

Intro to *QGIS*  
with Vector Data:  
EXERCISE



2026

# Activity #1



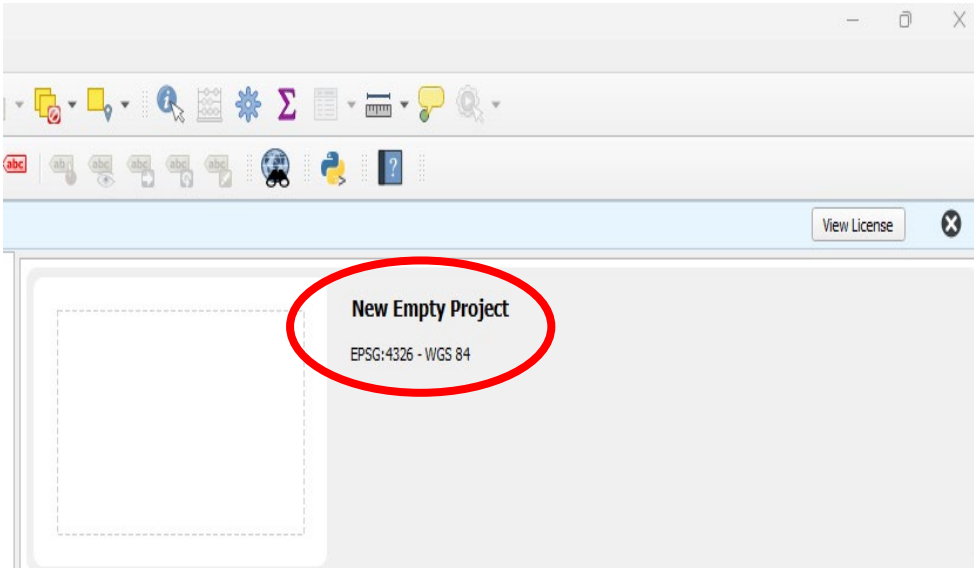
# Start *QGIS* (if you haven't already)

## Download workshop data

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

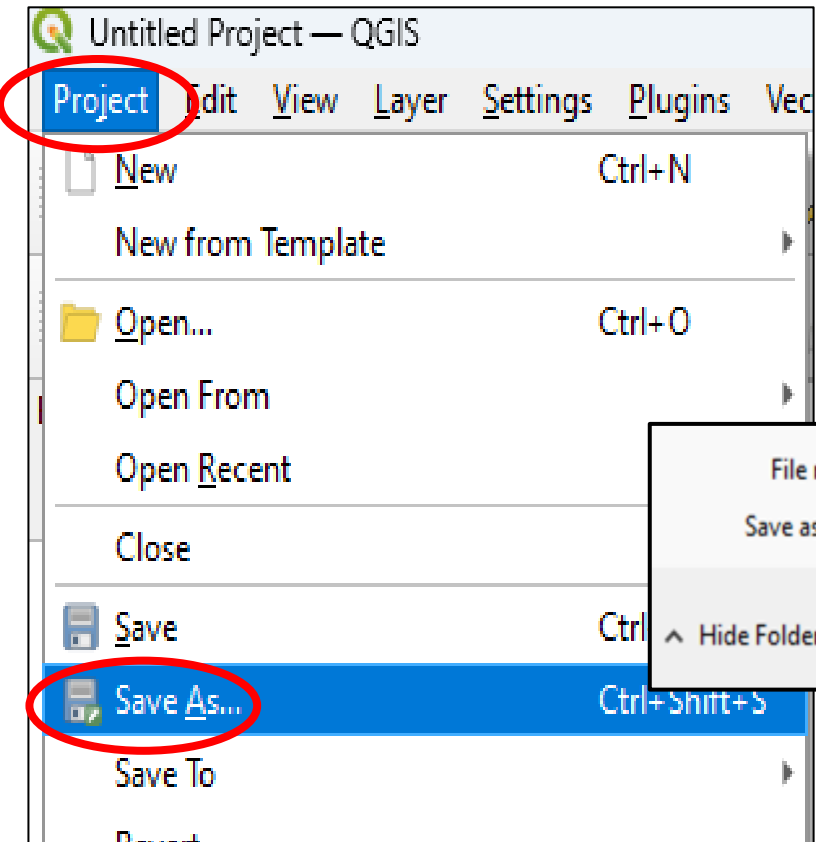
## Open *QGIS* (your version may be different)

