

Intro to *QGIS* with Vector Data: EXERCISE

2026



Activity #1



Start QGIS (if you haven't already)

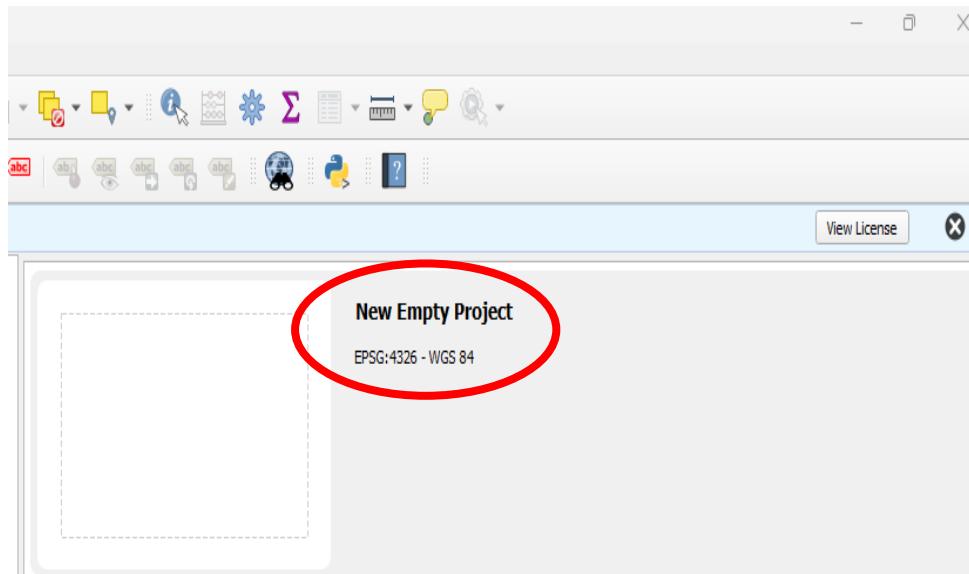
Download workshop data

- Extract /unzip the .zip file
- Save it where you can find it...



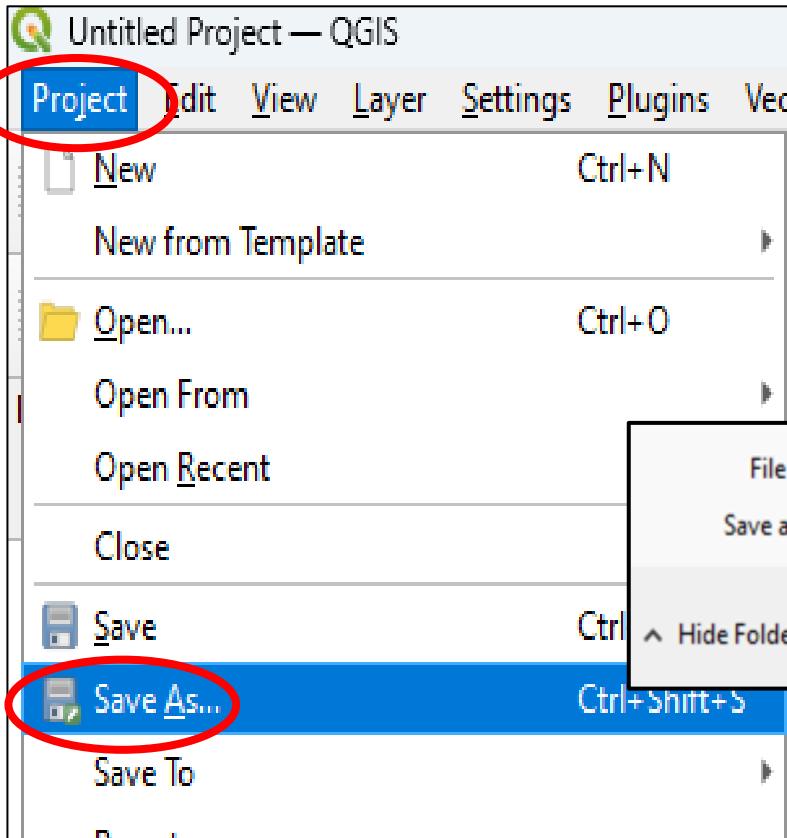
Open QGIS (your version may be different)

- Double click on *New Empty Project*

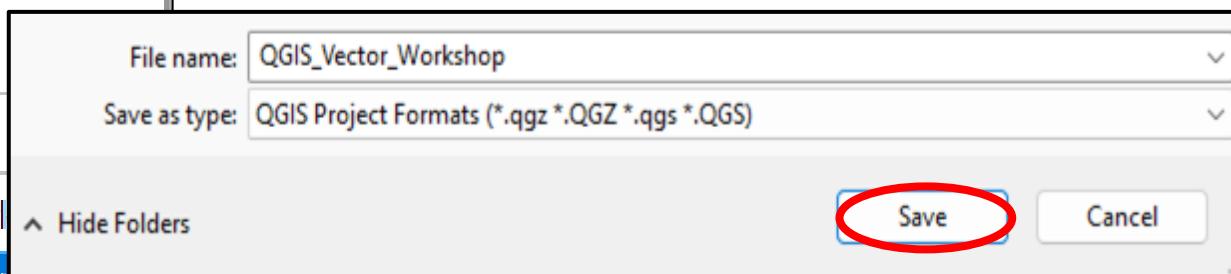


Note: new QGIS projects open with
Geographic Coordinate System (GCS) **EPSG 4326**

Save new project



- In *QGIS* Menu Bar, select *Project* then *Save As*
- Name your project “*QGIS_Vector_Workshop*”
- Save your project as **.qgz** to where you can find it

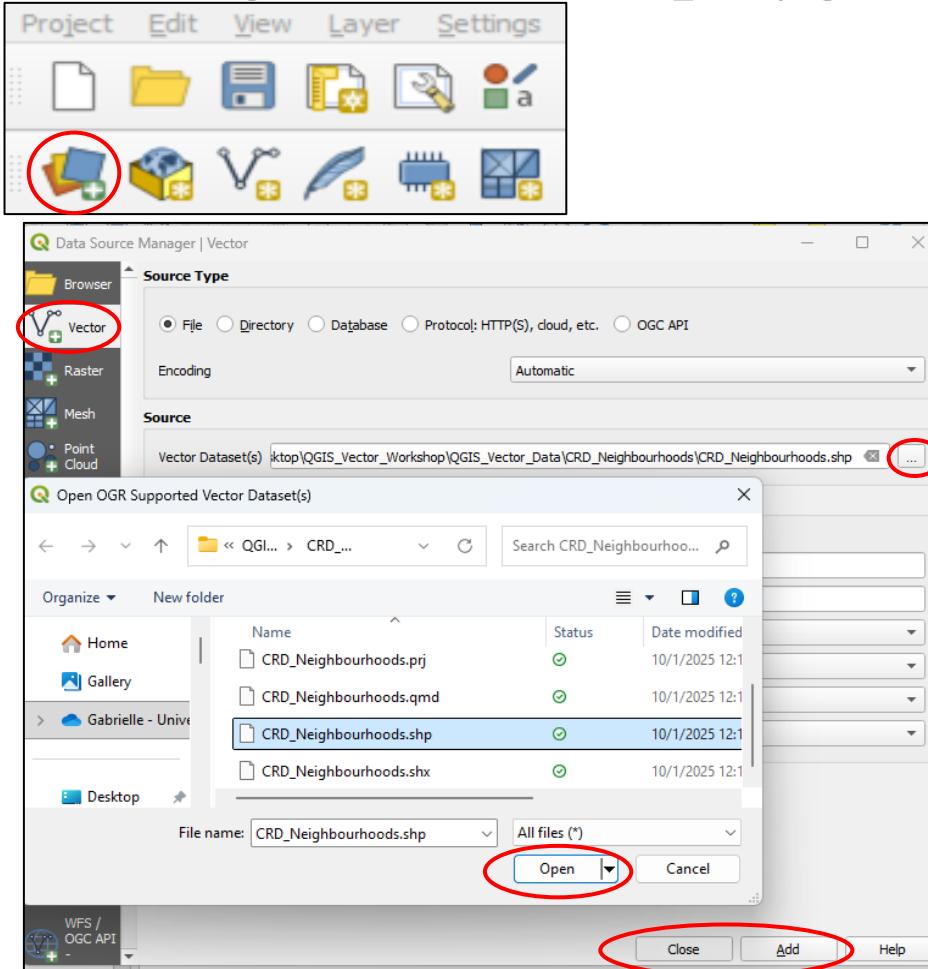


Note: .qgz is the project file format for *QGIS*

Activity #2



add Neighbourhoods polygon data



- Select *Open Data Source Manager* 
- Select the *Vector* tab
- Under the *Source* heading click the 
- Navigate to workshop data
- Select **CRD_Neighbourhoods.shp**, Open
- **Add and Close**

Navigate / Examine neighbourhoods data layer



Navigate Neighbourhoods with the *Pan* tool



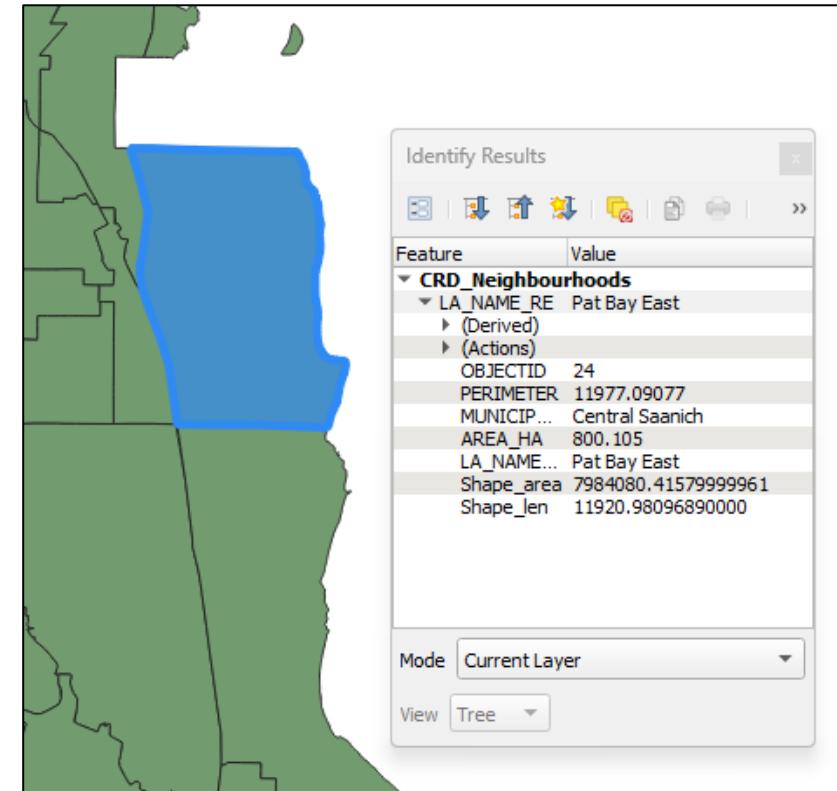
Zoom in and out



Use *zoom full*  to see full data extent

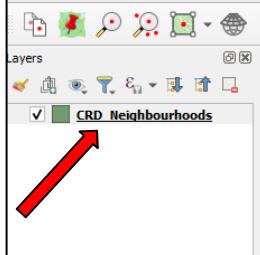
Select the *Identify Features*  tool
to examine **CRD_Neighbourhoods**

Click on different neighbourhoods to display
their associated attributes

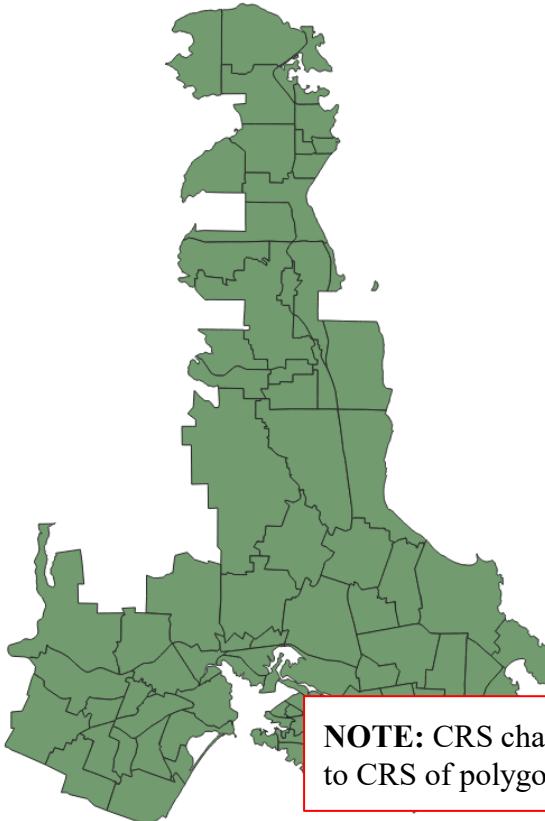
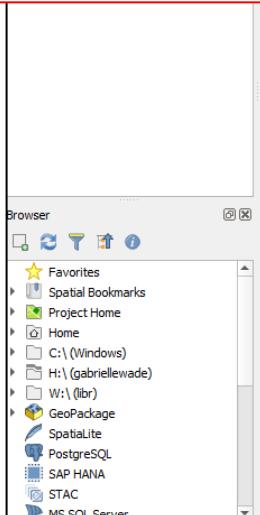


CHECK IN

Save your work!



