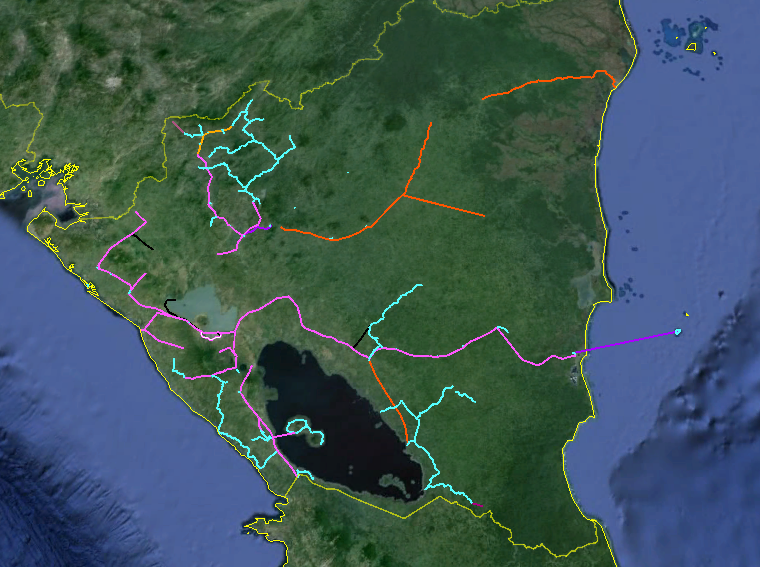
**Technical Options and Design**

The project team considered the different technical alternatives to expand the backbone network in Nicaragua. Below is a map with the current status of the ENATREL’s backbone infrastructure:

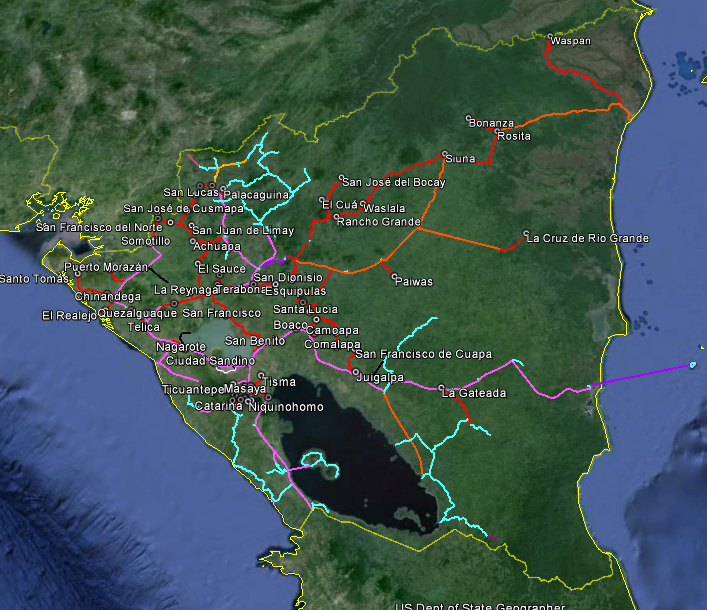


Based on the technical study developed in the NBP, the technical solution selected for the backbone networks will be Gigabit Ethernet[[1]](#footnote-1), deploying national and regional fiber optic rings with speeds that will range between 1Gbps and 40Gbps. In order to enable the operation of the backbone network, the component will also finance the acquisition of submarine cable capacity. Accordingly, the technical study determined that the optimal technical solution for the last mile networks will be a wireless solution. This solution will be based in microwaves with a local area network (LAN) that will be deployed in each benefited municipality. The access network will follow the IEEE 802.11 standard and will have to provide adequate coverage and capacity for all the schools, health centers, telecentres and households in the municipality.

The backbone deployment will be based on Gigabit Ethernet technology. To that goal, this subcomponent will finance: (i) optical fiber; (ii) acquisition of 10Gbps irrevocable Rights of Use (IRUs) (i.e. submarine cable capacity); (iii) main nodes (40Gbps); (iv) medium nodes (10Gbps); (v) small nodes (1Gbps); (vi) amplifier nodes and; (vii) all the containers and civil works for the installation.

Last mile networks deployment will be based on microwave technology (standard 802.11). To that goal, this subcomponent will finance: (i) base stations (antennas); (ii) towers that will be deployed to enhance coverage; (iii) fiber optic links that will be deployed over existing poles and that will connect the backbone with the base stations; (iv) equipment kits for each center (education, health and telecentres); (v) systems to operate the platforms that will serve the telecentres, as well as the education and health center; and (vi) a civil registry system and a financial administration system to support the provision of public services.

As a result, the backbone network after the proposed intervention will connect 72 new municipalities, in which last mile networks will be developed. The resulting network is shown in the map below (the links financed by the project are marked in red color). The name of the connected municipalities is shown in white font.



1. Gigabit Ethernet (GbE or 1 GigE) is a technology for transmitting Ethernet frames at a rate of a gigabit per second (1,000,000,000 bits per second), as defined by the IEEE 802.3-2008 standard. [↑](#footnote-ref-1)