- Double click on *New Empty Project*



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

# Save new project

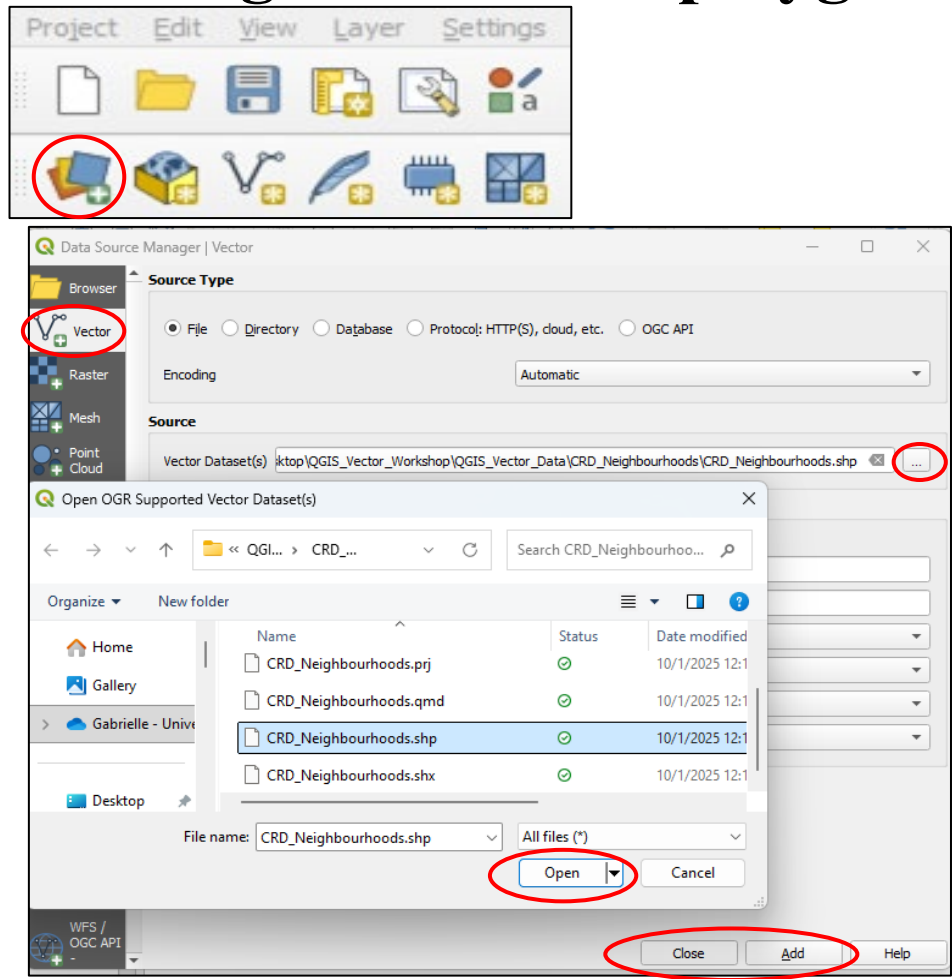





- In *QGIS* Menu Bar, select *Project* then *Save As*
- Name your project “*QGIS\_Vector\_Workshop*”
- Save your project as **.qgz** to where you can find it



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

# 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

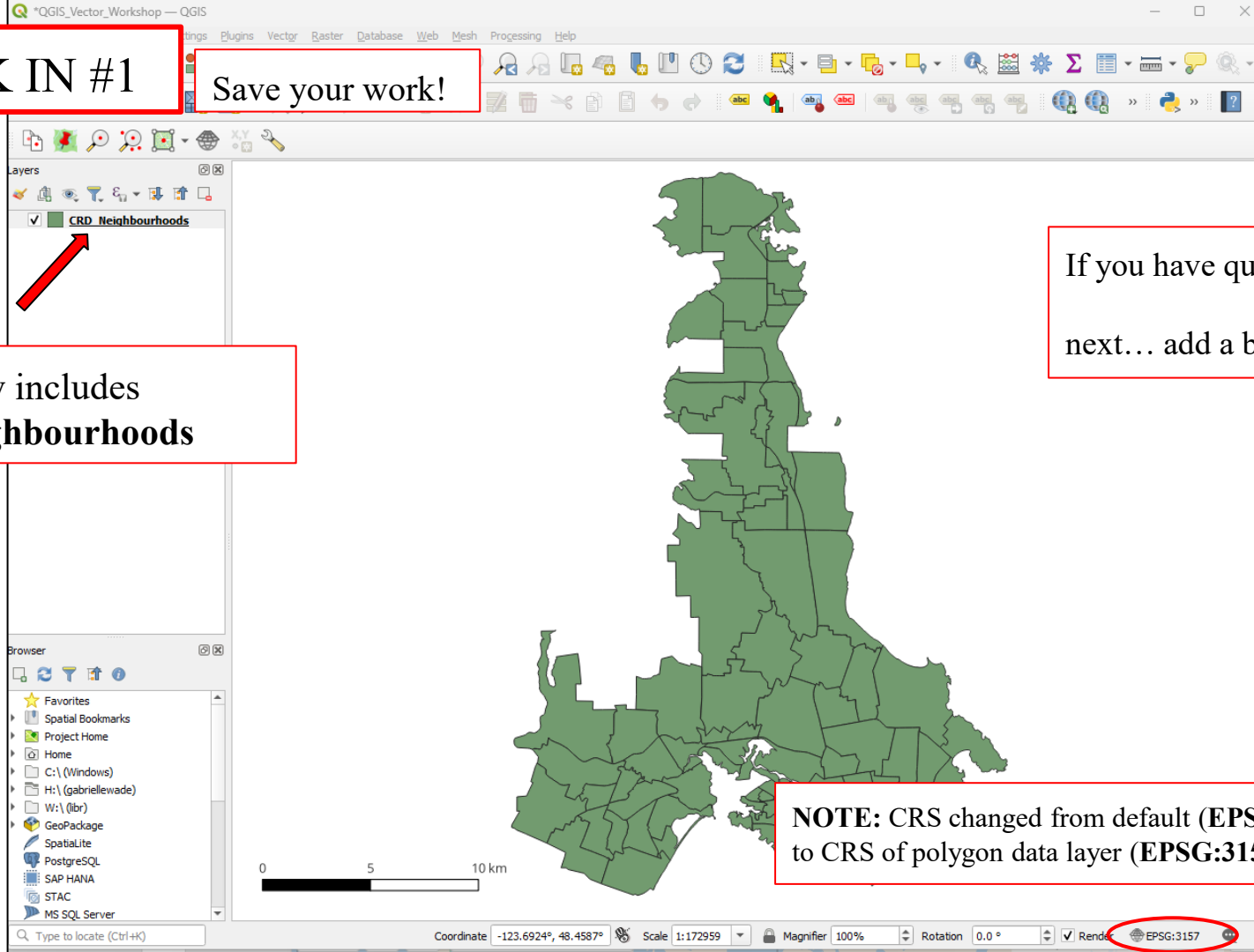
The map displays a green landmass with a blue highlighted area representing a neighbourhood. To the right, the 'Identify Results' panel is open, showing a table of attributes for the selected feature.

Feature	Value
<b>CRD_Neighbourhoods</b>	
LA_NAME_RE	Pat Bay East
(Derived)	
(Actions)	
OBJECTID	24
PERIMETER	11977.09077
MUNICIP...	Central Saanich
AREA_HA	800.105
LA_NAME...	Pat Bay East
Shape_area	7984080.41579999961
Shape_len	11920.98096890000

Mode: Current Layer  
View: Tree

CHECK IN #1

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)