Layers now includes
CRD_Neighbourhoods



If you have questions, **ask!**

next... add a basemap

NOTE: CRS changed from default (**EPSG:4326**)
to CRS of polygon data layer (**EPSG:3157**)

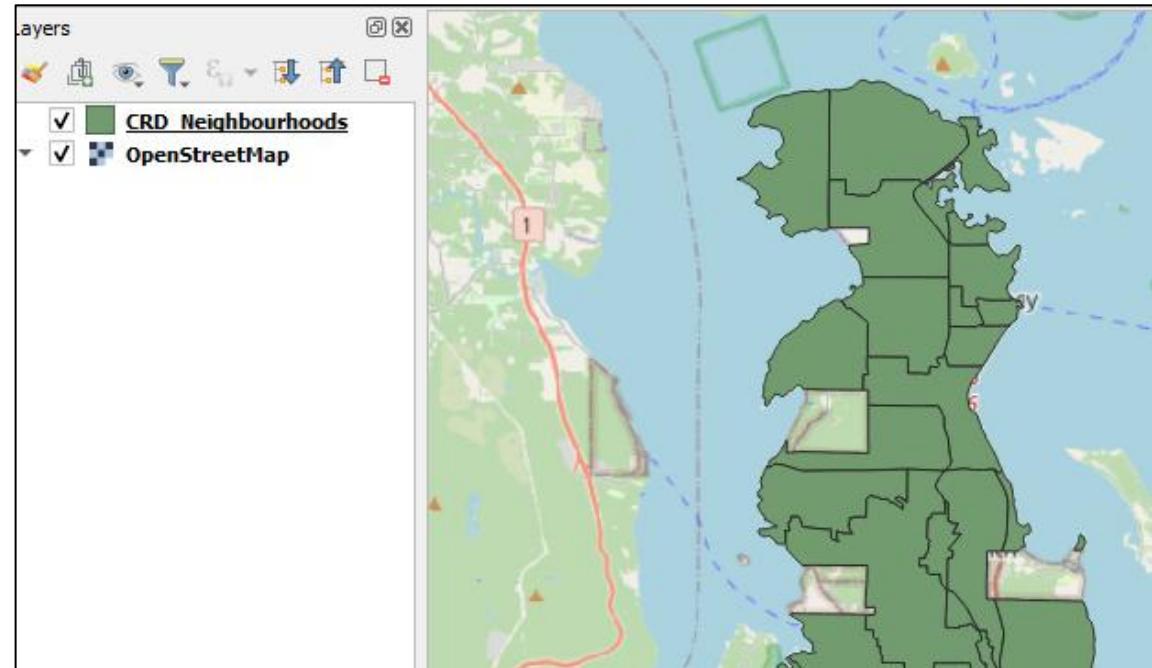
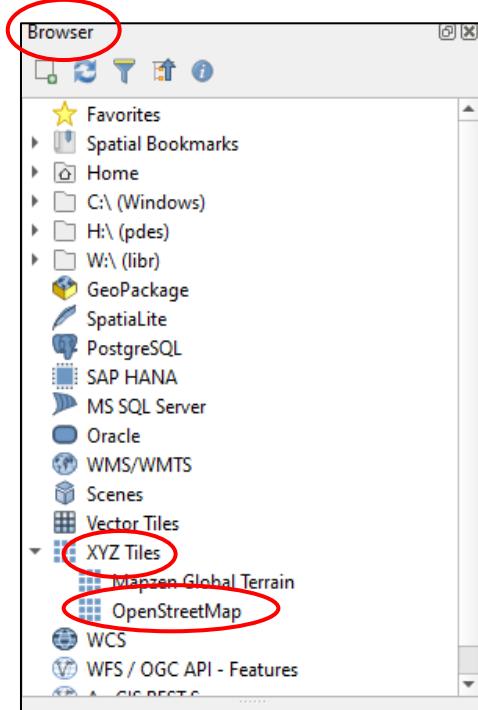
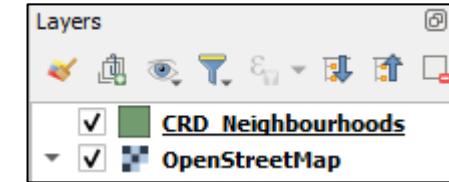
Activity #3



Add a Basemap

Add a **basemap** for location context for **CRD_Neighbourhoods**

- In the ‘Browser’, expand *XYZ Tiles*
- Double-click *OpenStreetMap* to add to map (if a warning appears, press OK)
- Click and drag to move *OpenStreetMap* layer below **CRD_Neighbourhoods**

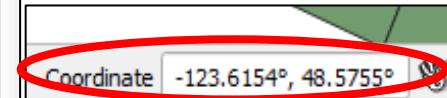
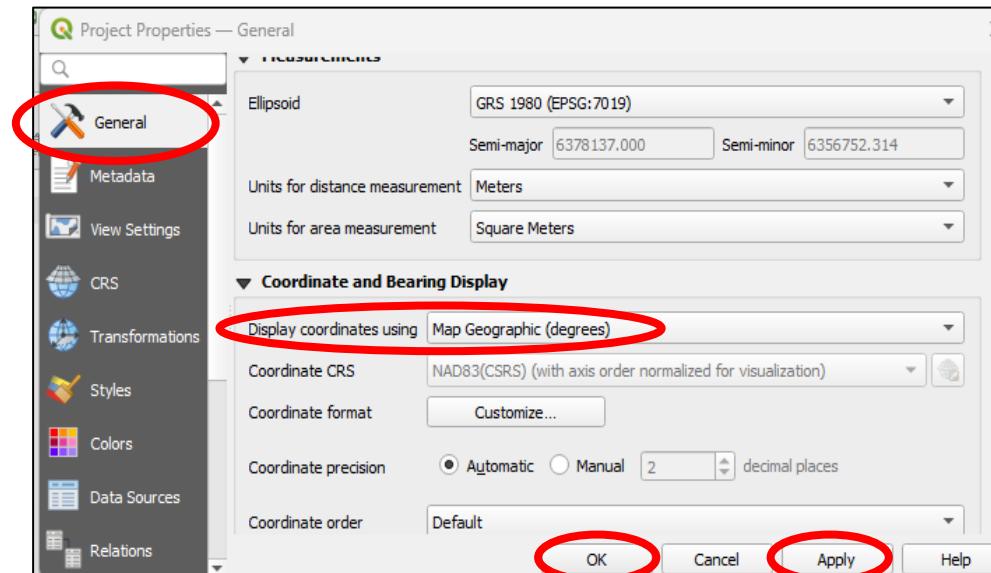
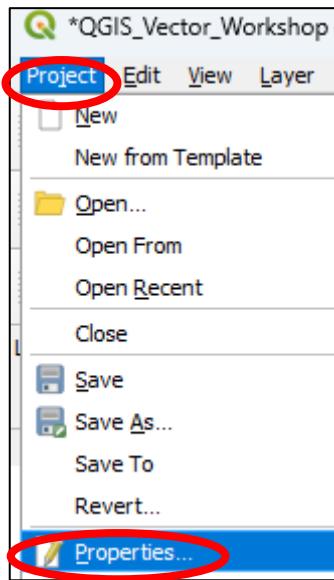
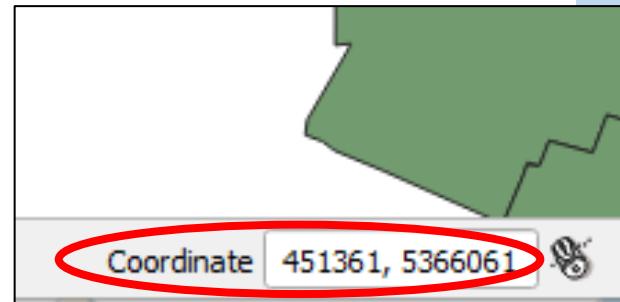


Change coordinate settings

QGIS defaults to *Coordinate* in the Status Bar shown in metres.

Change settings so coordinates show in decimal degrees when moving mouse around the map

- In the Menu Bar, go to *Project* then *Properties*
- In the *General* tab, change *Display coordinates using* to **Map Geographic (degrees)**
- **Apply** and **OK**

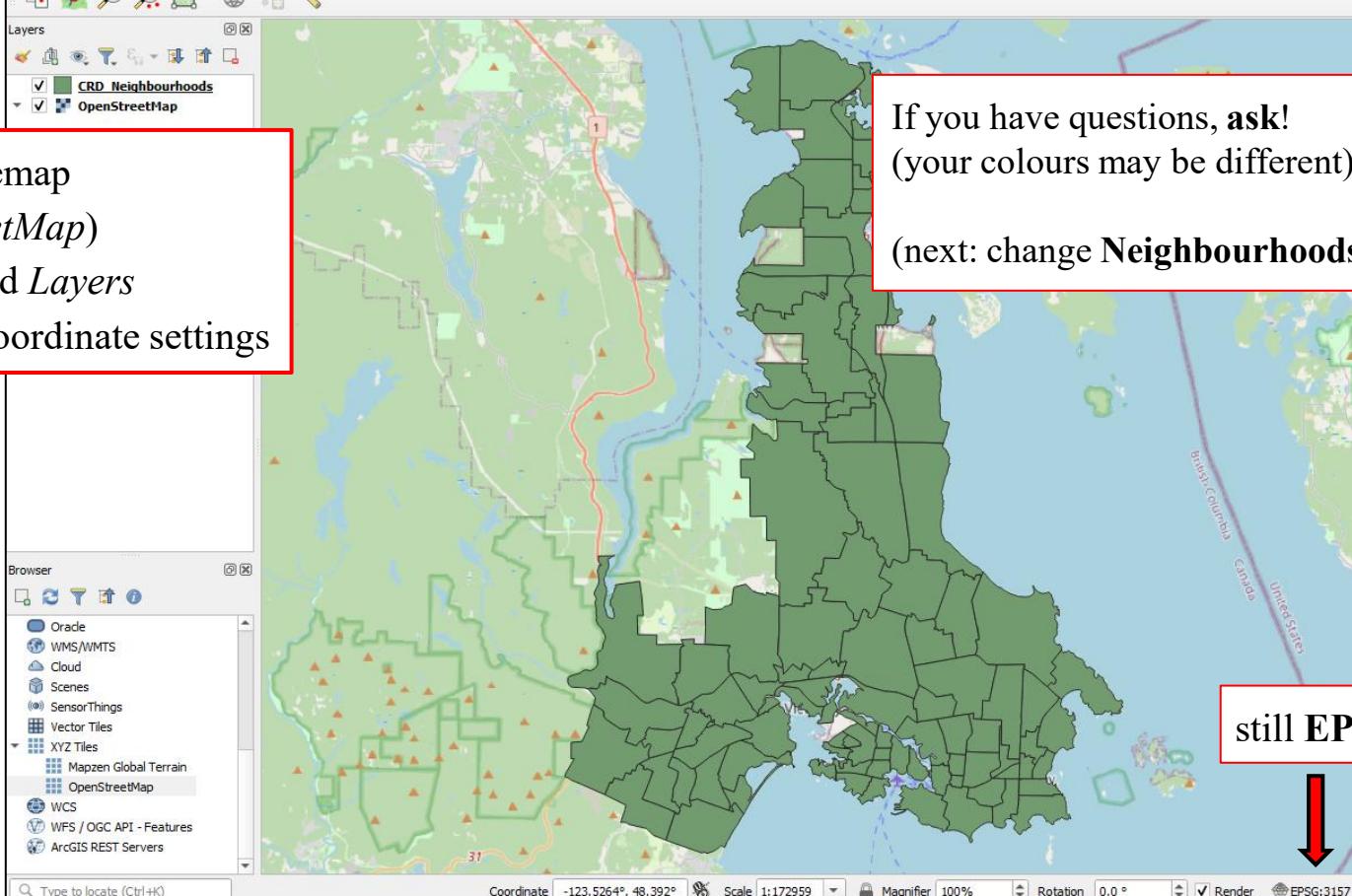




CHECK IN

Save your work!

- added Basemap
(*OpenStreetMap*)
- Re-arranged *Layers*
- Changed coordinate settings



If you have questions, **ask!**
(your colours may be different)

(next: change **Neighbourhoods** symbology...)

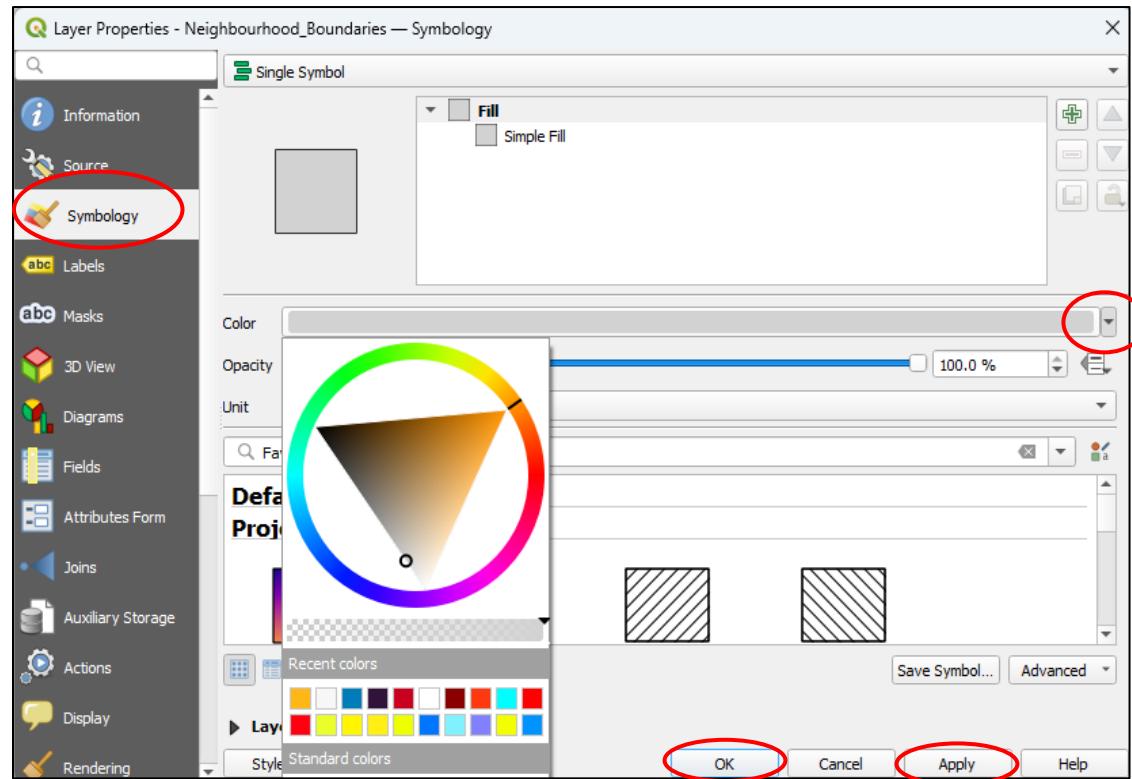
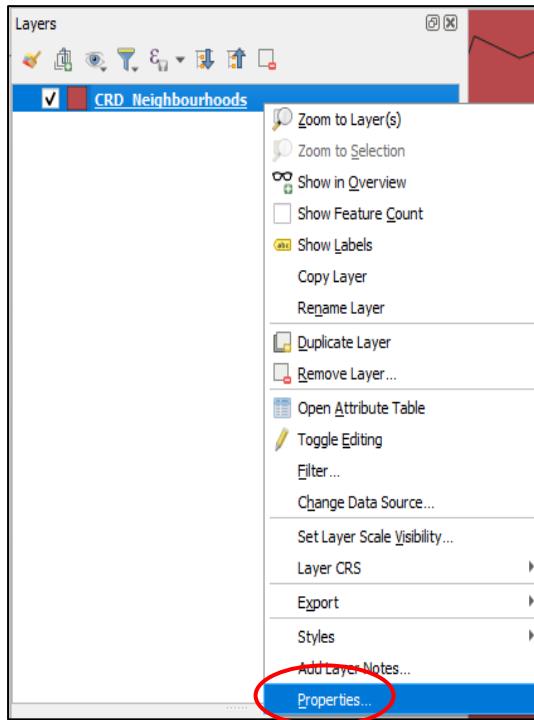
still EPSG:3157

Activity #4



Change CRD_Neighbourhoods symbology

- In the *Layers* panel right click **CRD_Neighbourhoods**
- Select *Properties* and then *Symbology*
- With *Colour* field, click the arrow and use colour palette to select light grey (or light colour of your choice)
- **Apply** and **OK**

