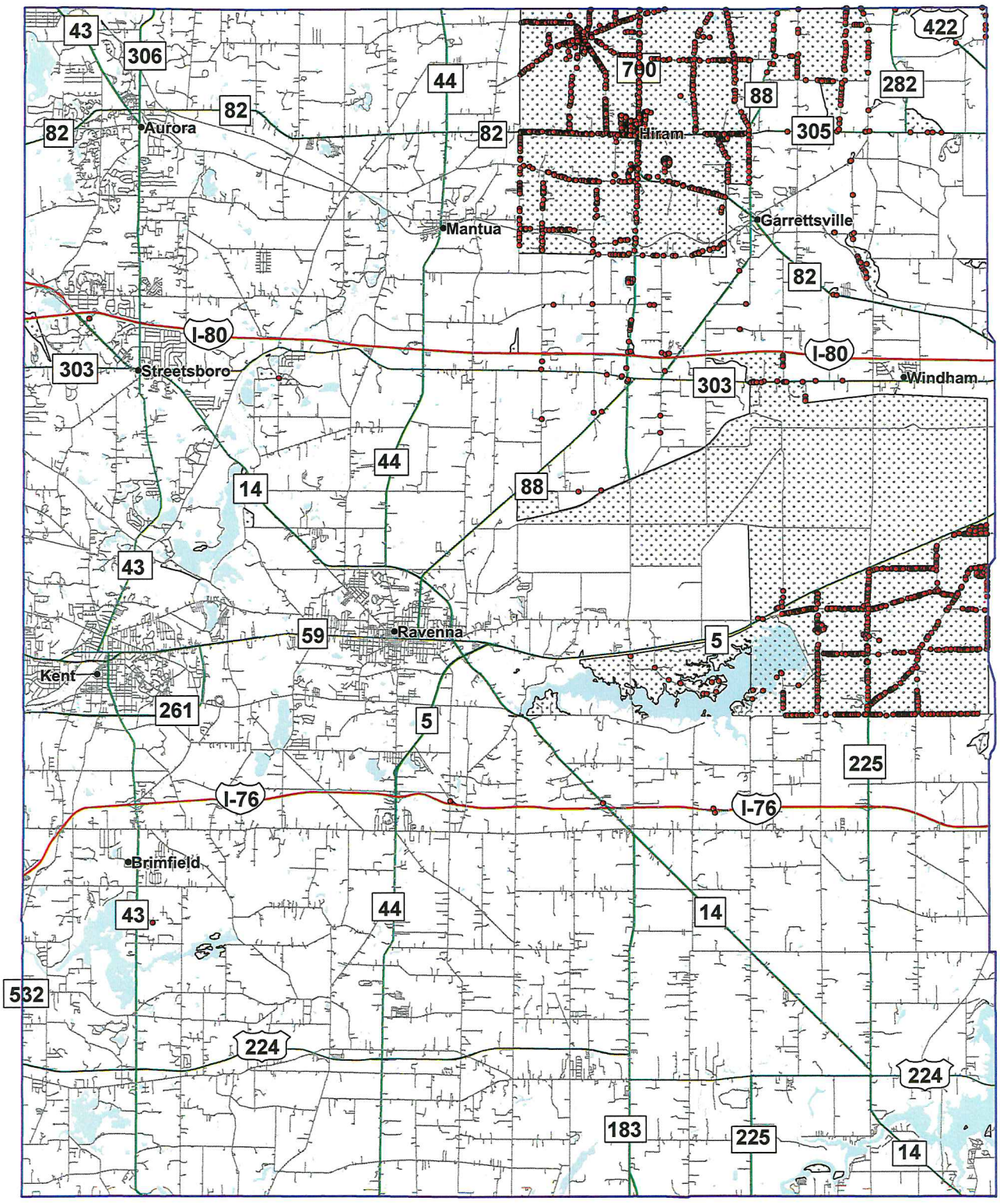
Finally, we reviewed the commercial viability and siting of the proposed new MARCS towers and whether they would provide improved value by moving them to alternate locations. Of the four proposed tower locations reviewed, we established that three of the four were positioned well for possible commercial service use. We recommend that the Outdoor Range site be moved 1.3 miles south to an identified alternate location.