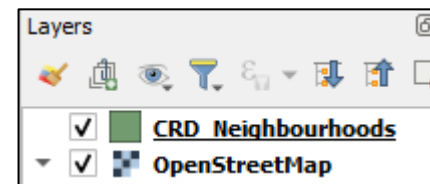
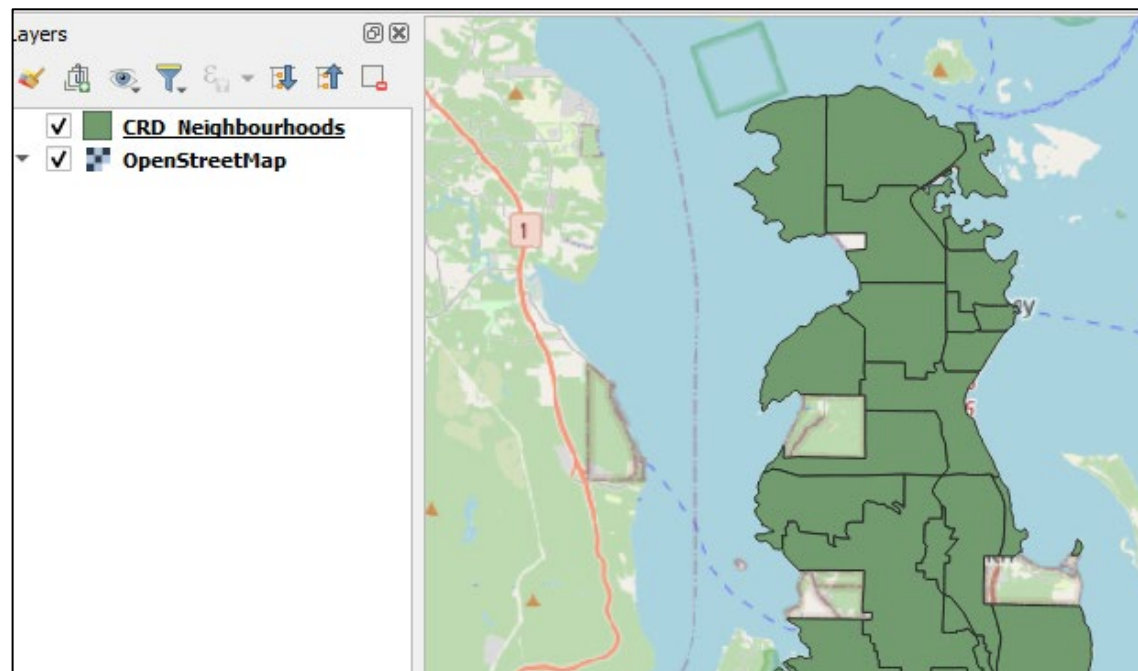
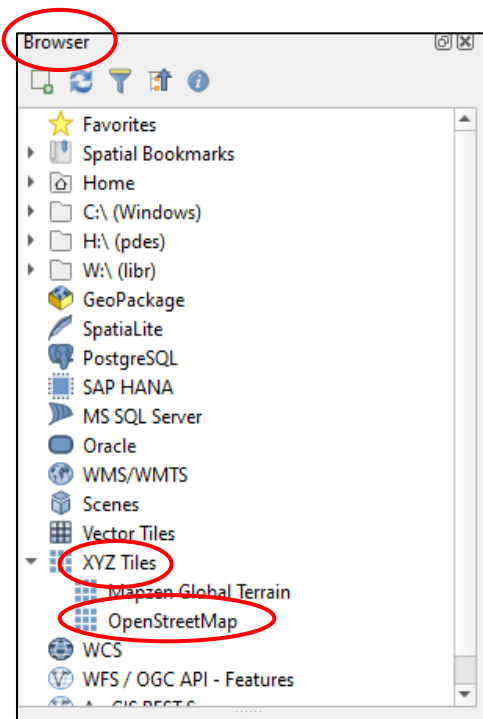
# Activity #2



# 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**

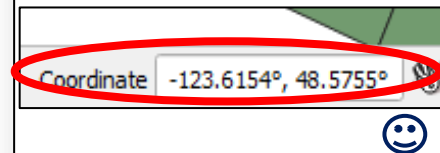
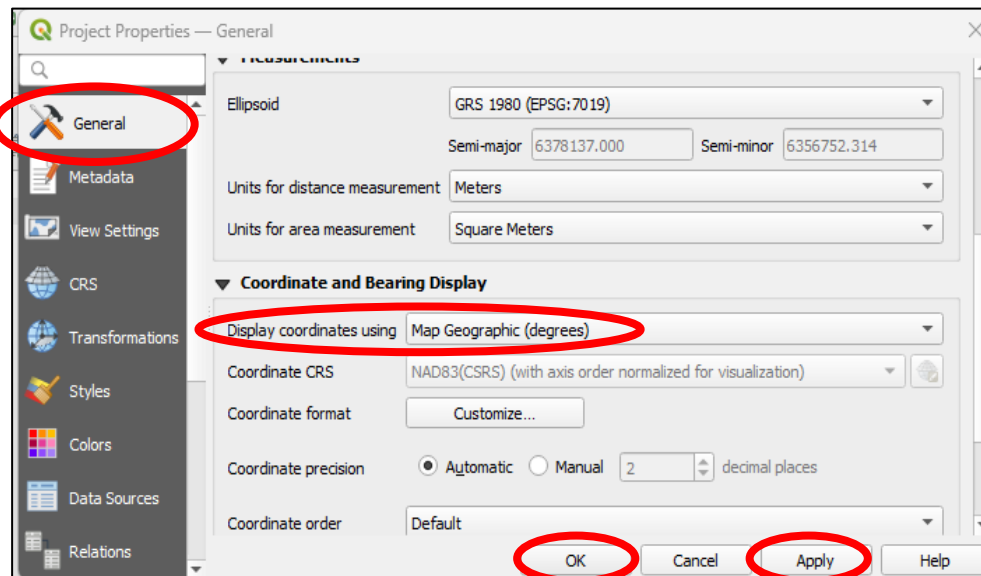
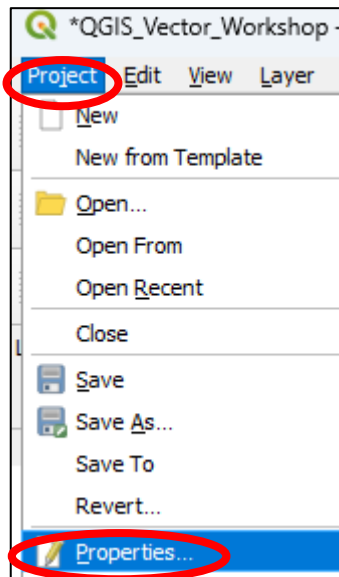
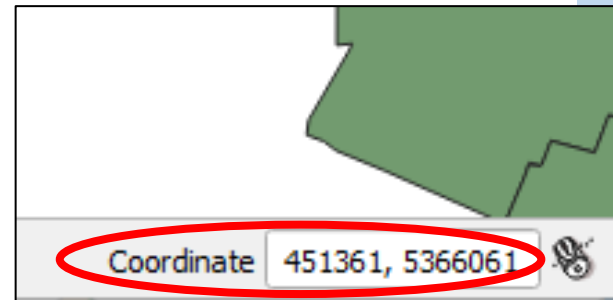