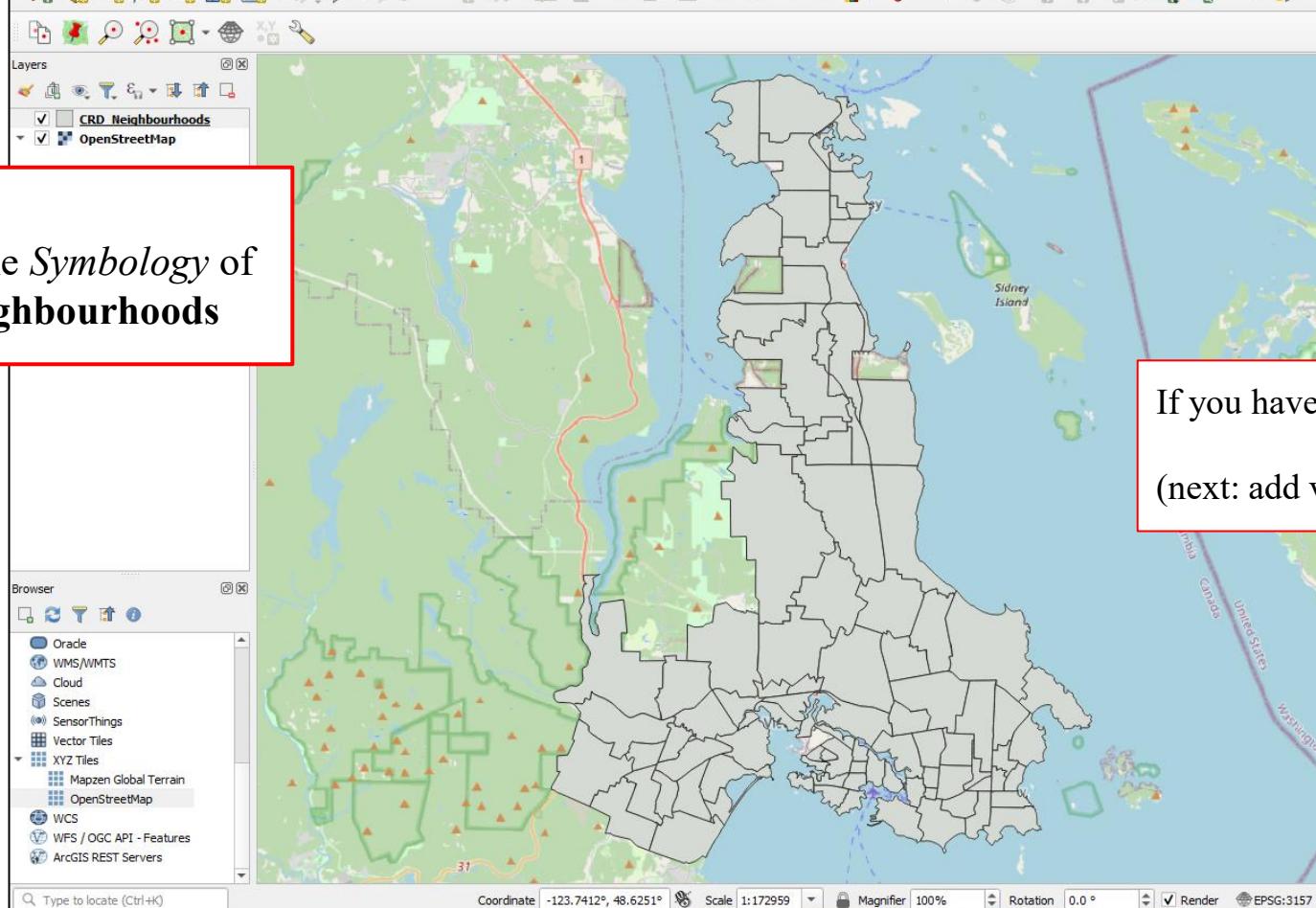


CHECK IN

Save your work!

You have:

- changed the *Symbology* of **CRD_Neighbourhoods**



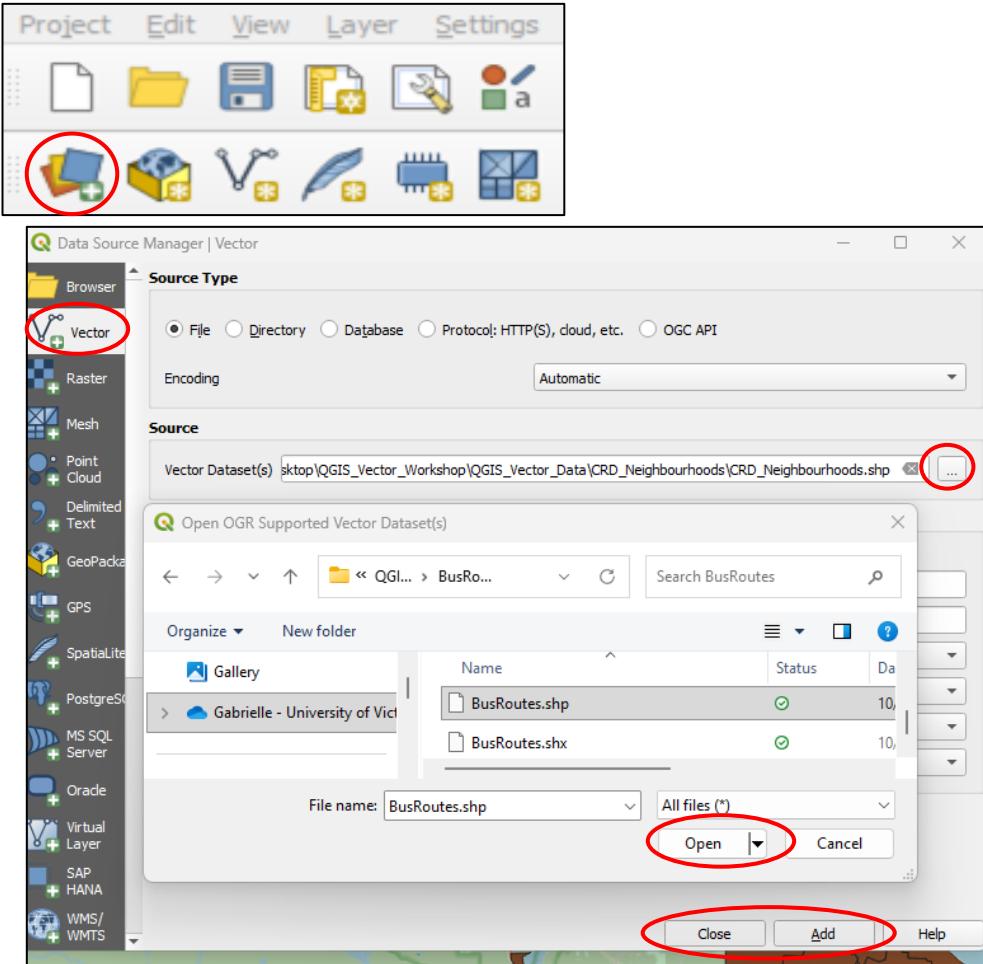
If you have questions, ask!

(next: add vector lines...)

Activity #5



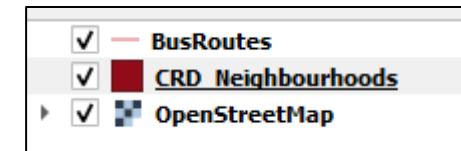
add BusRoutes line shapefile



- Select *Open Data Source Manager* 
- Select the *Vector* tab
- Under the *Source* heading click the 
- Navigate to workshop data
- Select **BusRoutes.shp**, Open
- **Add** and **Close**

Check that **BusRoutes** is above
CRD_Neighbourhoods

if not, click and drag **BusRoutes** to the top



CHECK IN

Save your work!

You have:

- added **BusRoutes** line data

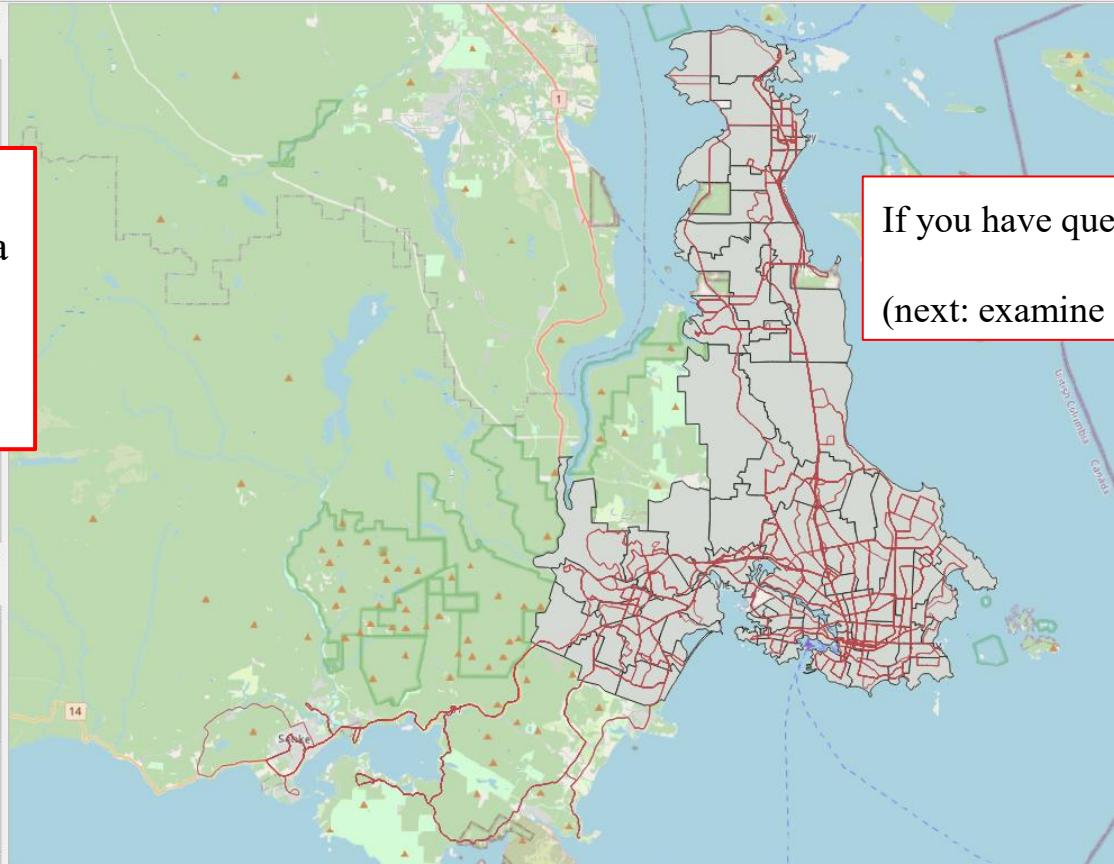
Some routes are outside
Neighbourhood area...

If you have questions, **ask!**

(next: examine **BusRoutes...**)

Browser

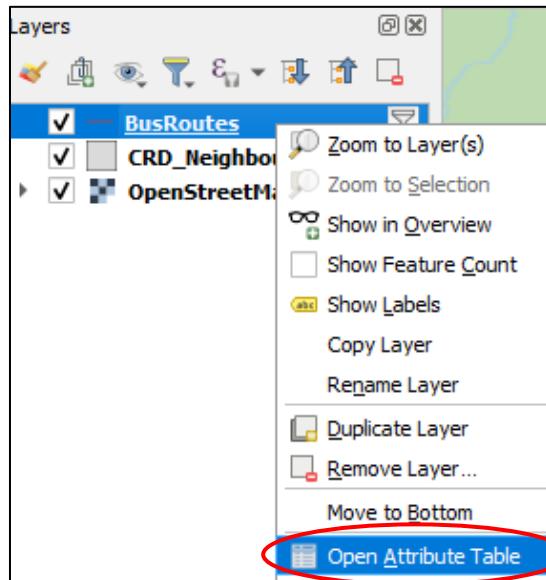
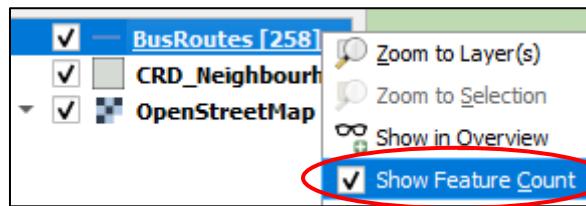
- Oracle
- WMS/WMTS
- Cloud
- Scenes
- SensorThings
- Vector Tiles
- XYZ Tiles
 - Mapzen Global Terrain
 - OpenStreetMap
- WCS
- WFS / OGC API - Features
- ArcGIS REST Servers



Activity #6



examine BusRoutes Attributes



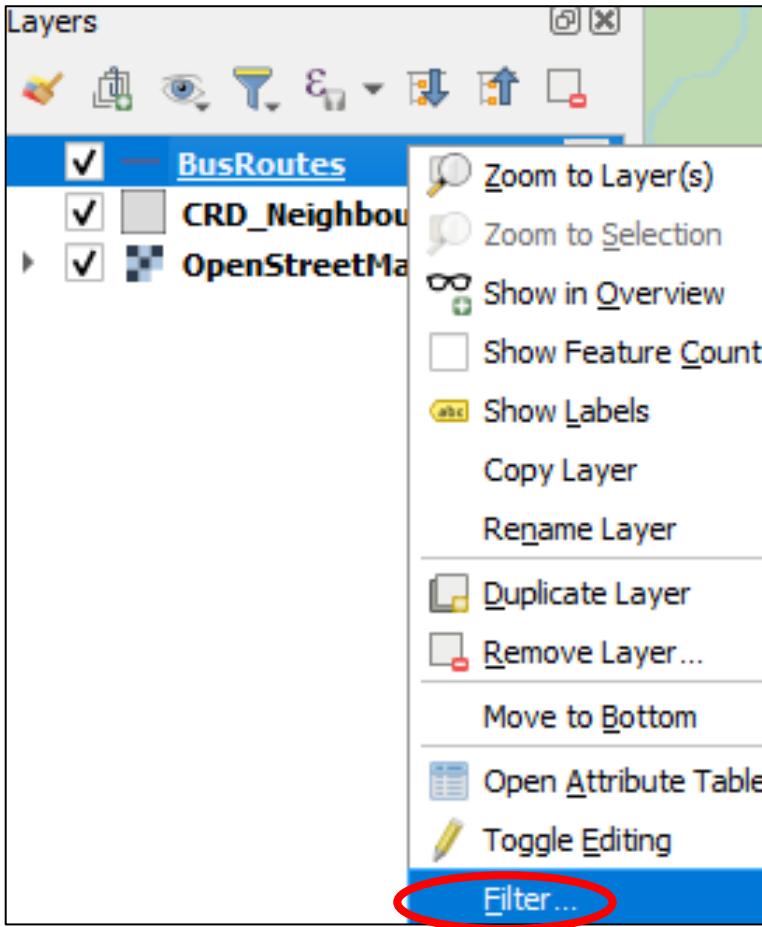
- In the *Layers* panel, right-click **BusRoutes** and choose “Show Feature Count” and *Open Attribute Table*
- Can see that **BusRoutes** has 248 features and various attribute table columns including route ID, heading, etc.

