Merging Multiple Datasets into Single Location-Level Layer Using QGIS

Overview

This document will guide applicants through the process of merging the following four location-related datasets into a single spatial file with the QGIS mapping tool:

- National Telecommunications and Information Administration (NTIA) Broadband Serviceable Location Fabric (BSLF or fabric)
- CPUC Broadband Disposition
- Census Block Attributes (from Applicant Tool)
- Project Area Attributes (from Applicant Tool

Prerequisites

Entity will need to do the following:

1. Obtain access to the Federal Funding Account Applicant Tool.
    - FFA Applicant Tool Registration (ca.gov)

You will need to obtain a license for the Broadband Serviceable Location Fabric. This dataset will provide point-level Fabric information. This licensed data file is available at no cost for qualified or presumptively qualified, prospective direct recipients or indirect subrecipients, and awarded direct recipients or indirect subrecipients to participate in the CPUC's broadband grant programs through either a challenge process, by applying for an award of available funds, or by reporting on an awarded grant/loan (including reporting related to the Broadband Map authorized by IIJA § 60105).

For organizations seeking a new NTIA license, please follow the CostQuest instructions to request a Tier D License. For organizations with an existing NTIA Tier D license who need to add counties, please contact ifasupport@costquest.com.

2. Install QGIS on your computer.
    - Download QGIS (qgis.org)

The steps in this document assume that QGIS 3.32 or newer is open on the desktop.

Required Files

- NTIA BSLF Fabric
    - Description: This file provides a relationship (location_id) to obtain the longitude and latitude necessary to place points on a map.
    - Data Dictionary: https://costquest.info/3oL4xeO
    - Example: ntia_primary_1_2.csv
    - Link/info to download

- CPUC Broadband Disposition
  - Description: This file provides CPUC broadband disposition (i.e. served or unserved). It also provides the relationship between location points (location_id) and Census Blocks (2020)
  - Example: Pub_CA_Points_06302023.csv
  - [Link to download data](#)
  - [Link to download data dictionary](#)
- Census Block Attributes
  - Description: This file provides a list of Census Blocks (2020) with attribute information. This file output is from the CPUC Federal Funding Account Applicant Tool.
  - Example: Reg_CA_CBs_06302023.csv
  - [Link to download](#)
- Project Area File output from CPUC Federal Funding Account Applicant Tool
  - Description: This file provides the list of Census Blocks for within a selected project area. This file output is from the CPUC Federal Funding Account Applicant Tool.
  - Example: {username} -- {plan name}_submission_data.csv
  - [Link to download](#)

Steps to Merge Required Files

In order for the merge to work, please perform each task in the order listed.

1. Save a QGIS Project

   a. In the main menu, select *Project > Save as…*
   b. Navigate to the folder where you placed the four required files and name the project ProjectJoin.qgz

2. Loading CSVs into QGIS

   a. Place the four required CSV files into a folder locally on your machine.
   b. From the main menu, click *Layer > Add Layer > Add Delimited Text Layer*
   c. In the Data Source Manager window, click the … Icon (upper right-hand corner)
   d. Select one of the required CSV files in the file dialog.
   e. If you have selected the NTIA BSLF Primary File, confirm that *Geometry Definition* has *Point* selected and that the *X field* has "longitude" selected and the *Y field* has "Latitude" selected. Additionally, set the *Geometry CRS* to "EPSG:4326 – WGS 84"
   f. Click *Add*

Repeat these steps for each of the four required CSV files.

When complete, you should see four layers in the *Layers* panel on the left side of QGIS.

For more information: [15.1.3.3. Importing a delimited text file (qgis.org)](#)

3. Convert CSVs into GeoPackage

   a. In the *Layers* panel, right-click a layer and select *Export > Save Feature As…*
   b. In the Save Vector Layer as… window

c. Select "GeoPackage" in the *Format* box.
d. Click on the … to select an output folder and file name. e.g., ProjectArea.gpkg
   ➢ Always select the same filename in subsequent conversions
e. Select "EPSG:4326 – WGS 84" in the CRS box
f. Deselect *Add saved file to the map*

Repeat these steps for each of the four required CSV files.

When complete, select all layers in the Layers panel, right-click, and select Remove Layer… The Layer panel should now be empty.

4. Load Layers from GeoPackage

a. In the Browser panel, go to Project Home and expand the sub-items.
b. One of the sub-items will be ProjectArea.gpkg, expand its sub-items.
c. Right-click each layer under ProjectArea.gpkg and select *Add Layer to Project*

When complete, the Layer panel should have the four required layers listed.

5. Index Layers (Optional)

a. In the Browser panel, right-click ProjectArea.gpkg and select *Execute SQL…*
b. In the Execute SQL window, paste the following SQL syntax.

```
CREATE INDEX ntia_primary_1_2_location_id_IDX ON ntia_primary_1_2 (location_id);
CREATE INDEX pub_ca_points_06302023_location_id_IDX ON pub_ca_points_06302023
(location_id);
CREATE INDEX pub_ca_points_06302023_CB2020_IDX ON pub_ca_points_06302023 (CB2020);
CREATE INDEX Reg_CA_CBs_06302023_CB2020_IDX ON Reg_CA_CBs_06302023 (CB2020);
```

c. Click *Execute*
d. Once complete, close the window.

When complete, you should see no change. This step speeds up the join in the following task.

6. Perform Join to Create Combined Table

a. From the main menu, select *Database > DB Manager…*
b. In the left-hand panel of the DB Manager, navigate to *Virtual Layers > Project Layers*
c. Select/highlight Project Layers
d. In the upper-left, click on the SQL Window button
e. In the Query tab, paste the following SQL into the top box (next to 1).

```
SELECT
        *
FROM
        Sample_Project_Area,
        ntia_primary_1_2,
        Pub_CA_Points_06302023,
        Reg_CA_CBs_06302023
WHERE
        ntia_primary_1_2.location_id = Pub_CA_Points_06302023.location_id
        AND Pub_CA_Points_06302023.CB2020 = Sample_Project_Area.CB2020
        AND Pub_CA_Points_06302023.CB2020 = Reg_CA_CBs_06302023.CB2020
        AND ntia_primary_1_2.fcc_rel = Pub_CA_Points_06302023.fcc_rel
```

f. Check *Load as new layer*
g. Click *Execute* (Please be patient, this step may take over 20 minutes)
h. Click *Load*

When complete, the Layer panel should have a new layer listed named "QueryLayer". This is the result of this process. You may now export this layer into your desired format by right-clicking it and selecting *Export… > Save Features as…*

Tip: Deselecting Render in the lower right corner of the QGIS window may speed up operations. Reselect the toggle when you are ready to view your map.

For more information: [15.2.2. Creating new layers from an existing layer (qgis.org)](#)