# Change coordinate settings

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**



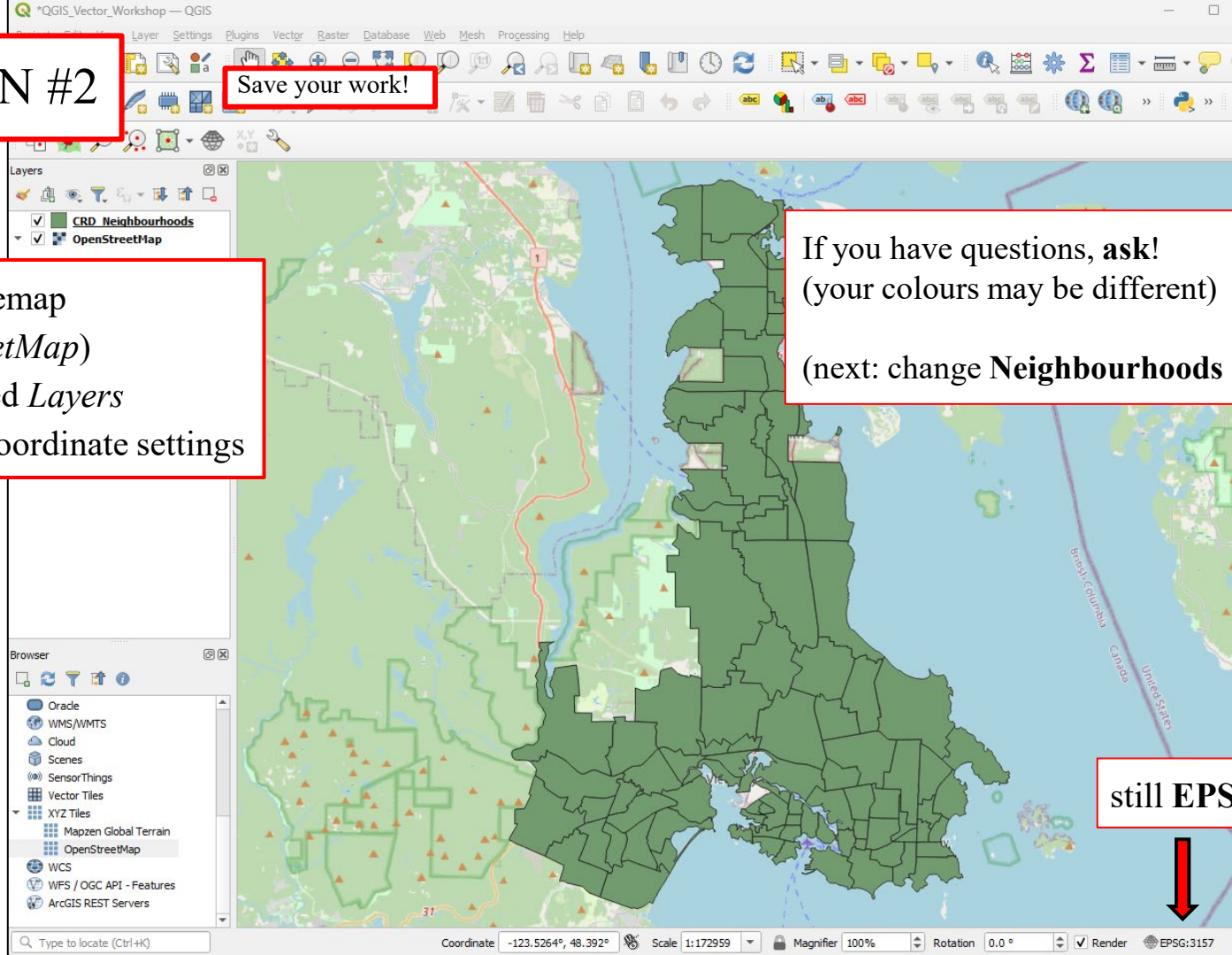
# CHECK IN #2

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**

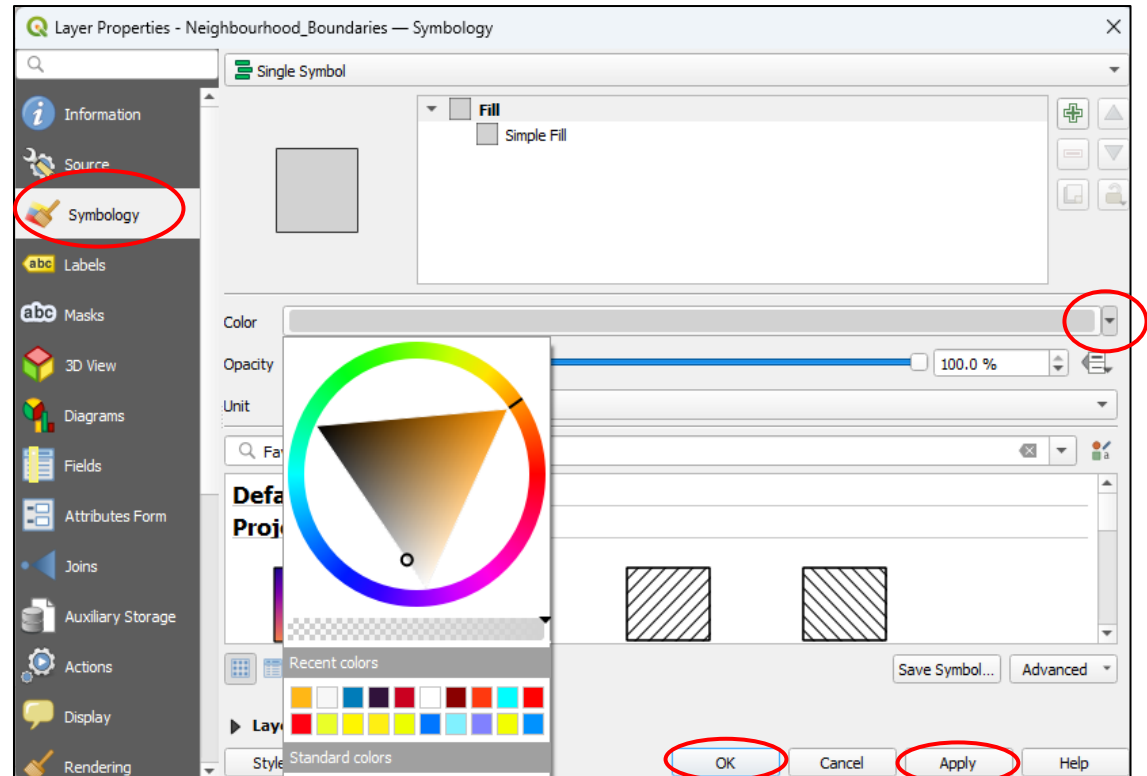
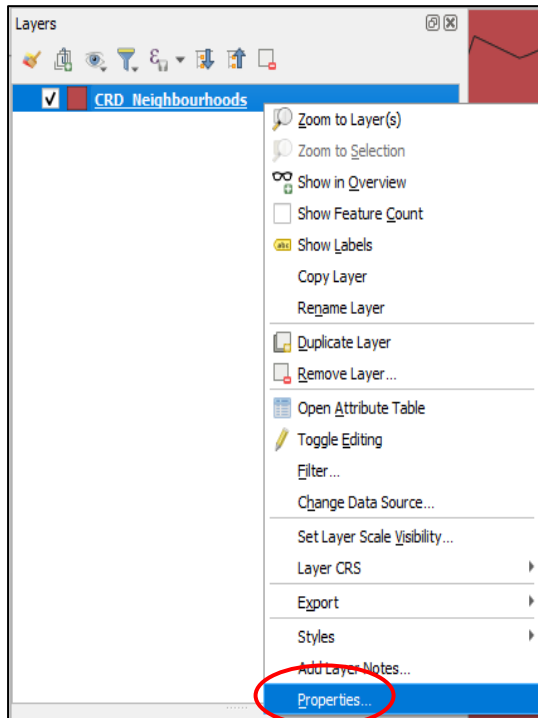