The screenshot shows the QGIS Attribute Table for the 'BusRoutes' layer. The table displays 258 features. The columns are labeled: shape_id, route_id, service_id, trip_id, and head. The data for the 258th feature is as follows:

shape_id	route_id	service_id	trip_id	head
255	33162	75-VIC	3874.0000000000...	10490492:87458...
256	33763	53-VIC	3799.0000000000...	10573718:87515...
257	33783	53-VIC	3874.0000000000...	10488309:87467...
258	33785	53-VIC	3799.0000000000...	10573950:87458...

Next...*Filter BusRoutes*

Filter BusRoutes layer



Sometimes, datasets provide more than needed, are massive, and ‘overcrowd’ a map

‘Filter’ is one way to sub-select a dataset.

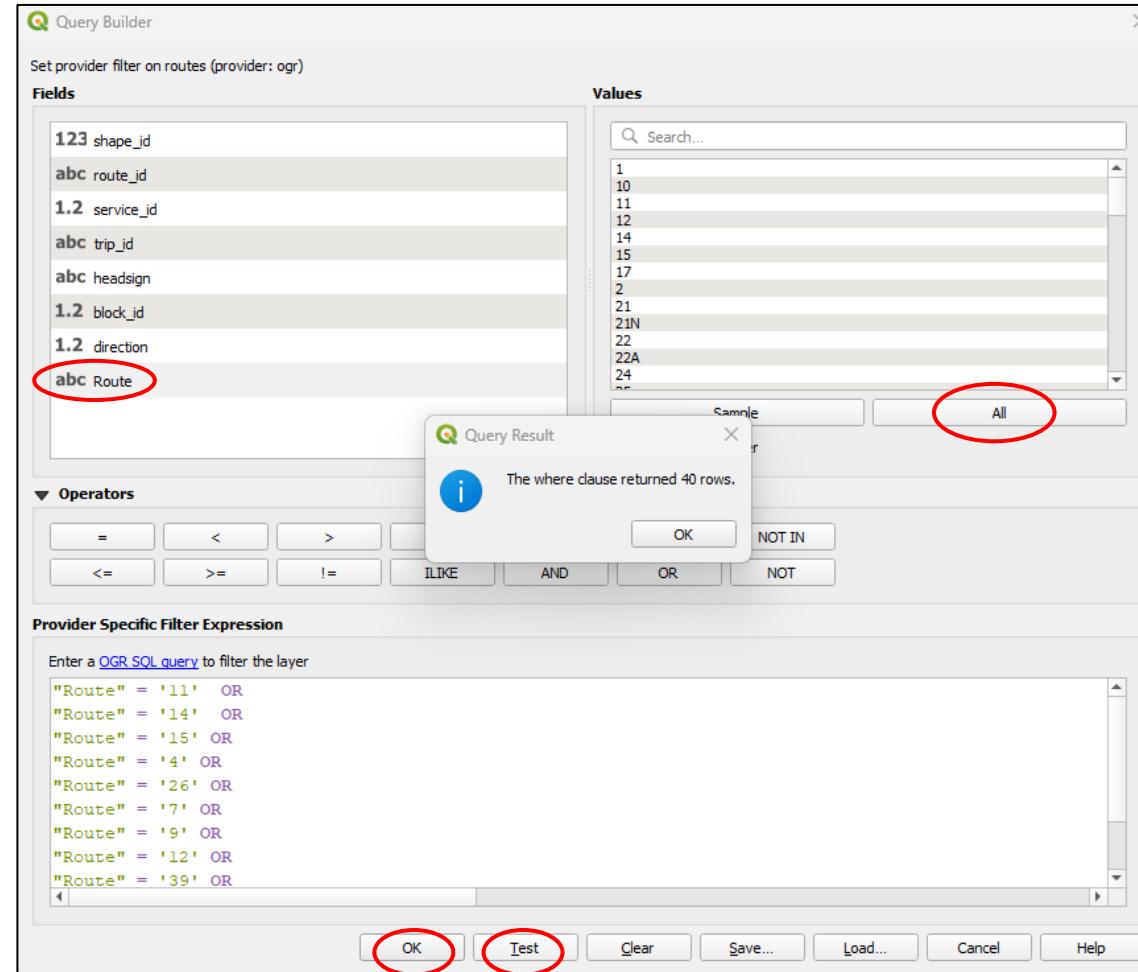
Only want to include bus routes that go to and from UVic

- In the *Layers* panel, right click on **BusRoutes** and choose *Filter*

Filter BusRoutes layer

- Select **Route** under *Fields*, then click *All* under *Values*
- Copy and paste the expression below into the *Filter Expression* box

```
"Route"='11' OR  
"Route"='12' OR  
"Route"='14' OR  
"Route"='15' OR  
"Route"='26' OR  
"Route"='4' OR  
"Route"='39' OR  
"Route"='51' OR  
"Route"='7' OR  
"Route"='76' OR  
"Route"='9'
```

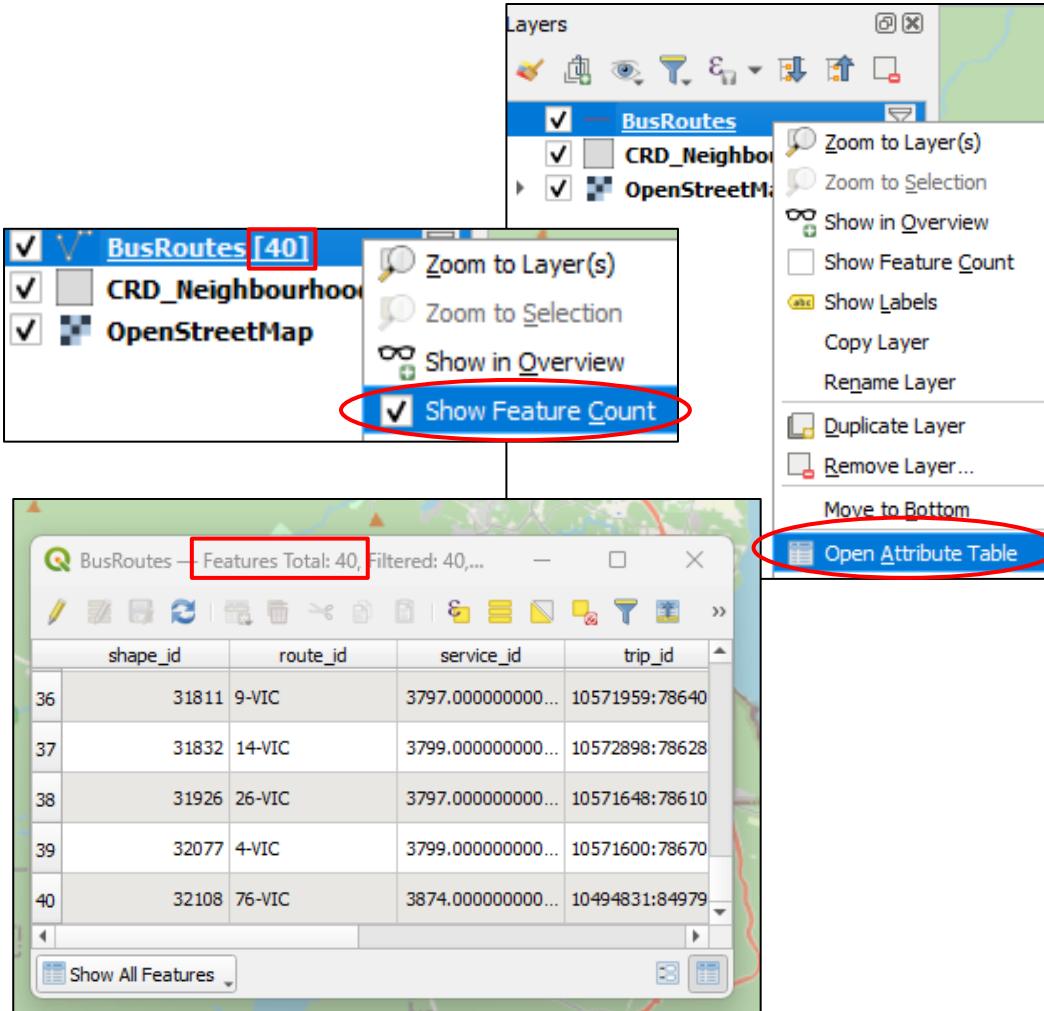


- Test then OK

examine BusRoutes Attributes

- In the *Layers* panel, see Feature Count of **BusRoutes** is now 40
- Right-click **BusRoutes** and *Open Attribute Table* after *Filter*, 40 rows of (**BusRoutes**) data remain

(NOTE: The original dataset has NOT been permanently changed, only ‘filtered’)



CHECK IN

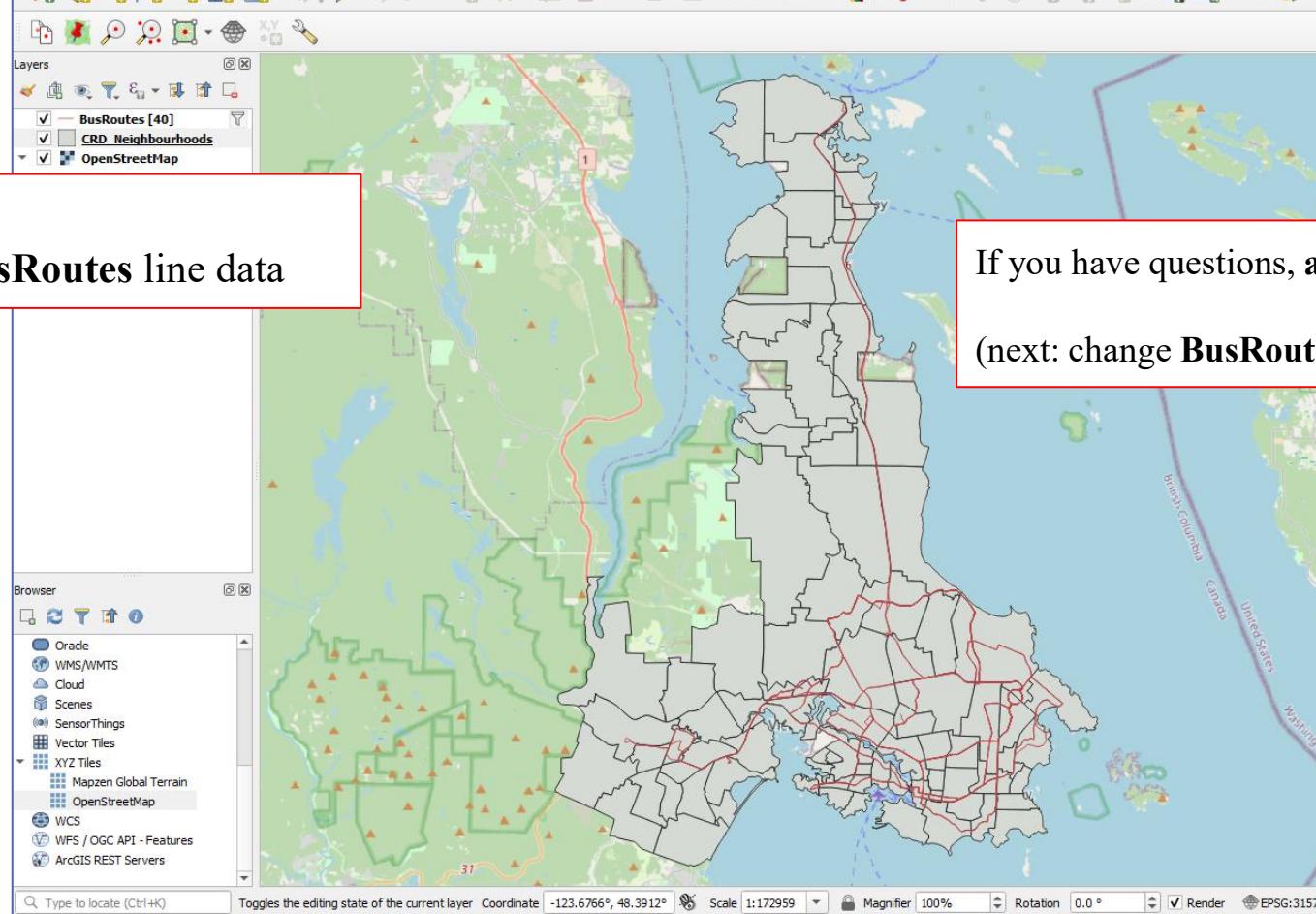
Save your work!

You have:

- Filtered **BusRoutes** line data

If you have questions, **ask!**

(next: change **BusRoutes** symbology...)

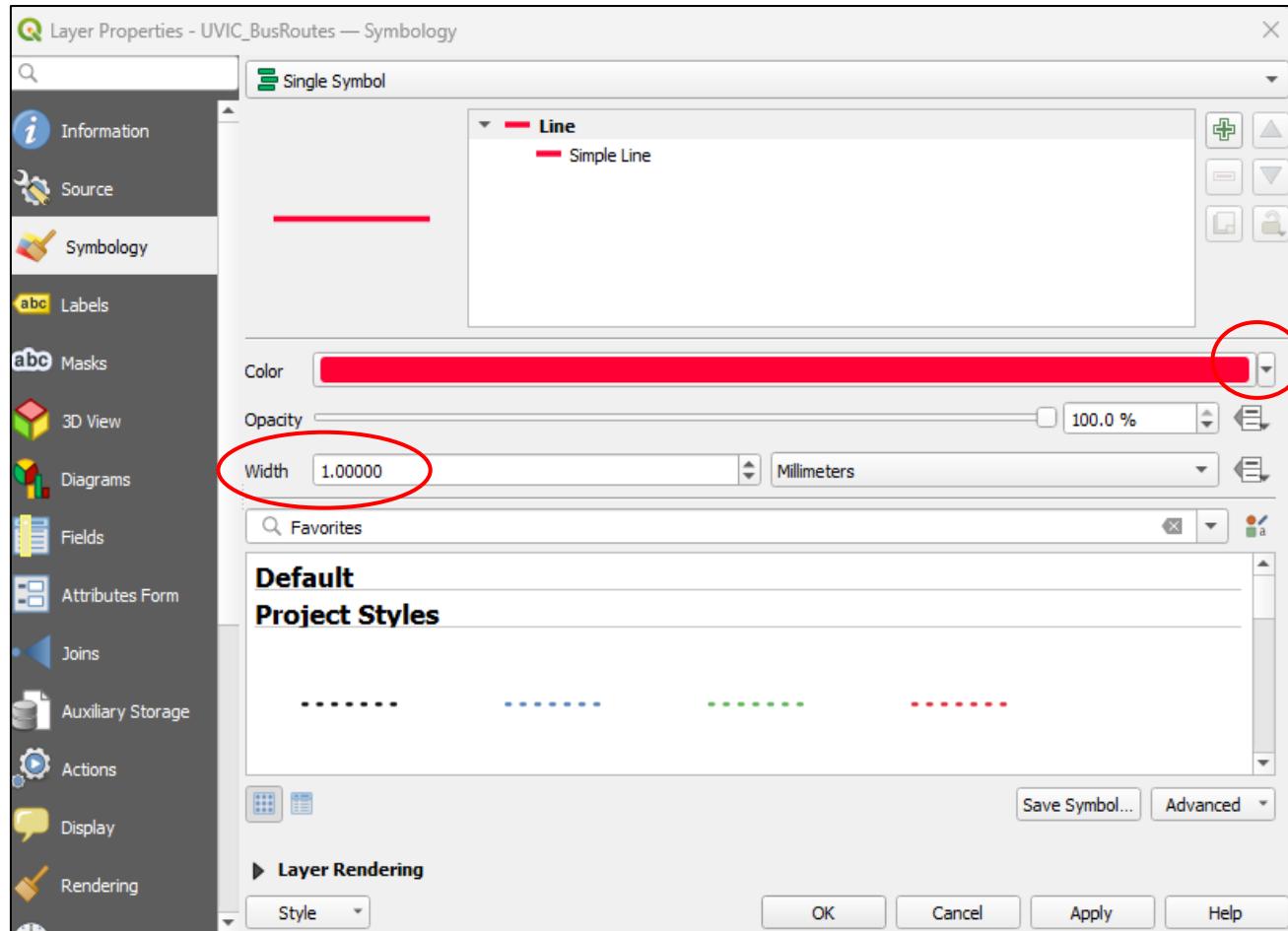


Activity #7



edit BusRoutes symbology

- in the *Layers* panel, double-click **BusRoutes** to open *Properties*
- click *Symbology*
- in *Colour* field, click on the arrow and select a visible colour
- Change *Width* to 1.0
- **Apply** and **OK**



CHECK IN

Save your work!