Flat Wireless can continue to assist Portage County and their selected commercial partner throughout the entirety of the Grant application process and the actual deployment process following award of funds. We have extensive contacts with equipment vendors and can assist with any required RFP process, negotiations with vendors, project management and site acquisition services, RF analysis, tower climbing, construction, implementation, and testing services as needed to bring the system live. We expect that within 6 months of award we could have the full system in operation and ready for customer sales.

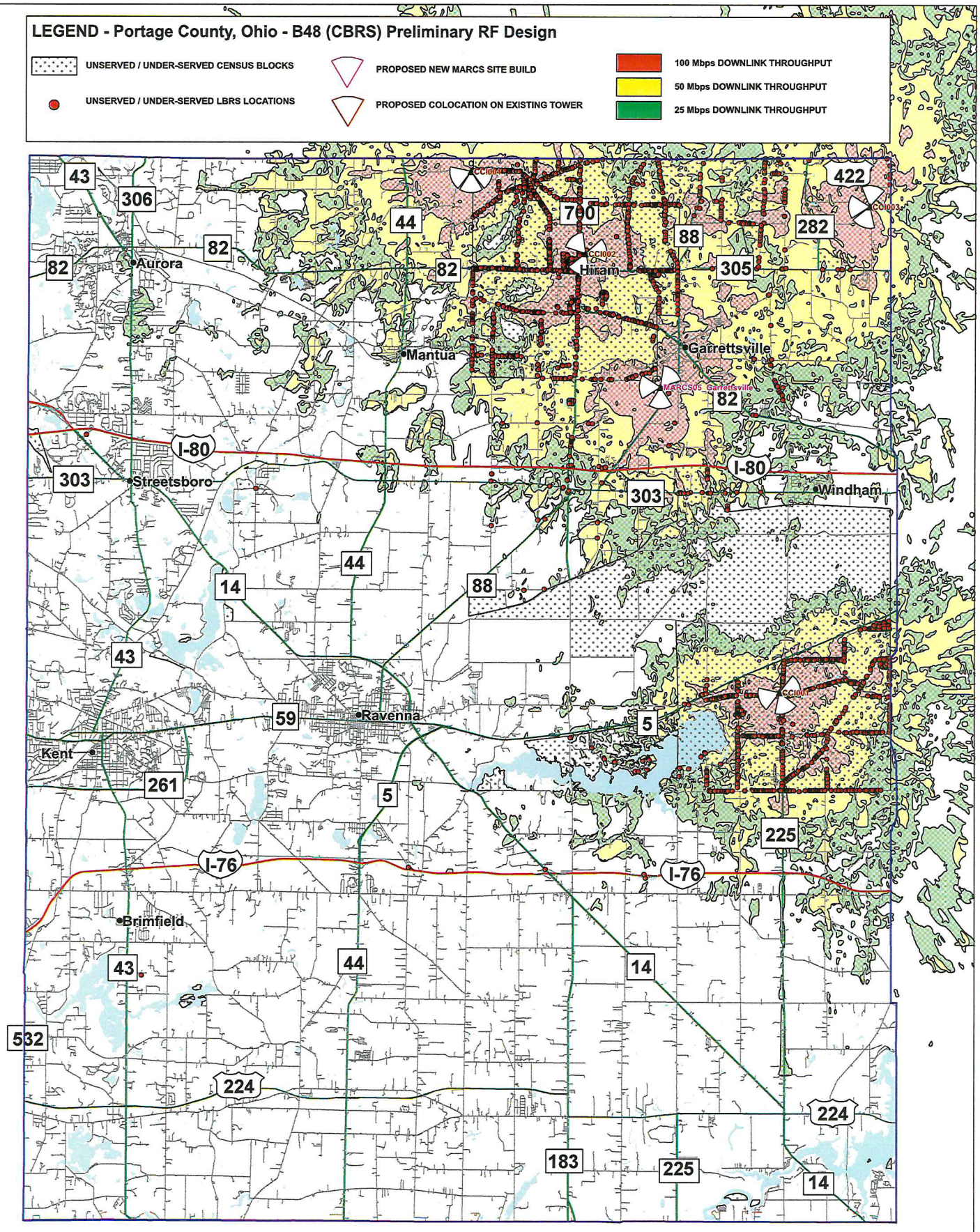
We look forward to assisting Portage County with developing and implementing their plans to meet critical broadband telecommunications needs.