# Activity #3



# 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 #3

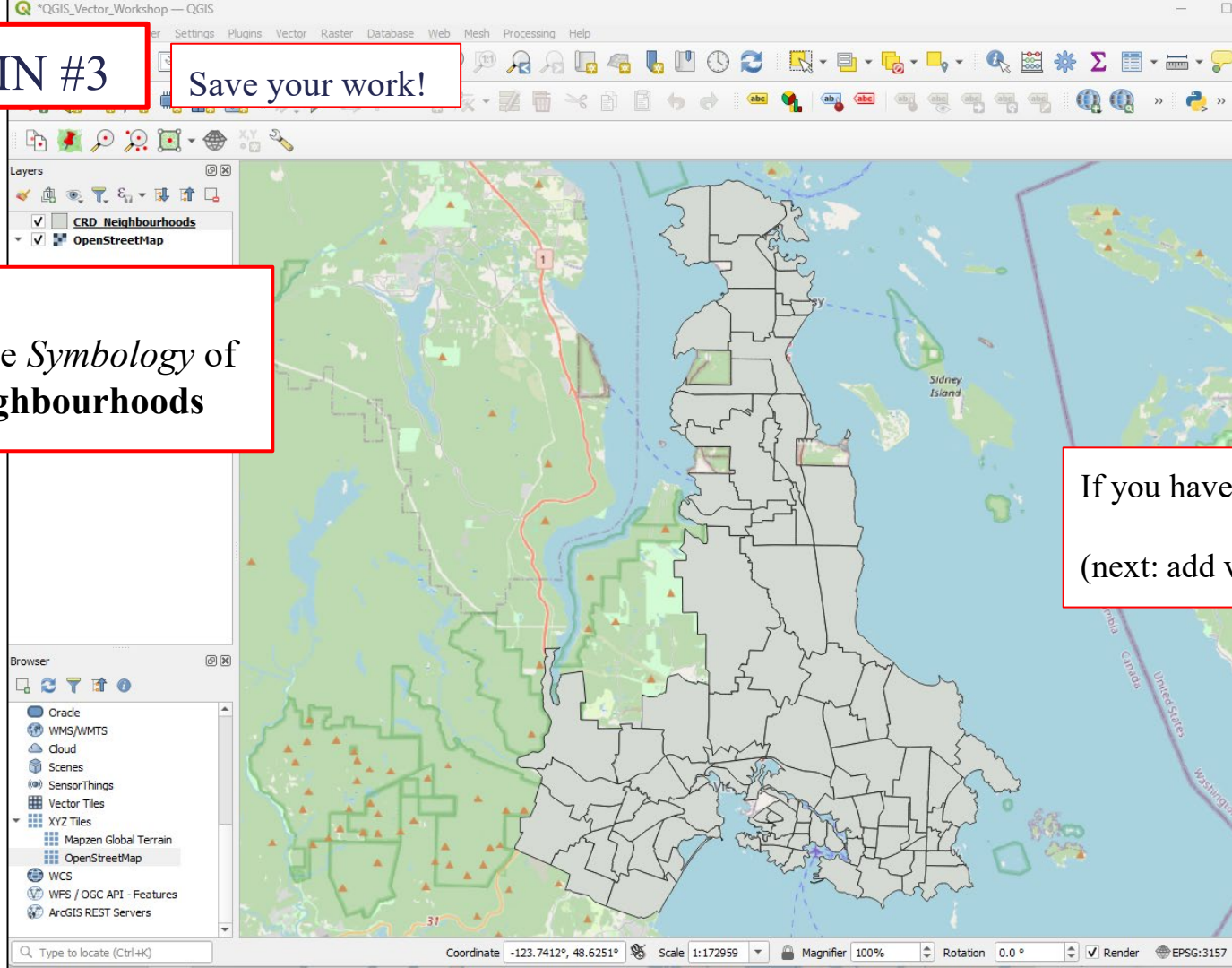
Save your work!

You have:

- changed the *Symbology* of CRD\_Neighbourhoods

If you have questions, ask!

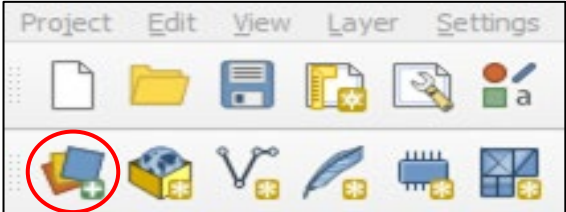
(next: add vector lines...)