You have:

- edited Lines symbology
- used different symbology for visual hierarchy

Layers

- ✓ BusRoutes [40]
- ✗ CRD_Neighbourhoods
- ✓ OpenStreetMap

Browser

- Oracle
- WMS/WMTS
- Cloud
- Scenes
- SensorThings
- Vector Tiles
- XYZ Tiles
 - Mapzen Global Terrain
 - OpenStreetMap
- WCS
- WFS / OGC API - Features
- ArcGIS REST Servers



If you have questions, ask!

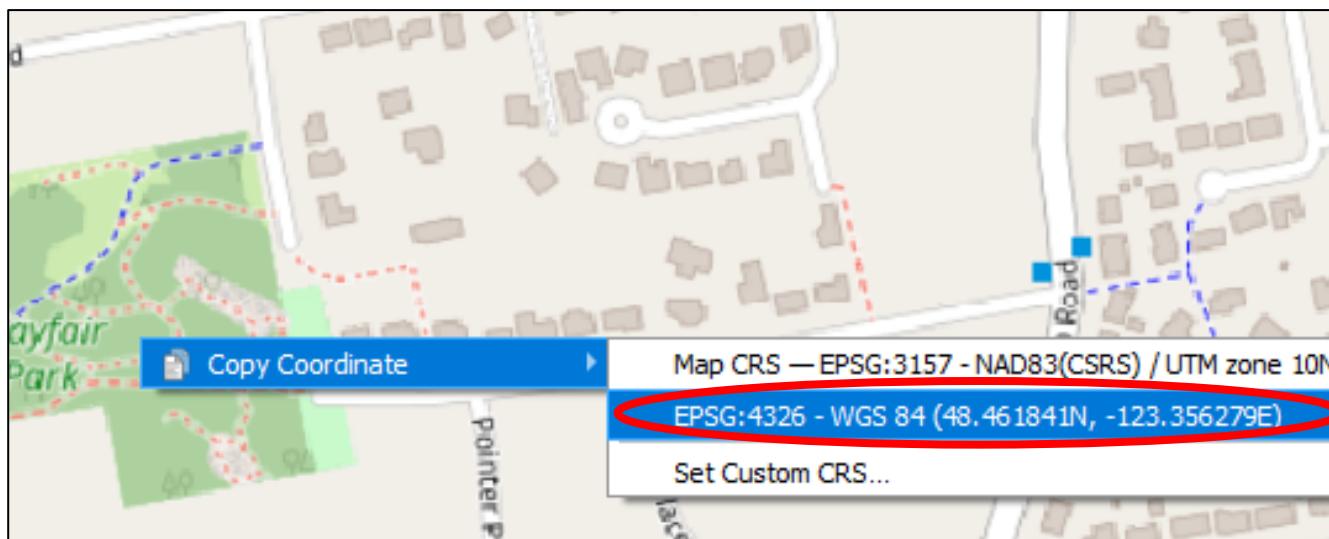
(next: add Locations point data)

Activity #8



work with Locations.csv point data

- Go to a location in Victoria (within QGIS map area)
 - If needed, click **CRD_Neighbourhoods** off to see the basemap →
- Right-click on a location and copy coordinate in **EPSG:4326**
- Paste these Coordinates somewhere so you can copy each coordinate individually (see next slide)



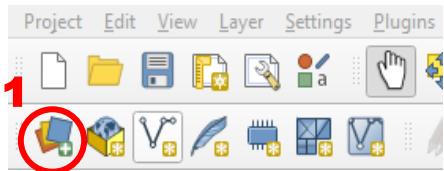
Work with Locations.csv point data

- Navigate to workshop data and open **Locations.csv** in Excel or Google Sheets
 - Note Name, Latitude, and Longitude columns
- In the row with “**Your Location**” paste in your **Latitude** and **Longitude** and put the name of your location
- Save the .csv (**must be .csv**)

Name	Latitude	Longitude
Your Location		
YYJ	48.65255013	-123.4297931
Swartz Bay	48.68812438	-123.4146051
PKOLS	48.49348443	-123.3422378
Royal BC Museum	48.42113463	-123.3673963

Add the Locations.csv point data

- Open *Data Source Manager*



- Select *Delimited Text*
- Navigate to workshop data
- Select and Open **Locations.csv**
- Set other requirements
- **Add** then **Close**

3

1

2

4

4 Data Source Manager — Delimited Text

File name C:\Users\gabriellewade\OneDrive - University of Victoria\Desktop\QGIS_Vector_Workshop\QGIS_Vector_Data\Locations.csv

Layer name Locations Encoding UTF-8

File Format

CSV (comma separated values) (radio button selected)

Regular expression delimiter

Custom delimiters

Record and Fields Options

Geometry Definition

Point coordinates (radio button selected)

Well known text (WKT)

No geometry (attribute only table)

X field Longitude Z field

Y field Latitude M field

DMS coordinates

Geometry CRS EPSG:4326 - WGS 84

Note: need EPSG 4326

Sample Data

	Name	Latitude	Longitude
1	Victoria International Airport	48.65255013	-123.4297931
2	Swartz Bay	48.68812438	-123.4146051
3	PKOLS (Mount Douglas Park)	48.49348443	-123.3422378
4	Royal BC Museum	48.42113463	-123.3673963
5	Royal Jubilee Hospital	48.43386085	-123.3275827
6	UVIC Library	48.46330287	-123.3096714
7	Beacon Hill Park	48.41308783	-123.3629365

Close Add Help 31

The screenshot shows the 'Data Source Manager — Delimited Text' dialog box. Step 1 highlights the 'Data Source Manager' icon in the QGIS toolbar. Step 2 highlights the 'Delimited Text' option in the left sidebar. Step 3 highlights the 'Close' button in the top right corner. Step 4 highlights the 'Add' button in the bottom right corner. A red arrow points to the 'EPSG 4326' note in the 'Geometry CRS' section. A red circle highlights the 'CSV (comma separated values)' radio button under 'File Format'. Another red circle highlights the 'Point coordinates' radio button under 'Geometry Definition'. A third red circle highlights the 'X field' dropdown set to 'Longitude' and the 'Y field' dropdown set to 'Latitude'. A fourth red circle highlights the 'Add' button at the bottom right of the dialog.

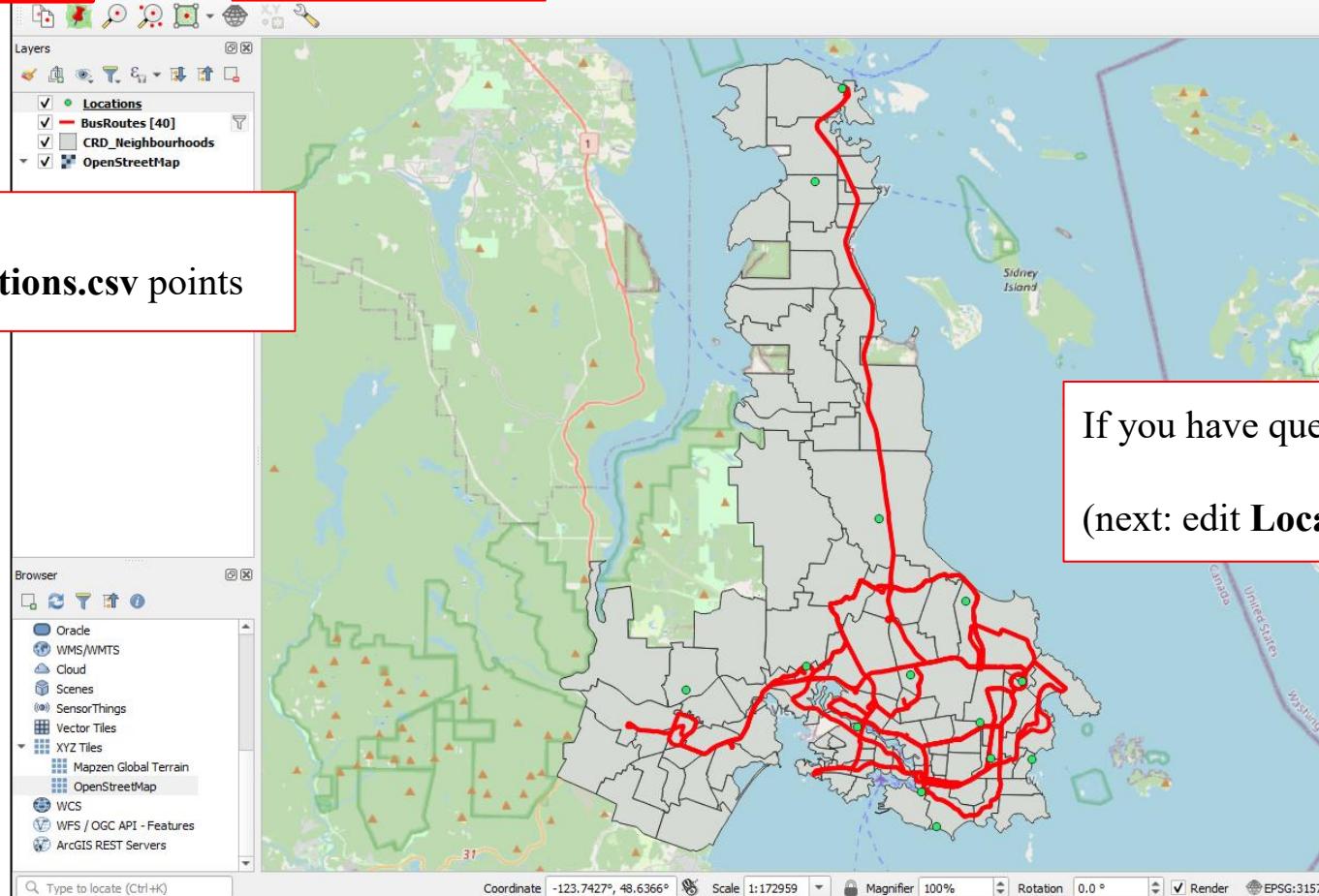


CHECK IN

Save your work!

You have:

- added **Locations.csv** points



If you have questions, ask!

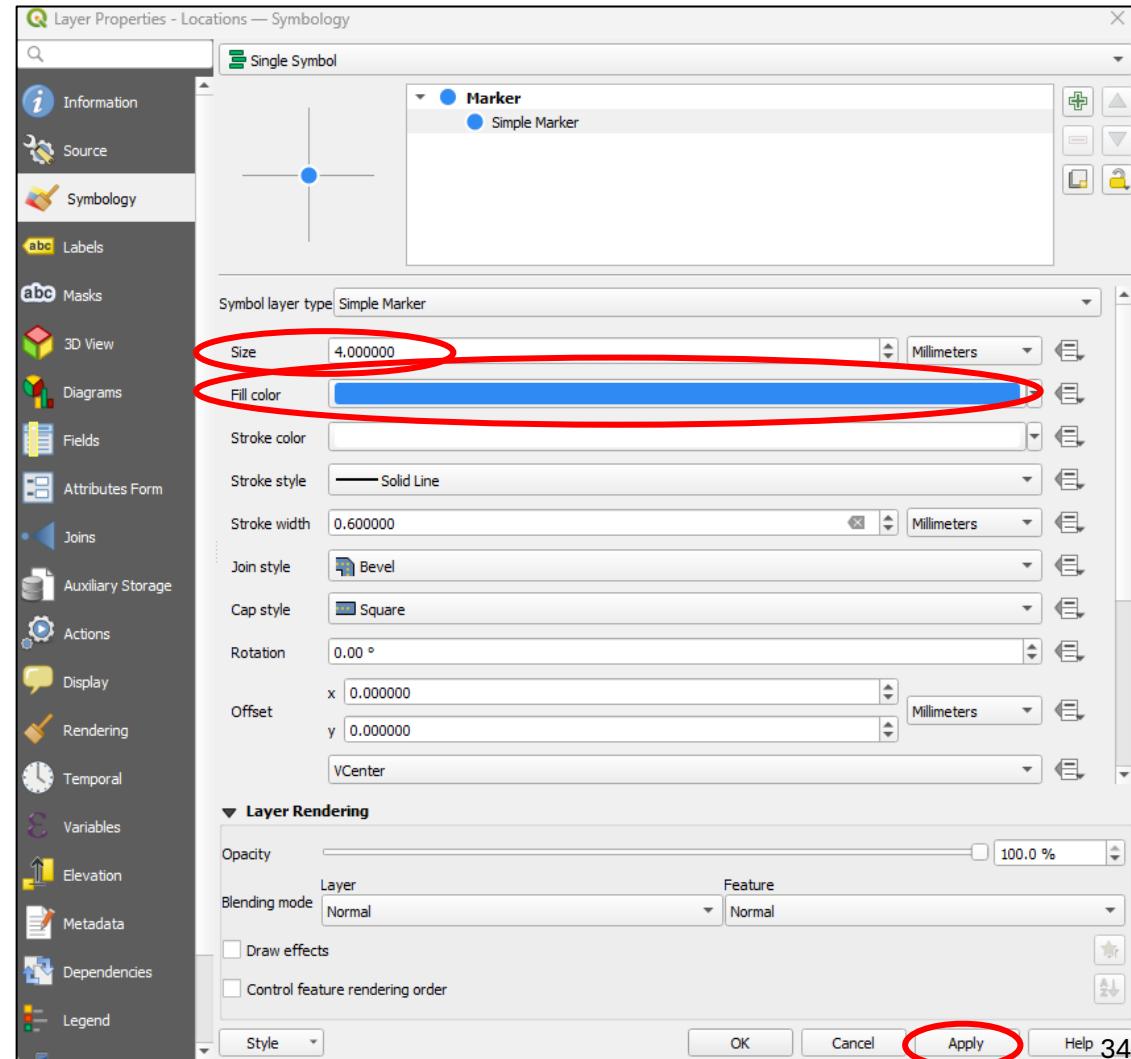
(next: edit **Locations.csv...**)

