CNHEAT: GENERATING FIXED BROADBAND AVAILABILITY LOCATION LISTS

USING QGIS TO EXTRACT COSTQUEST LOCATIONS FROM COVERAGE POLYGONS

SETTING UP QGIS

- Open QGIS. (For this walkthrough we are using QGIS 3.26.1.)
- Confirm that your Coordinate Reference System (CRS) is to EPSG:4326.
- Click the CRS in the bottom-right of the screen.



Select EPSG:4326 and click OK



LOADING THE DATA

Note: cnHeat has four steps under the Export > Coverage (477/BDC) feature. After going through all <u>four</u> steps a download of the final merged result will be available. Unzipping this file will present a .gpkg file of polygon coverage that can be used in this process. (Note: Do not use the .gpkg generated from Step 3. It is provided for reference and may be incomplete for this task.)

LOAD THE COSTQUEST SERVICEABLE BROADBAND LOCATION FABRIC DATA

Warning: If the CostQuest data has any rows with BSL_Flag set to "False" then remove these records before proceeding. The BDC portal will reject these entries.

• Open the Data Source Manager with either Ctrl+L or by clicking this icon in the toolbar.



- Make sure "Vector" is selected from the left and load the locations received from CostQuest.
- Enter "Longitude" and "Latitude" as the names of your X and Y columns as shown below.
- Click Add.

| 🔇 Data Source Manager | - Vector | | | | × |
|-----------------------|--|---|-------|-----|--------|
| Browser | Source Type | | | | |
| V Vector | • File O Directory O D | stabase O Protocol: HTTP(S), doud, etc. | | | |
| Raster | Encoding | Automatic | | | - |
| Mesh | Source | | | | |
| Point Cloud | Vector Dataset(s) C:\\$tmp2\2 | 1 Alpha\Seth\bsl_fabric.csv | | | ◙ |
| Delimited + Text | Options | | | | |
| GeoPackage | Consult <u>CSV driver help page</u> fo | r detailed explanations on options | | | |
| GPS | MERGE_SEPARATOR | <default></default> | | | |
| 🌽 SpatiaLite | KEEP SOURCE COLUMNS | <default></default> | | | |
| PostgreSQL | AUTODETECT_WIDTH | <pre><pre></pre></pre> | | | |
| MS SQL Server | AUTODETECT_SIZE_LIMIT | | | | |
| Oracle | QUOTED_FIELDS_AS_STRING | <default></default> | | | - |
| Virtual Layer | X_POSSIBLE_NAMES | Latitude | | | |
| SAP HANA | Z_POSSIBLE_NAMES | | | | |
| | GEOM_POSSIBLE_NAMES | | | | |
| WFS / OGC | KEEP_GEOM_COLUMNS | <default></default> | | | - |
| Features | EMPTY STRING AS NULL | <pre><default></default></pre> | | | • • |
| to wcs | | | | | |
| xyz | | | Close | Add | Help |
| | | | | | |

LOAD THE CNHEAT BDC COVERAGE EXPORT

- Make sure "Vector" is selected from the left and load the .gpkg file from the zip file downloaded in Step 4 of the cnHeat Coverage Export tool.
- Click Add.

| Q Data Source Manager | er — Vector | × |
|--------------------------------|---|------|
| Erowser | Source Type | |
| Vector | File Directory Database Protocol: HTTP(S), doud, etc. | |
| Raster | Encoding Automatic | - |
| Mesh | Source | |
| Point Cloud | Vector Dataset(s) C:\\$tmp2\2.1 Alpha\Seth\\$BDC Webinar\Final_Merge-Report\broadband_coverage.gpkg | a |
| Delimited | ▼ Ontions | |
| GeoPackage | Consult <u>GPKG driver help page</u> for detailed explanations on options | |
| 🚛 gps | LIST_ALL_TABLES | - |
| 🖉 SpatiaLite | PRELUDE_STATEMENTS | |
| PostgreSQL | | |
| MS SQL Server | | |
| - Oracle | | |
| Virtual Layer | | |
| SAP HANA | | |
| C wms/wmts | | |
| WFS / OGC API - Features | | |
| ter wcs | | |
| xyz | Close | Help |

• Click Add Layers.

| Q Select Ite | ems to Add broadband_coverage | × |
|---------------|---|---|
| C:\\$tmp2\2.1 | Alpha\Seth\\$BDC Webinar\Final_Merge-Report\broadband_coverage.gpkg | |
| Search | | |
| Item | Description | |
| 🟳 со | . Polygon (3) | |
| | | |
| | | |
| Select All | Deselect All | |
| Add layer | s to a group | |
| Show syst | tem and internal tables | |
| | Add Layers Cancel | |

Results should look something like this.



CREATING A SPATIAL INDEX (OPTIONAL)

For very large datasets it may be necessary to create a spatial index for both the CostQuest Location data and the cnHeat Polygon Coverage export.

QGIS does not support generating a Spatial Index of .csv files so the CostQuest data will need to be saved as a .gpkg first and loaded into the tool.

To save as a .gpkg, right-click the Location row in the list of Layers. Select Export > Save Features As...