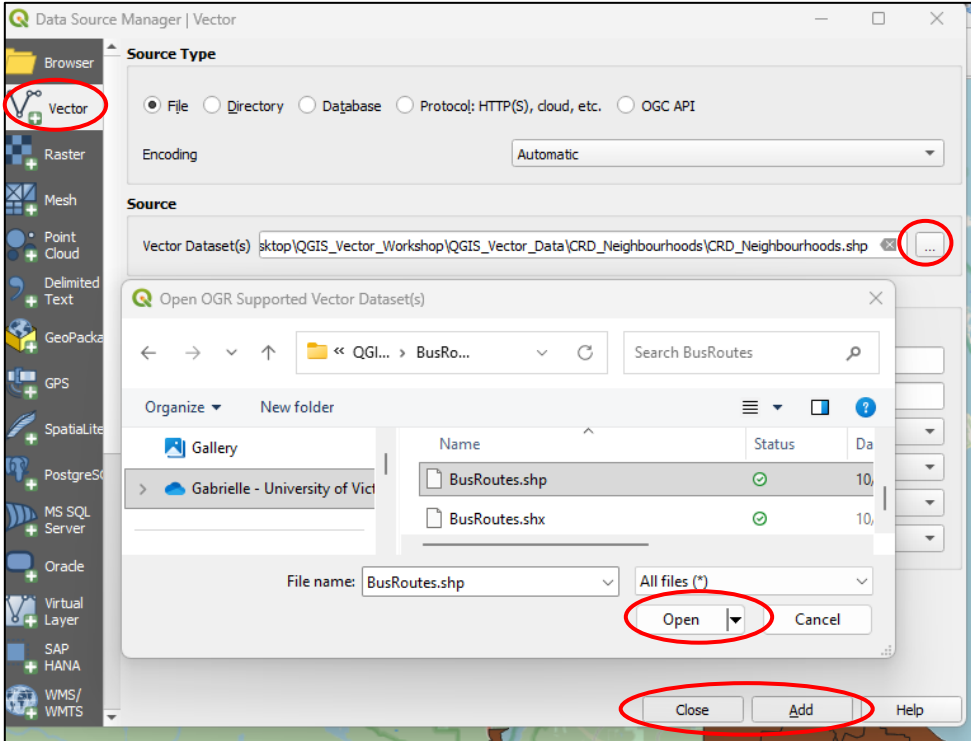
# Activity #4



# add BusRoutes line shapefile

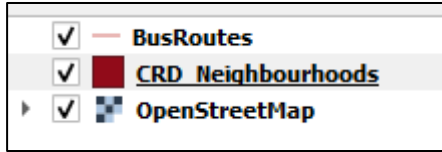


- Select *Open Data Source Manager* 
- Select the *Vector* tab
- Under the *Source* heading click the 
- Navigate to workshop data
- Select **BusRoutes.shp**, Open
- **Add and Close**



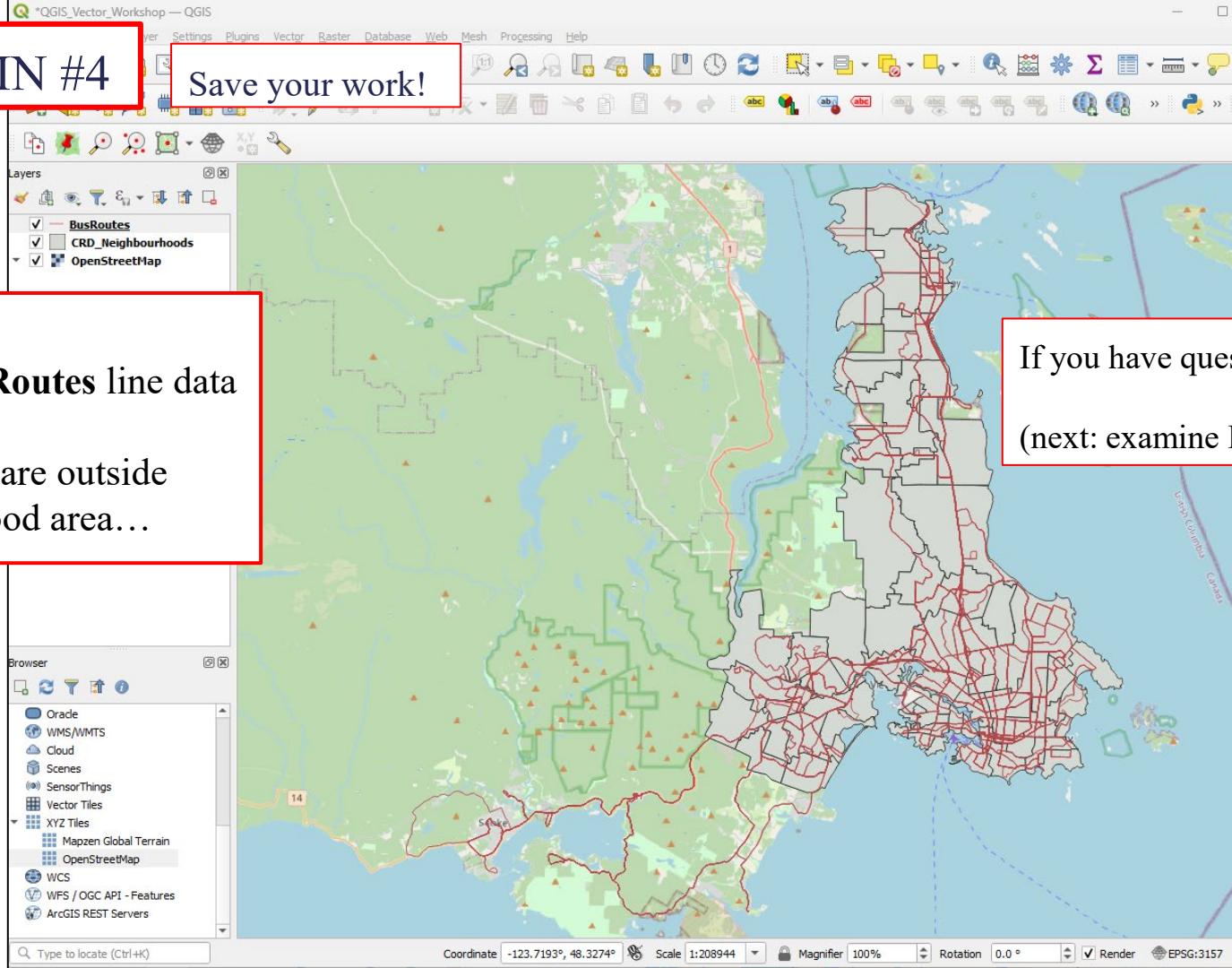
Check that **BusRoutes** is above **CRD\_Neighbourhoods**

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



## CHECK IN #4

Save your work!



You have:

- added **BusRoutes** line data

Some routes are outside  
Neighbourhood area...