Activity #9



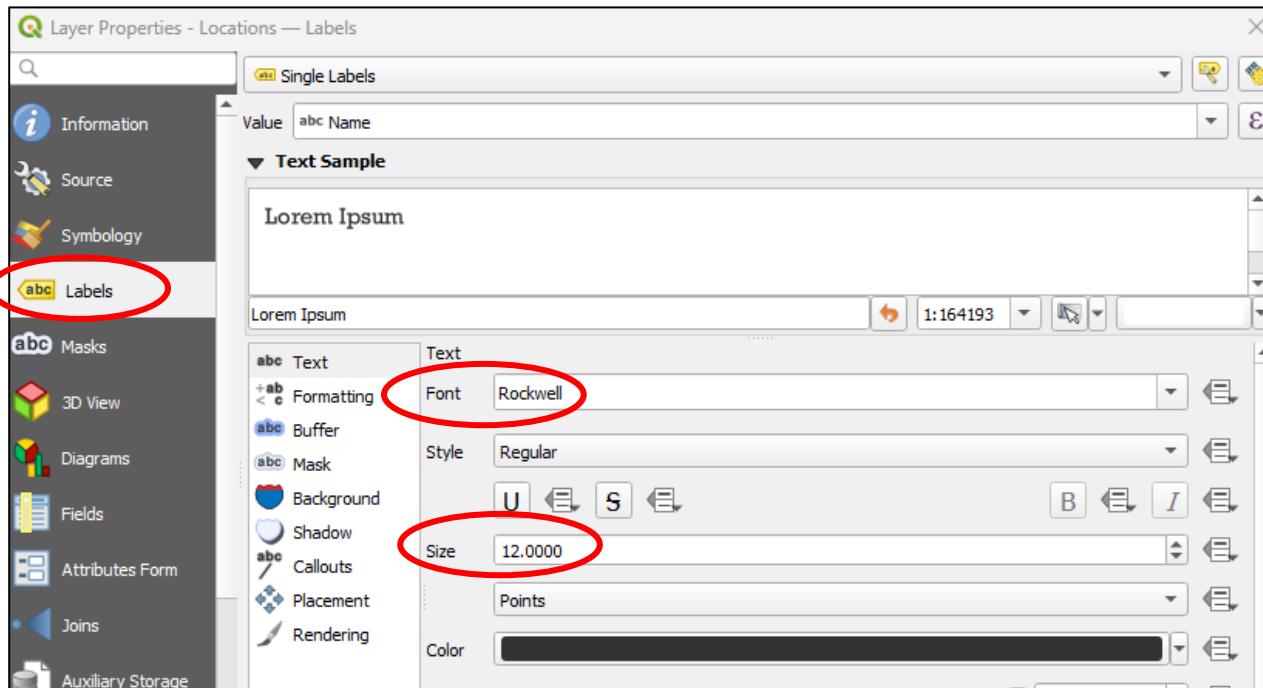
edit Locations.csv symbology

- In *Layers* panel, double-click on **Locations** to open *Properties* then *Symbology*
- Change *Size* to 4.0
- Change *Fill Colour* to a visible colour
- click **Apply** but not **OK** yet



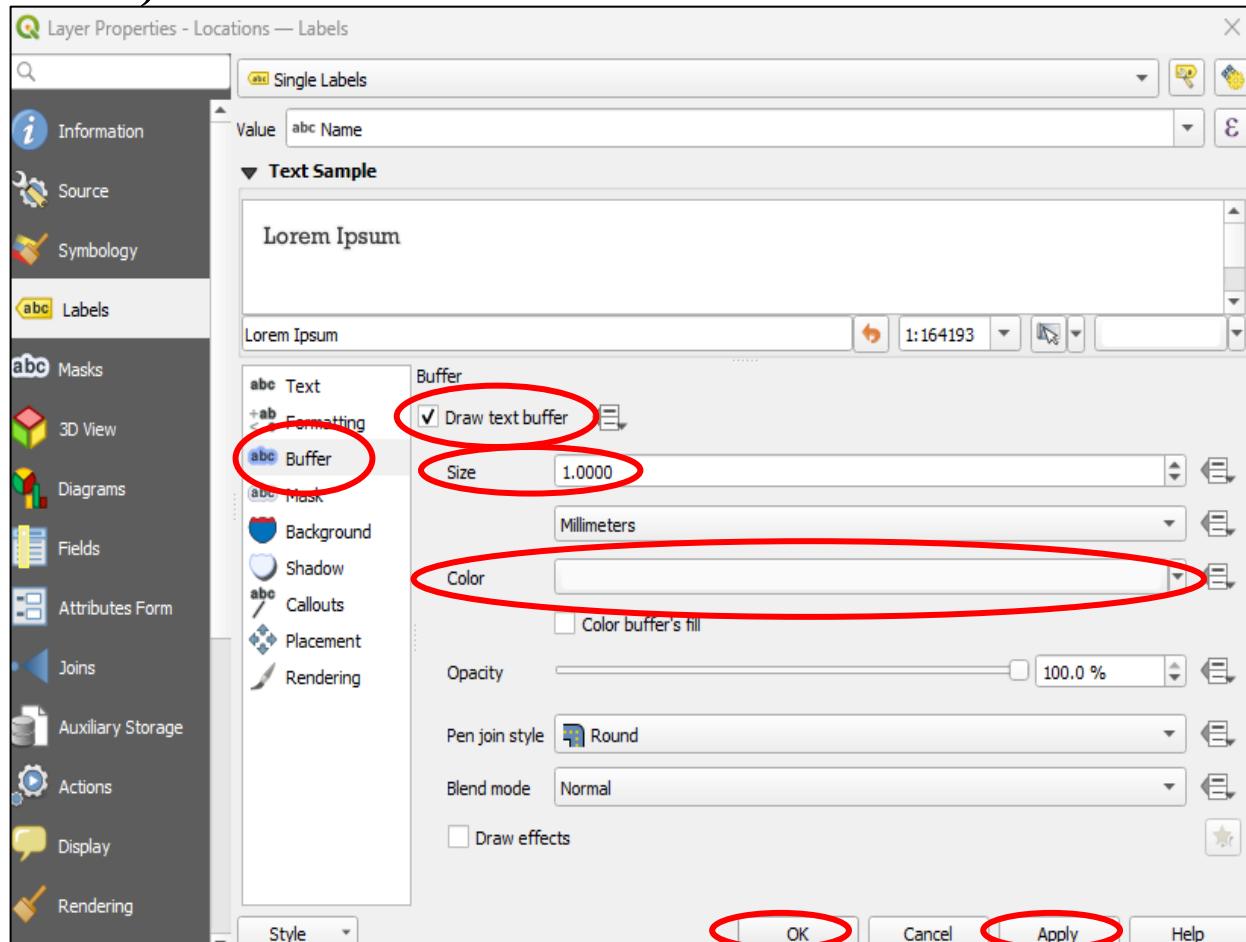
Label Locations.csv

- while still in *Properties*, select the *Labels* tab
- Select *Single Labels* from the drop-down
- *Value* should be “Name”
- change *Font* (if desired)
and Size (if desired)
- Colour should be Black
- click **Apply** but not **OK** yet



Buffer Labels (for Locations.csv)

- while still in *Labels*, choose “Buffer” and check “Draw text buffer”
- *Size 1.0* and *Colour white*
- **Apply** and **OK**



CHECK IN

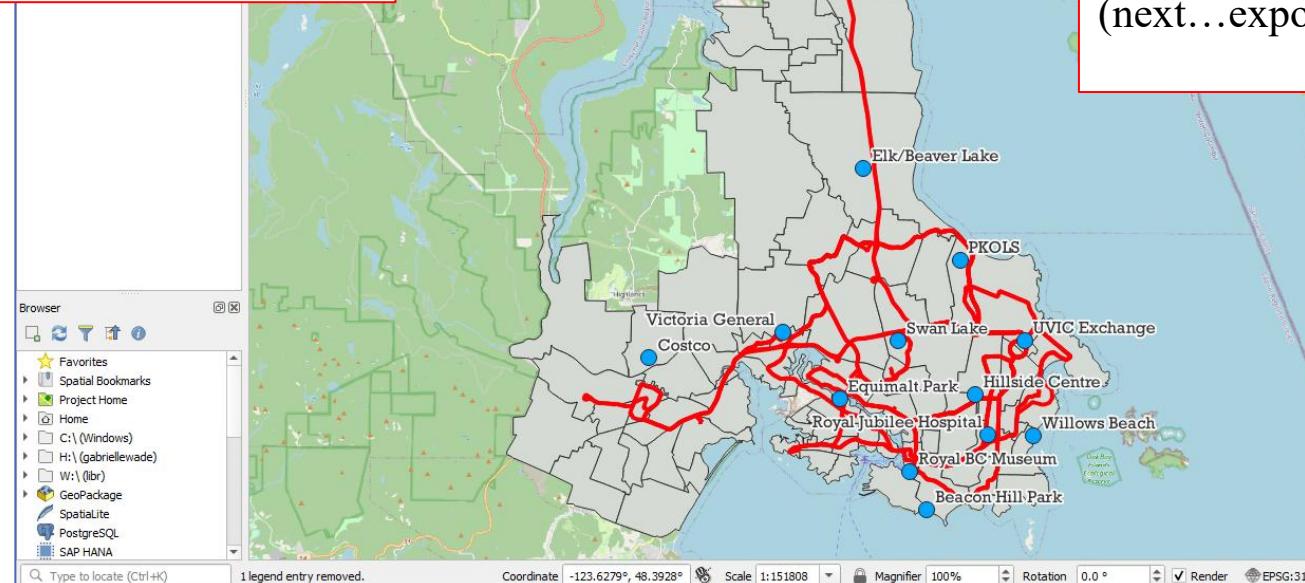
Save your work!

You have:

- edited point data symbology
- added Labels & buffered them

If you have questions, **ask!**

(next...export ‘quick’ map)



Activity #10



Export “quick” map

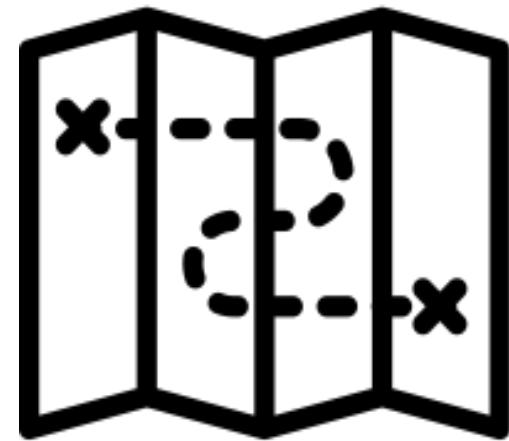
- .pdf
- several raster files

Note: quick and dirty with limited options

- No legend (unless copy and paste)

“Printer composter layout” is the detailed way to export a map

- **NOT** today (separate workshop)

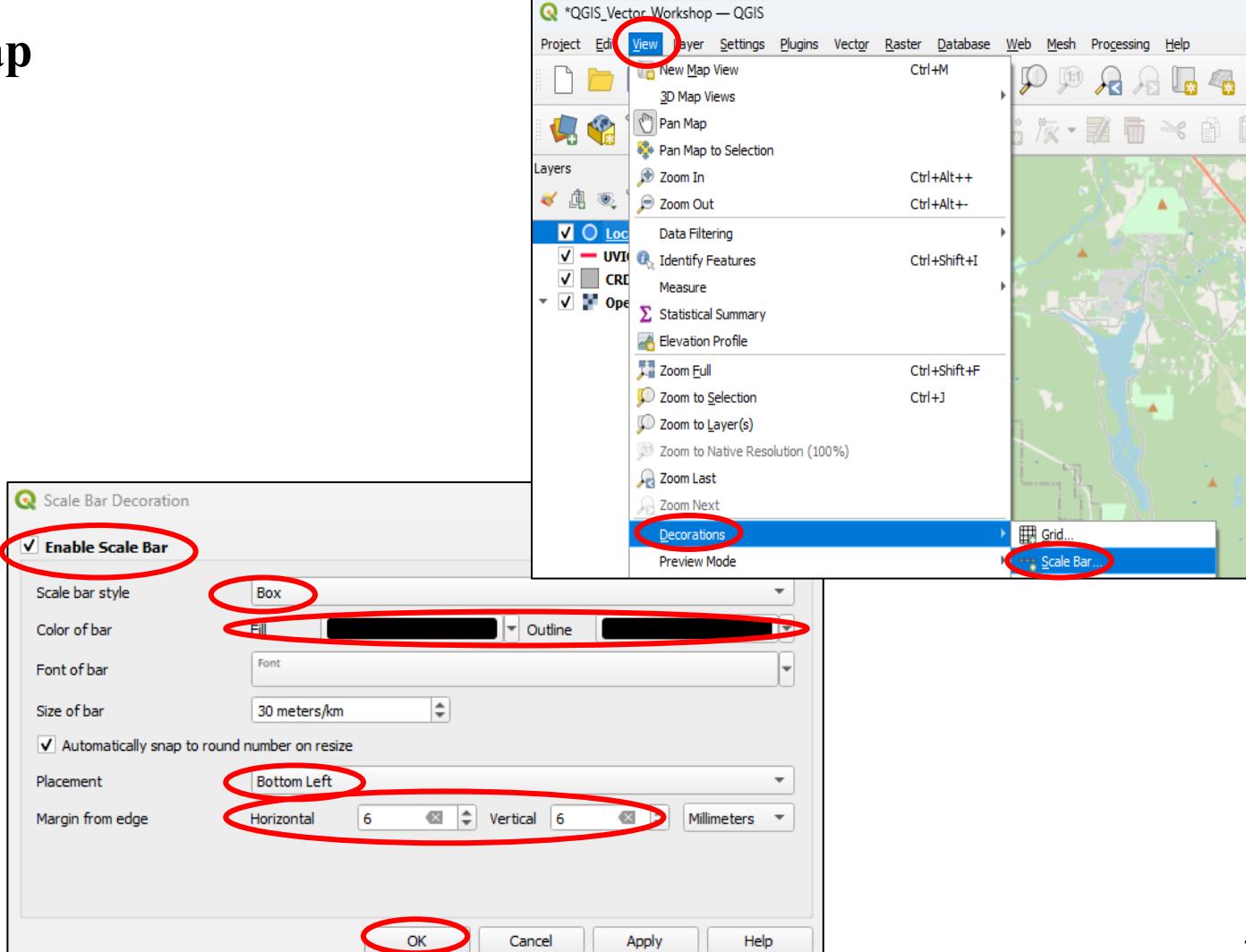


Export “quick” map

Add scale bar →

Scale bar options:

- Style
- Colour
- Font size
- Size of scale bar
- Placement
- Margin from edge
- etc