Sincerely,

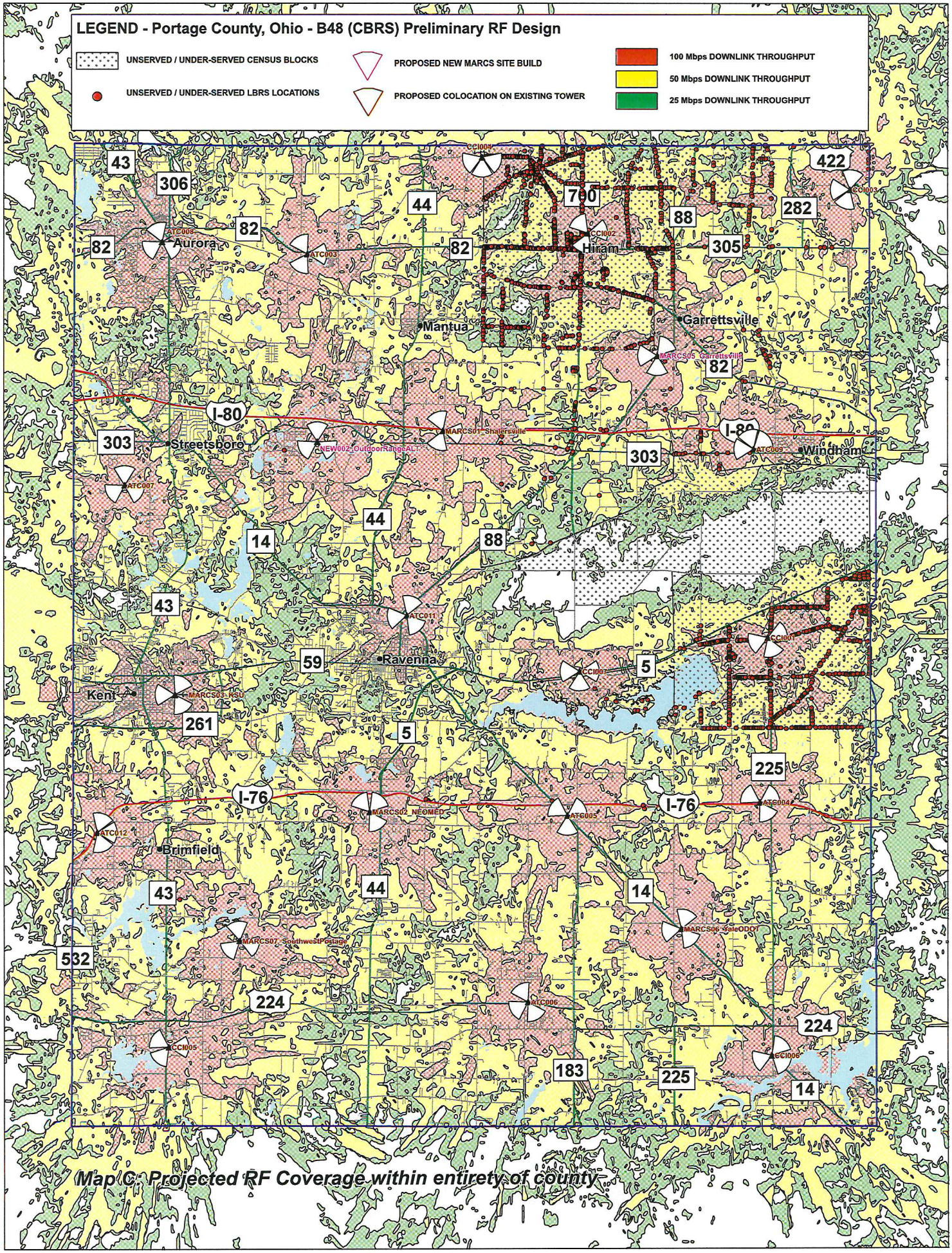
Kevin Beierschmitt
kevin@flatwireless.com
806-438-3382



Map A: Target Unserved / Under-served Census Blocks and Customer Locations



Map B: Projected RF Coverage within Unserved / Under-served Areas



Map C: Projected RF Coverage within entirety of county