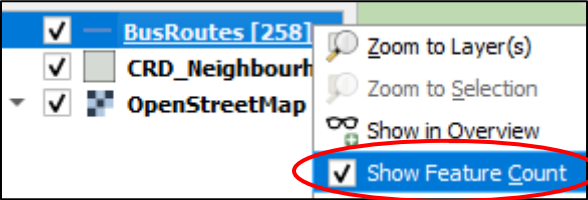
If you have questions, **ask!**

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

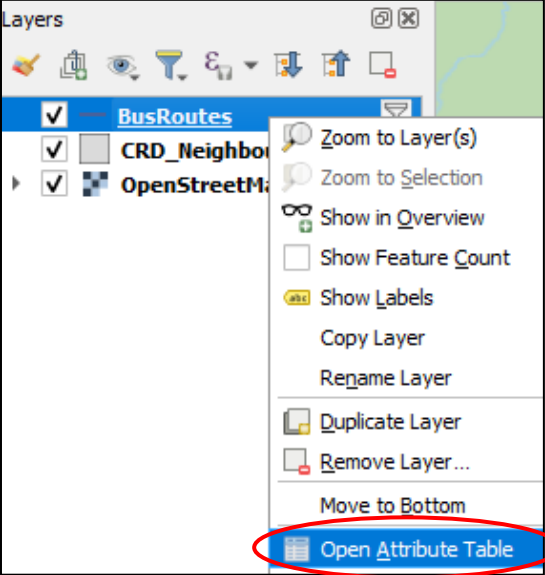
# Activity #5



# examine BusRoutes Attributes



- In the *Layers* panel, right-click **BusRoutes** and choose “Show Feature Count” and *Open Attribute Table*
- Can see that **BusRoutes** has 258 features and various attribute table columns including route ID, heading, etc.

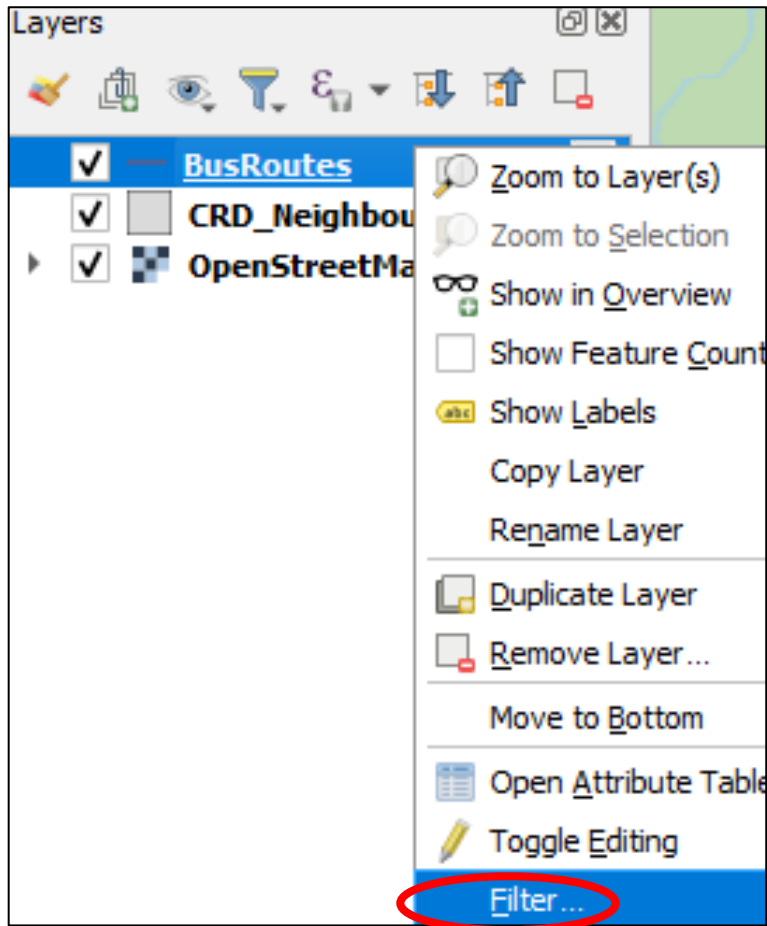


A screenshot of the 'BusRoutes' attribute table window. The title bar shows 'BusRoutes — Features Total: 258, Filtered: 258, Selected: 0'. The table has columns: shape\_id, route\_id, service\_id, trip\_id, and heading. The row with shape\_id 258 is circled in red.

shape_id	route_id	service_id	trip_id	heading	
255	33162	75-VIC	3874.000000000...	10490492:87458...	to Keating
256	33763	53-VIC	3799.000000000...	10573718:87515...	Langford Atkins
257	33783	53-VIC	3874.000000000...	10488309:87467...	Langford Atkins
258	33785	53-VIC	3799.000000000...	10573950:87458...	Langford Atkins

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

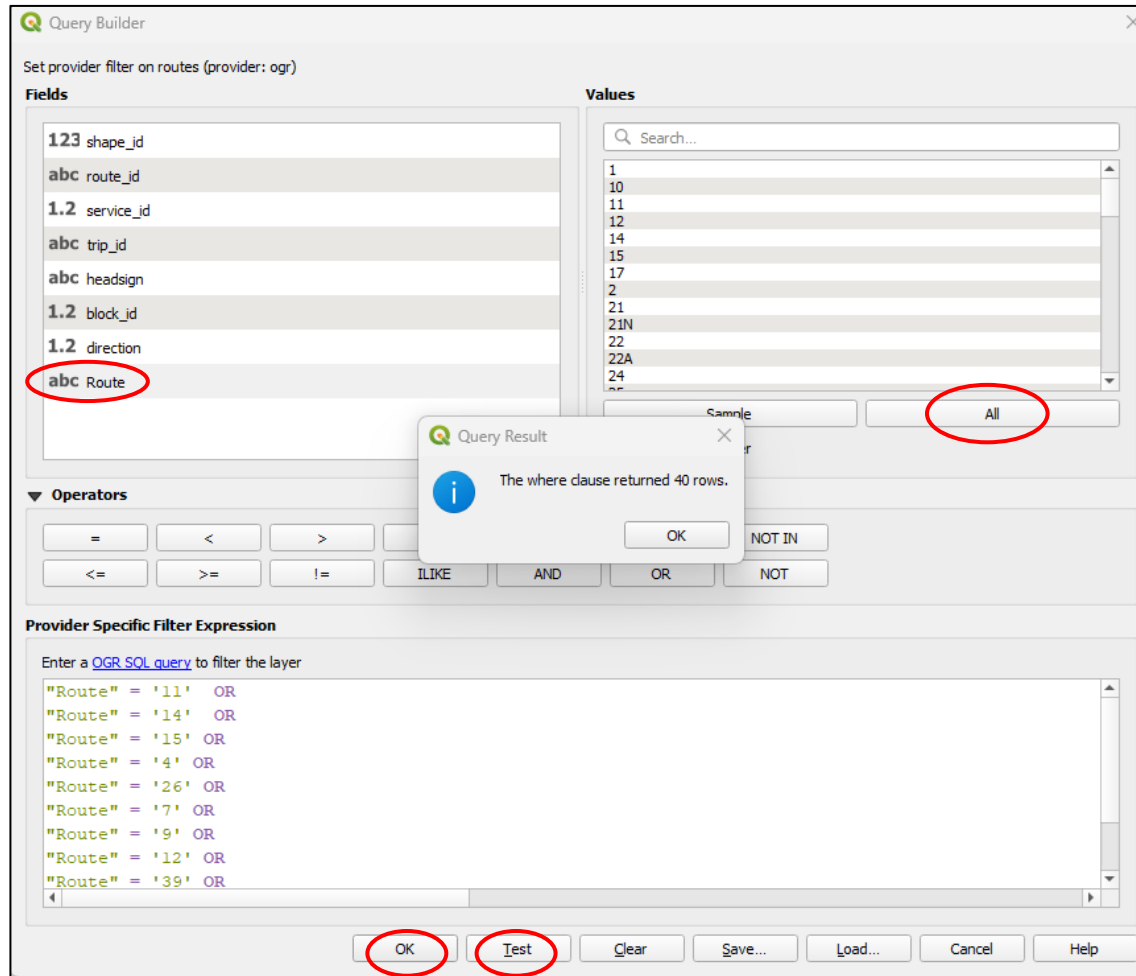
- In the *Layers* panel, right click on **BusRoutes** and choose *Filter*