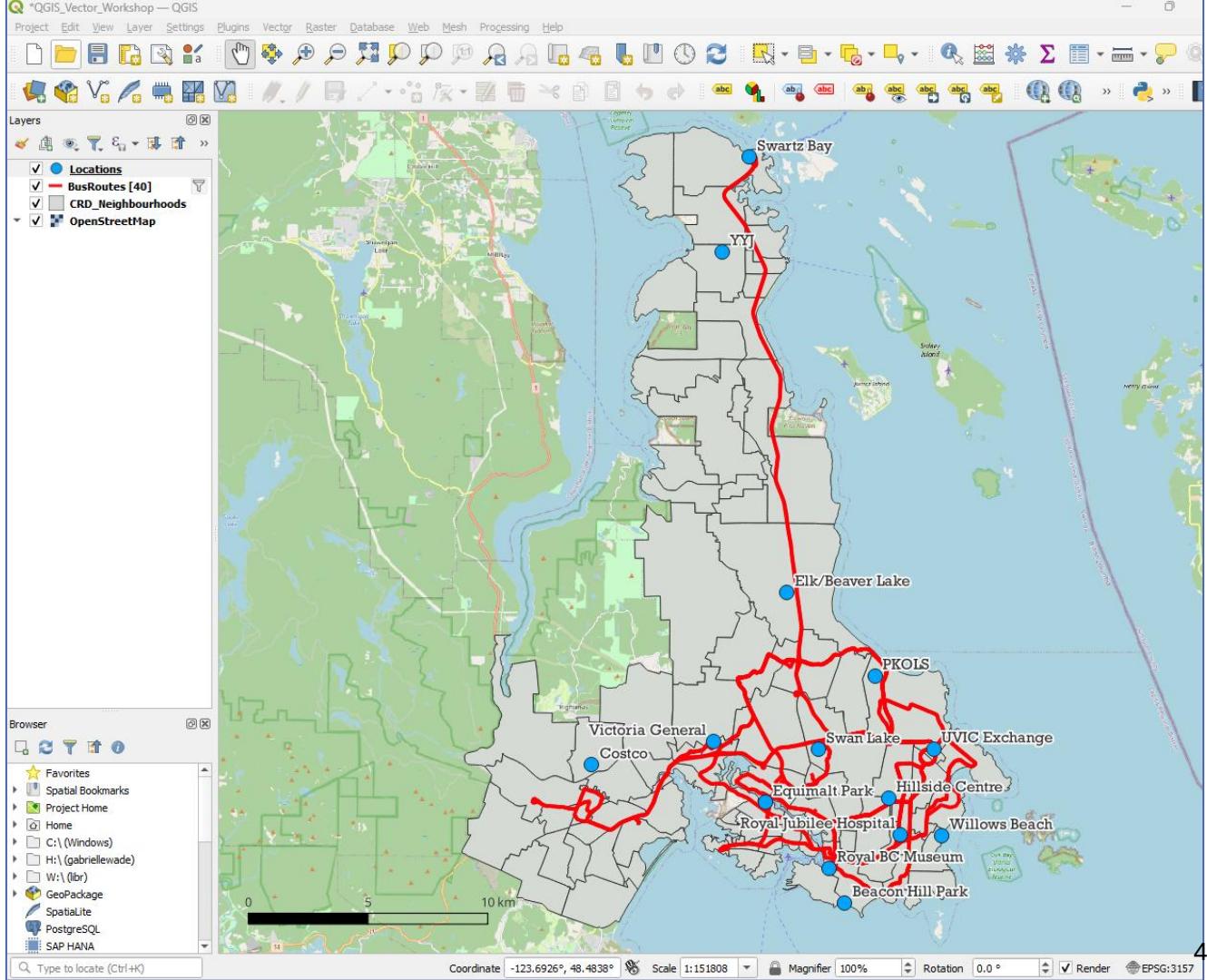


Export “quick” map

Scale bar added

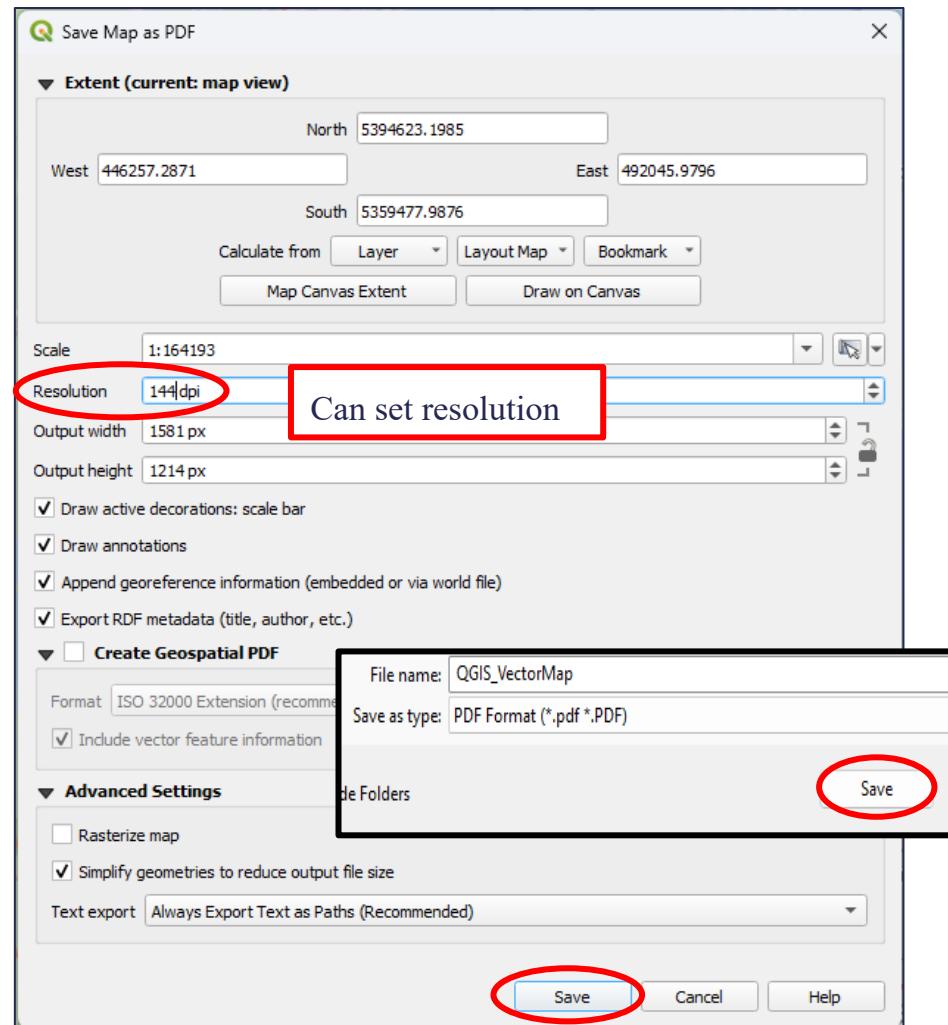
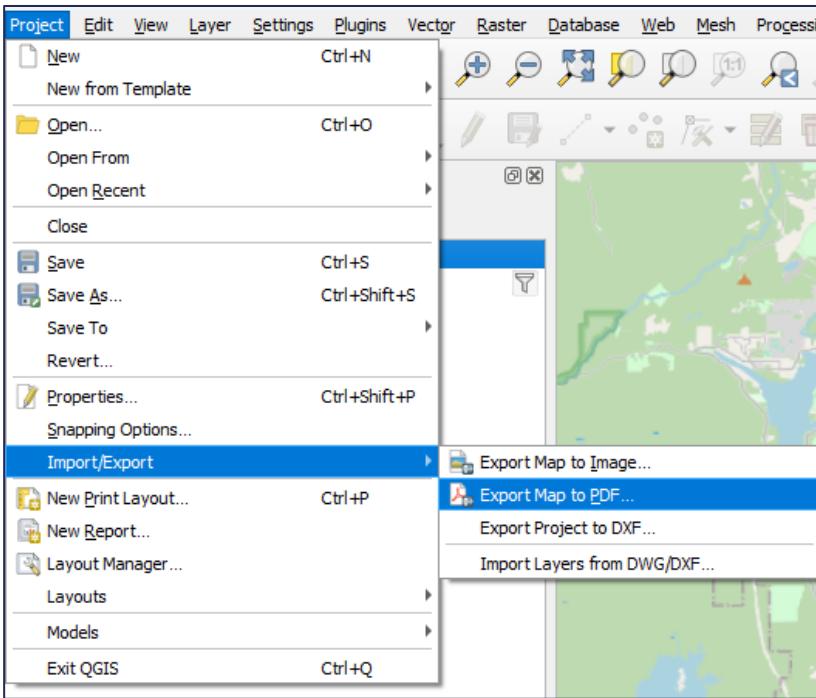
(other options to add: **not** today)

- Title
- North Arrow
- Grid
- etc



Export “quick” map

Export map



CHECK IN

Save your work!

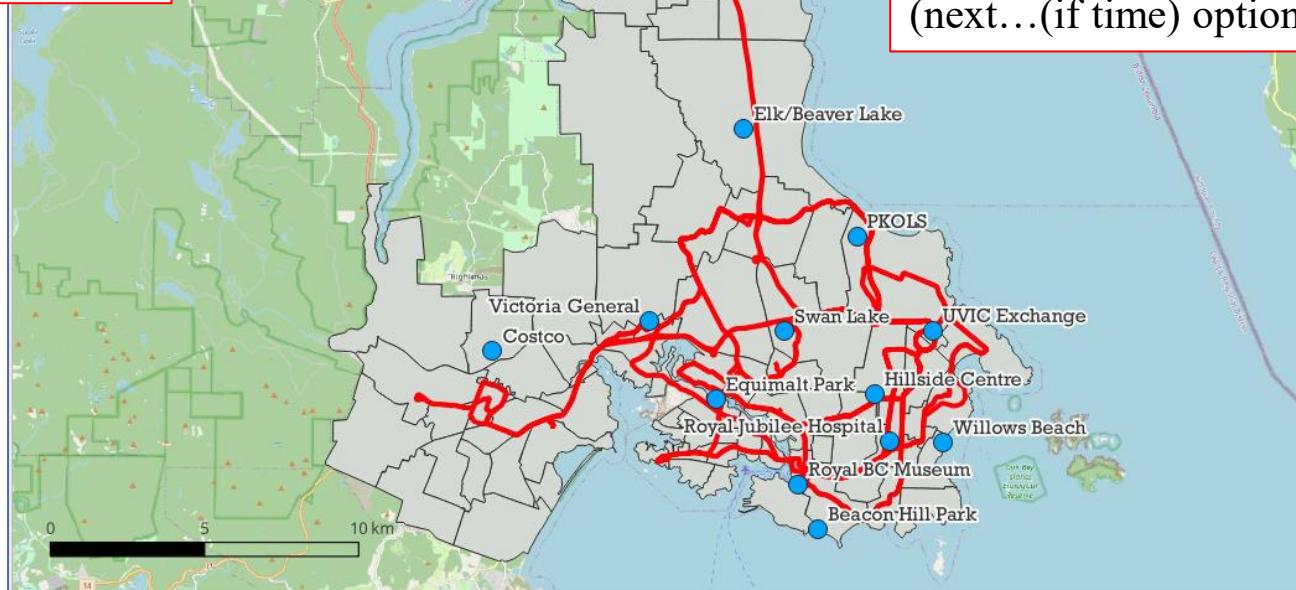


You have:

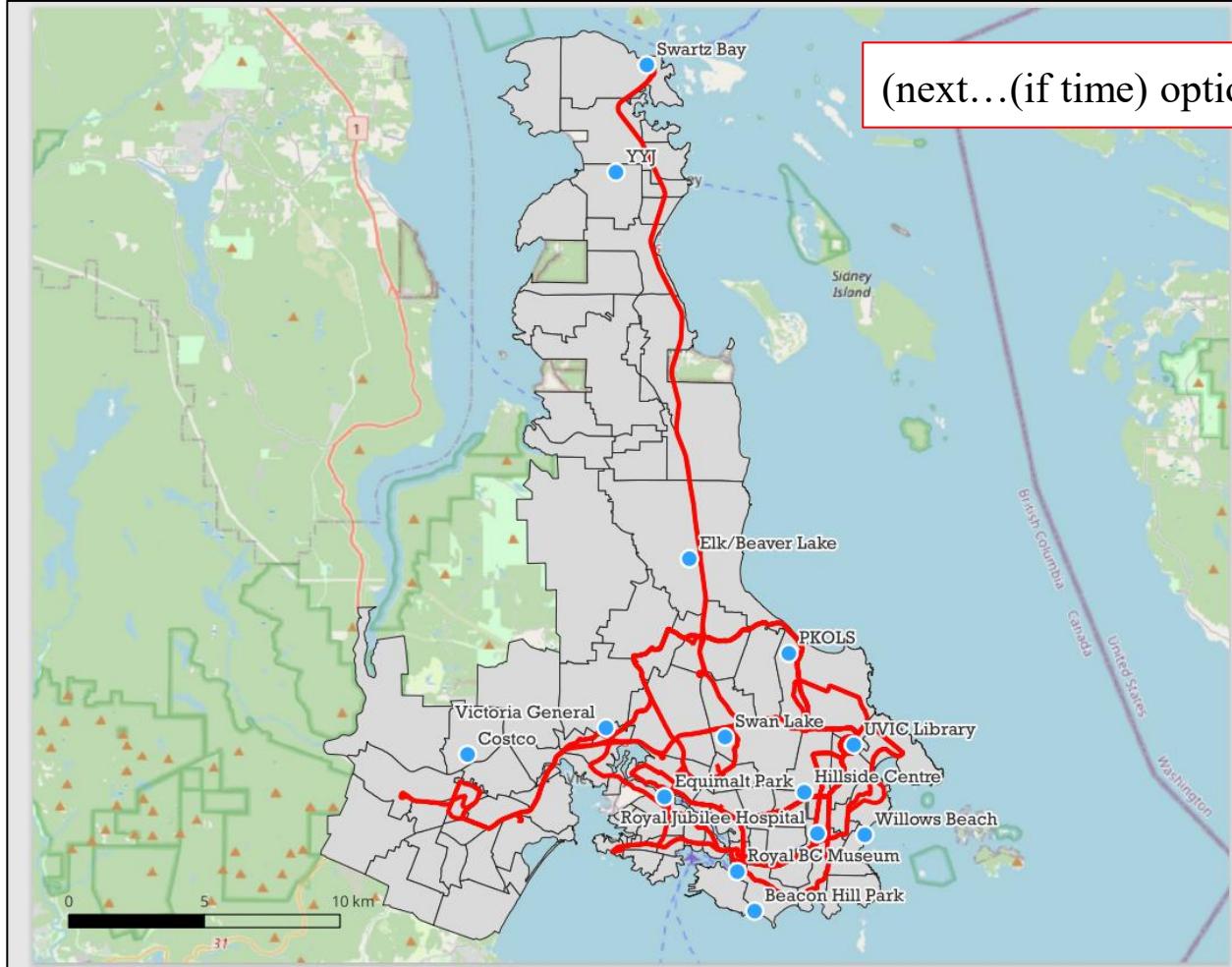
- Added scale bar
- Exported .pdf map

If you have questions, **ask!**

(next...(if time) optional exercises...)