• Select 'GeoPackage' for Format. Provide a filename and set the CRS to EPSG:4326. Then click OK.

| CRS Project CRS: EPSG:4326 - WGS 84 | |
|--|-----|
| Image: Save only selected features Save only selected features Select fields to export and their export options Select fields to export and their export options Image: Image | · · |
| Save only selected features Select fields to export and their export options Name Export name V location_id Iocation_id I ocation_id String I address_primary address_primary | - |
| ▼ Select fields to export and their export options Name Export name Type ✓ location_id location_id String ✓ address_primary address_primary String | |
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| ✓ address_primary address_primary String | |
| | |
| ✓ city String | |
| ✓ state state String | |
| ✓ zip zip String | |
| ✓ zip_suffix zip_suffix String | Ŧ |
| Select All Deselect All | |
| | |

• The <u>new</u> layer will be loaded and the <u>original</u> layer can be removed by right-clicking the layer and choosing "Remove Layer".



Create a Spatial Index to improve performance for the next step.

• Select Vector > Data Management Tools > Create Spatial Index... from the menu at the top.



• Select the cnHeat Polygon layer as the input and click "Run".

| Q Create Spatial Index | | | × |
|---------------------------------|---|--|---|
| Parameters Log | 4 | Create spatial index | |
| Input layer | | Creates an index to speed up access to the features in a layer based on their spatial location. Support for spatial index creation is dependent or the layer's data provider. | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| 0% | | Cancel | |
| Advanced * Run as Batch Process | | Run Close Help | |

- Now select the CostQuest Locations layer as the input and click "Run" to create a spatial index for that layer as well.
- Once it is complete, click "Close".

SEARCH LOCATIONS WITHIN COVERAGE

Run an intersection to identify all locations within coverage.

• From the toolbar select Vector > Data Management Tools > Join Attributes by Location...



- Select the <u>CostQuest Locations</u> layer as the "Join to features in" field and the <u>cnHeat Polygon</u> coverage as the "By comparing to" field.
- For Join type ensure that "Create separate feature for each matching feature (one-to-many)" is selected.
- Check the "Discard records which could not be joined" option.

(Scroll down for additional options.)

| | | 1 |
|---|------|--|
| Parameters Log | | Join attributes by location |
| loin to features in Cocations [EPSG:4326] | | This algorithm takes an input vector layer and creates a new vector layer that is an extended version of the input one, with additional attribute in its attribute table. |
| Selected features only | | The additional attributes and their values are take |
| -eatures they (geometric predicate) | | from a second vector layer. A spatial criteria is |
| ✔ intersect overlap | | applied to select the values from the second laye that are added to each feature from the first laye |
| contain are within | | in the resulting one. |
| equal cross | | |
| touch | | |
| By comparing to | | |
| 🗁 broadband_coverage [EPSG:4326] 🔹 👘 🔧 🗌 | | |
| Selected features only | | |
| ields to add (leave empty to use all fields) [optional] | | |
| 0 field(s) selected | | |
| Join type | | |
| Create separate feature for each matching feature (one-to-many) | - 11 | |
| ✓ Discard records which could not be joined | | |
| Joined field prefix [optional] | | |
| | -1 · | |
| 0% | | Cancel |
| | | |

- Click the 3 dots next to "Joined layer [optional]" and select "Create Temporary Layer".
- Then click "Run".

| Q Join Attributes by Location | | × |
|--|---|---|
| Parameters Log V intersects overlaps contains within equals crosses touches Fields to add (leave empty to use all fields) [optional] O options selected Join type Create separate feature for each matching feature (one-to-many) | | Join attributes by location This algorithm takes an input vector layer and creates a new vector layer that is an extended version of the input one, with additional attributes in its attribute table. The additional attributes and their values are taken from a second vector layer. A spatial criteria is applied to select the values from the second layer that are added to each feature from the first layer in the resulting one. |
| ✓ Discard records which could not be joined Joined field prefix [optional] Joined layer [optional] [Create temporary layer] | | |
| Open output file after running algorithm Unjoinable features from first layer [optional] [Skip output] Open output file after running algorithm | - | |
| 0% | (| Cancel |
| Run as Batch Process | | Run Close Help |

• Once the process is finished running click the "Close" button to close the "Join Attributes by Location" dialogue box. The results will be shown on the left in Layers as "Joined layer".



EXPORT RESULTS TO .CSV

- Right-click the newly created "Joined layer" and select Export > Save Features As...
- Select 'Comma Separated Value [CSV]' for Format. Provide a filename and set the CRS to EPSG:4326.
- Next 'Deselect All' fields from the table with the 'Deselect All' fields button.
- Scroll through the list and checkmark only the following fields:
 - location_id
 - providerid
 - brandname
 - technology
 - maxdown
 - maxup
 - lowlatency
 - bizrescode

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|---------------------------------|--|---|
| RS Project CRS: EP | SG:4326 - WGS 84 | • |
| Name | Export name | Type Replace with displayed value |
| ✓ technology | technology | integer 🗌 Use Range |
| ✓ maxdown | maxdown | integer 🗌 Use Range |
| 🔽 maxup | maxup | integer 🗌 Use Range |
| ✓ lowlatency | lowlatency | integer 🗌 Use Range |
| ✓ bizrescode | bizrescode | string |
| 4 Selec | t All | ► Deselect All |
| Use aliases for exporte | d name v field values by displayed values | |
| Persist layer metadata Geometry | | |
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• Then click "OK".