Congratulations!

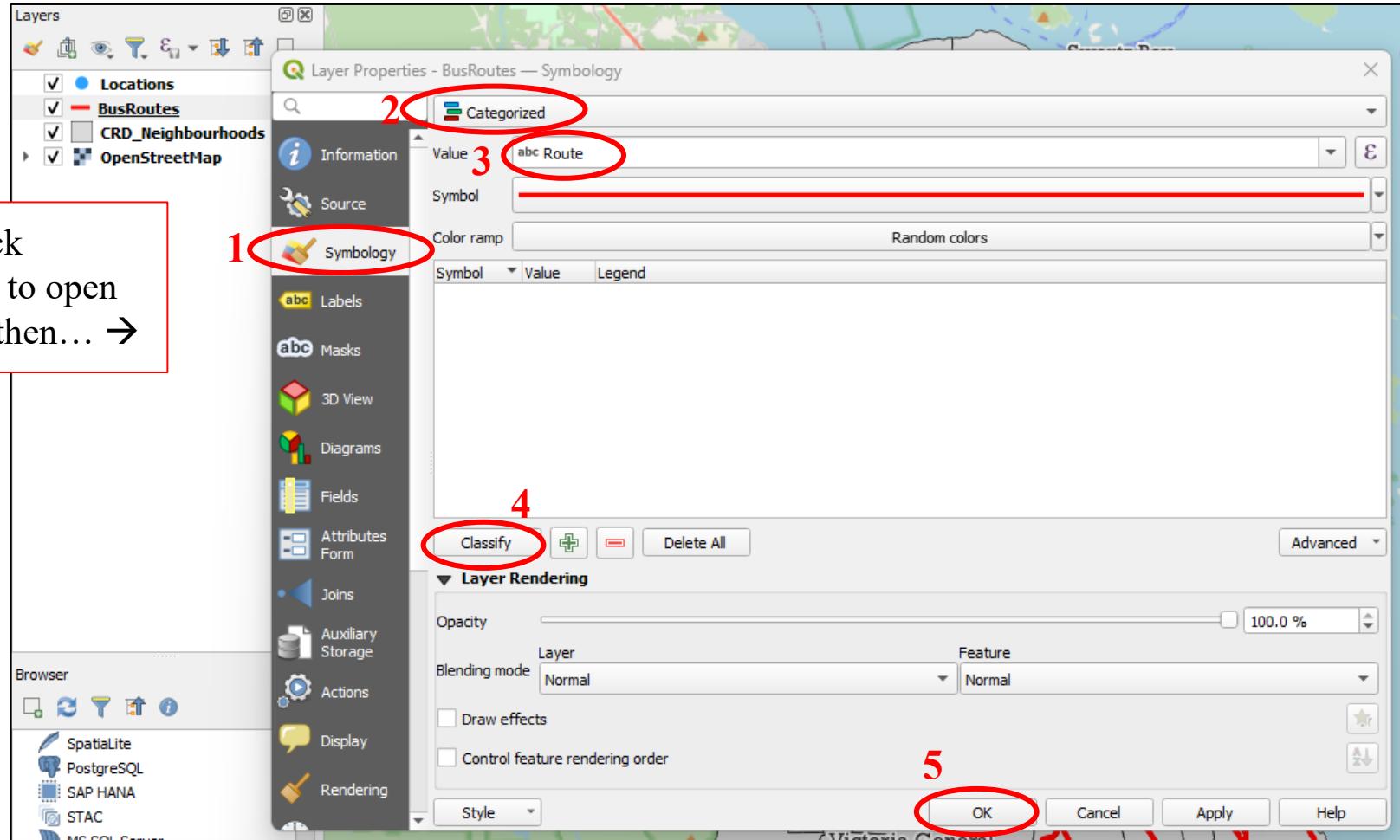


Optional Activity

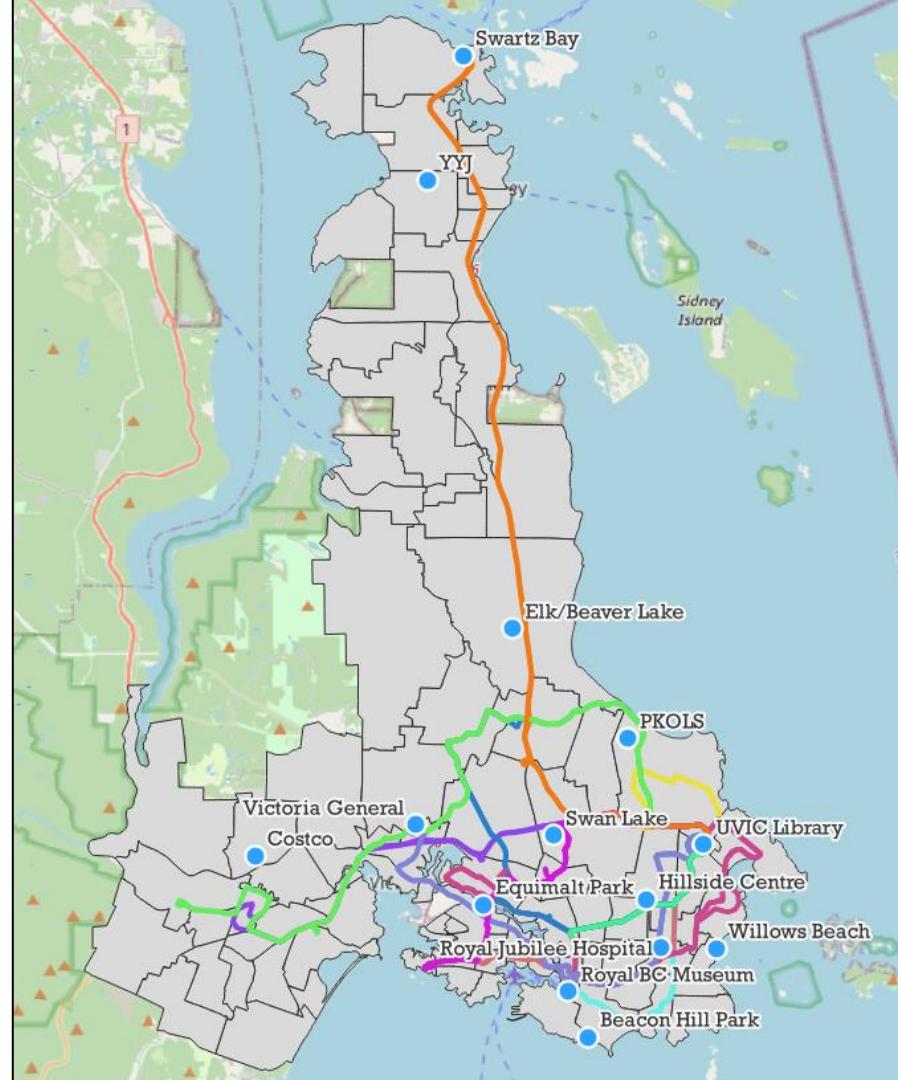


Optional Exercise: ‘Symbol’ lines to differentiate between bus routes

Double-click
BusRoutes to open
Properties then... →



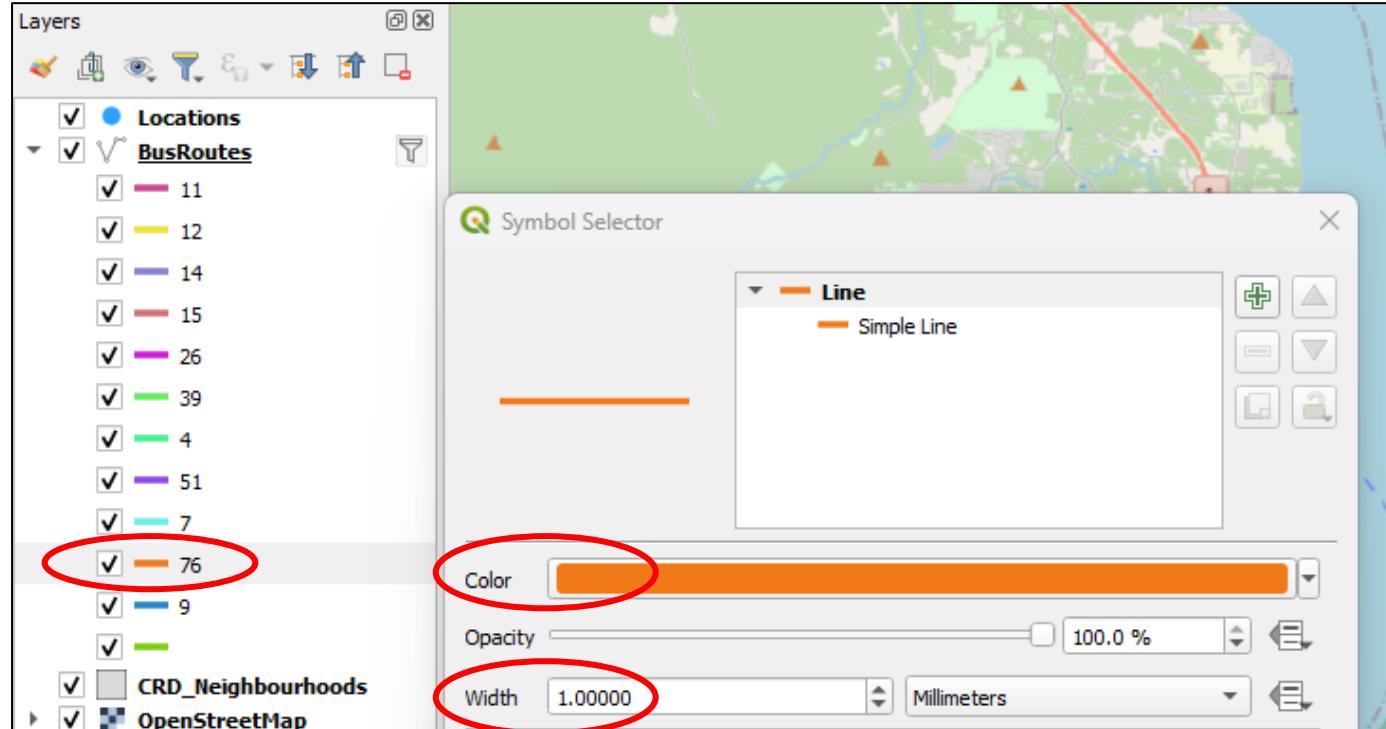
All bus routes are different
(random) colours, but...



You can change each one individually via drop-down on *Layers* panel

- Can change style, colours, sizes, etc.
- Can also do these steps to point layers, polygon layers
- Style by different attributes

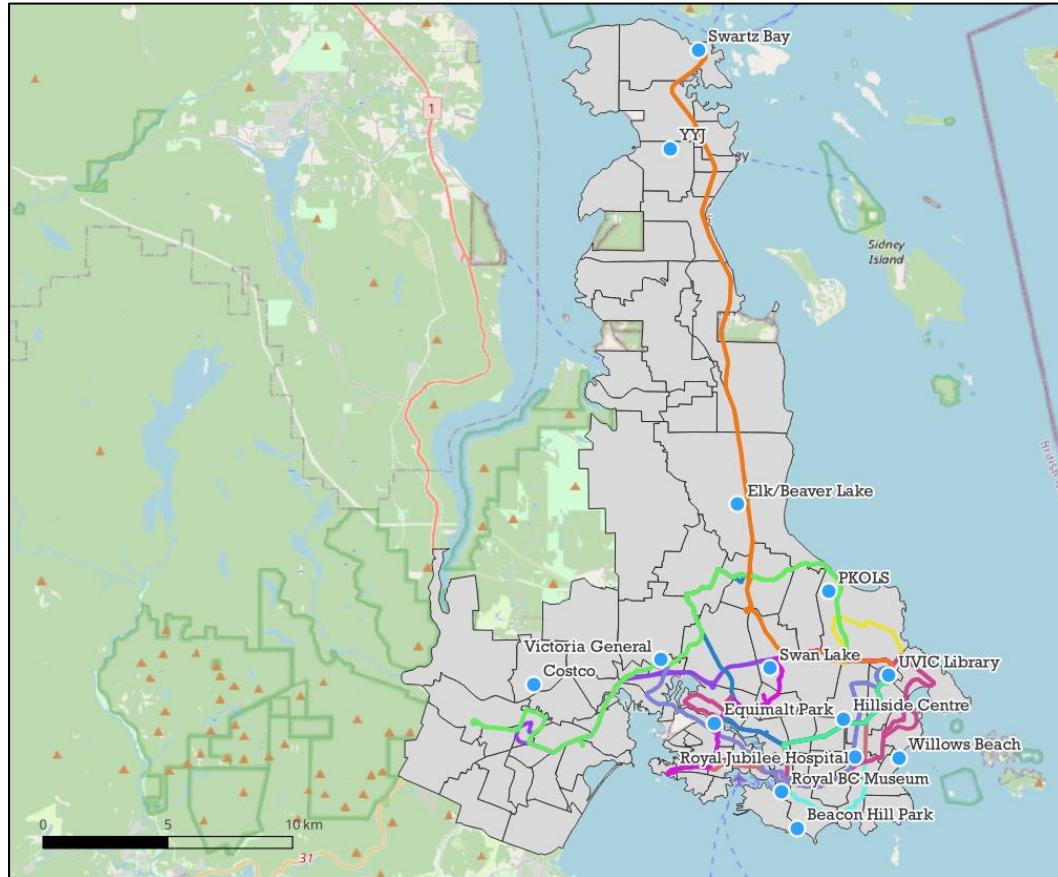
Many styling options!



Congratulations!

You:

- Explored *QGIS* software and its layout
- Imported Vector and .csv data using the *Data Source Manager*
- Edited Vector data symbology
- used *Filter* to remove unwanted data
- Created and exported a map



Congratulations!

You can:

- Define and differentiate basic features of:
 - Geospatial Tools
 - Geospatial data
 - Data types
 - File formats
- Load and edit vector symbology data
- Create and export a map in *QGIS*



Resources going forward:

QGIS – used in workshop today:

- QGIS Tutorials & Tips: <https://www.qgistutorials.com/>
- QGIS Training Manual: https://docs.qgis.org/3.40/en/docs/training_manual/index.html
- QGIS User Guide: https://docs.qgis.org/3.40/en/docs/user_manual/index.html

Find data:

- GeoSpatial Data Guide: <http://libguides.uvic.ca/geospatialdata>

Questions or problems:

- UVic Geospatial Librarian (danielbm@uvic.ca), YCW Geospatial Intern (gabriellewade@uvic.ca), or KULA Geospatial Assistant (jeronimo.elenes@gmail.com)

UVic full semester GIS courses in the Department of Geography:

- GEOG222 – Intro to Maps and GIS
- GEOG328 – GIS Analysis

GIS Skills and Mapping Micro-certificate

<https://continuingstudies.uvic.ca/science-and-the-environment/programs/gis-skills-and-mapping>