# 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’)

The screenshot illustrates the process of opening the attribute table for a filtered layer in QGIS. The top panel shows the Layers panel with 'BusRoutes' selected, displaying a feature count of 40. A right-click context menu is open over the 'BusRoutes' layer, with 'Show Feature Count' and 'Open Attribute Table' highlighted. The bottom panel shows the Attribute Table window for 'BusRoutes', displaying 40 filtered features. The table has columns for shape\_id, route\_id, service\_id, and trip\_id.

	shape_id	route_id	service_id	trip_id
36	31811	9-VIC	3797.000000000...	10571959:78640
37	31832	14-VIC	3799.000000000...	10572898:78628
38	31926	26-VIC	3797.000000000...	10571648:78610
39	32077	4-VIC	3799.000000000...	10571600:78670
40	32108	76-VIC	3874.000000000...	10494831:84979

CHECK IN #5

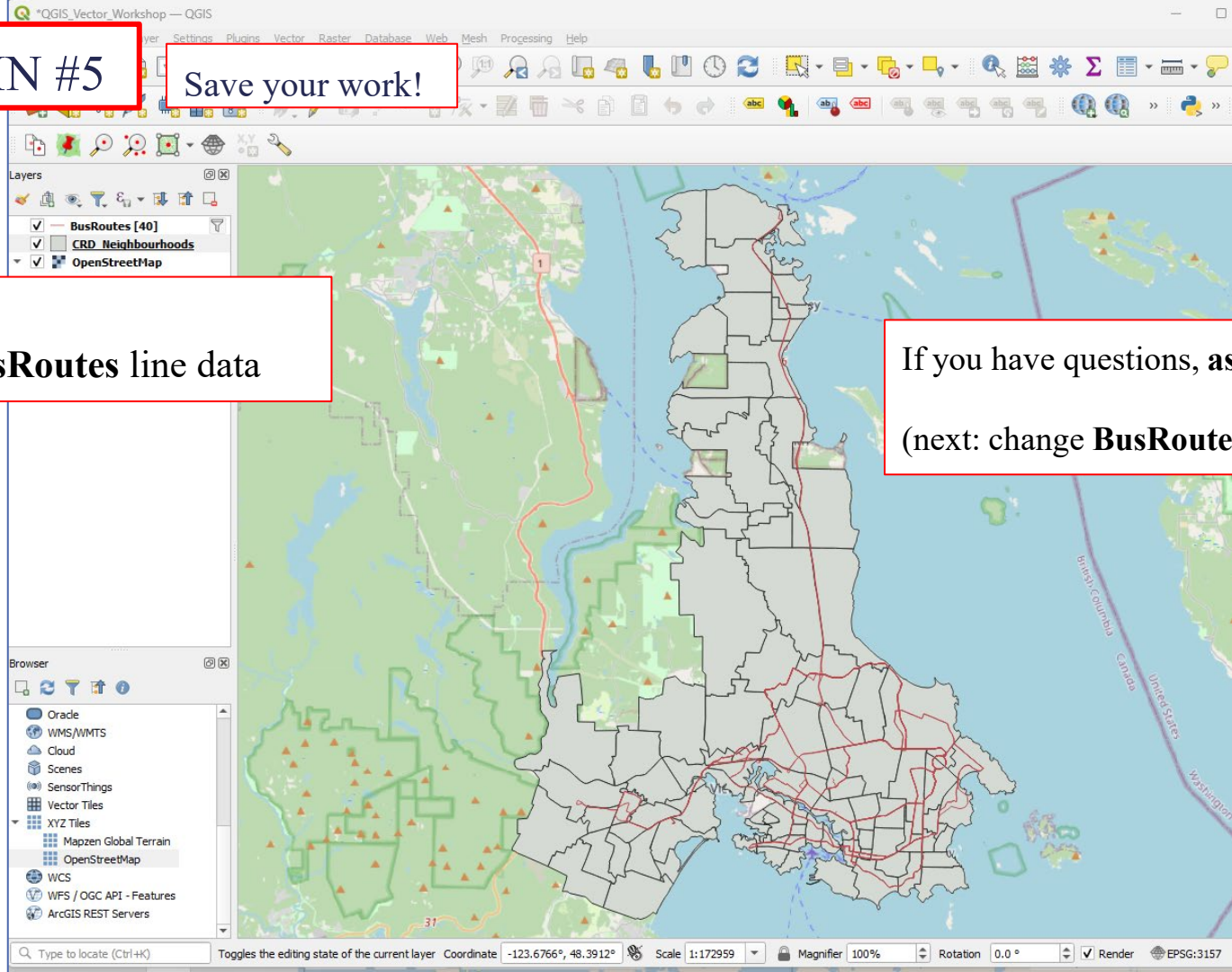
Save your work!

You have:

- Filtered **BusRoutes** line data

If you have questions, **ask!**

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

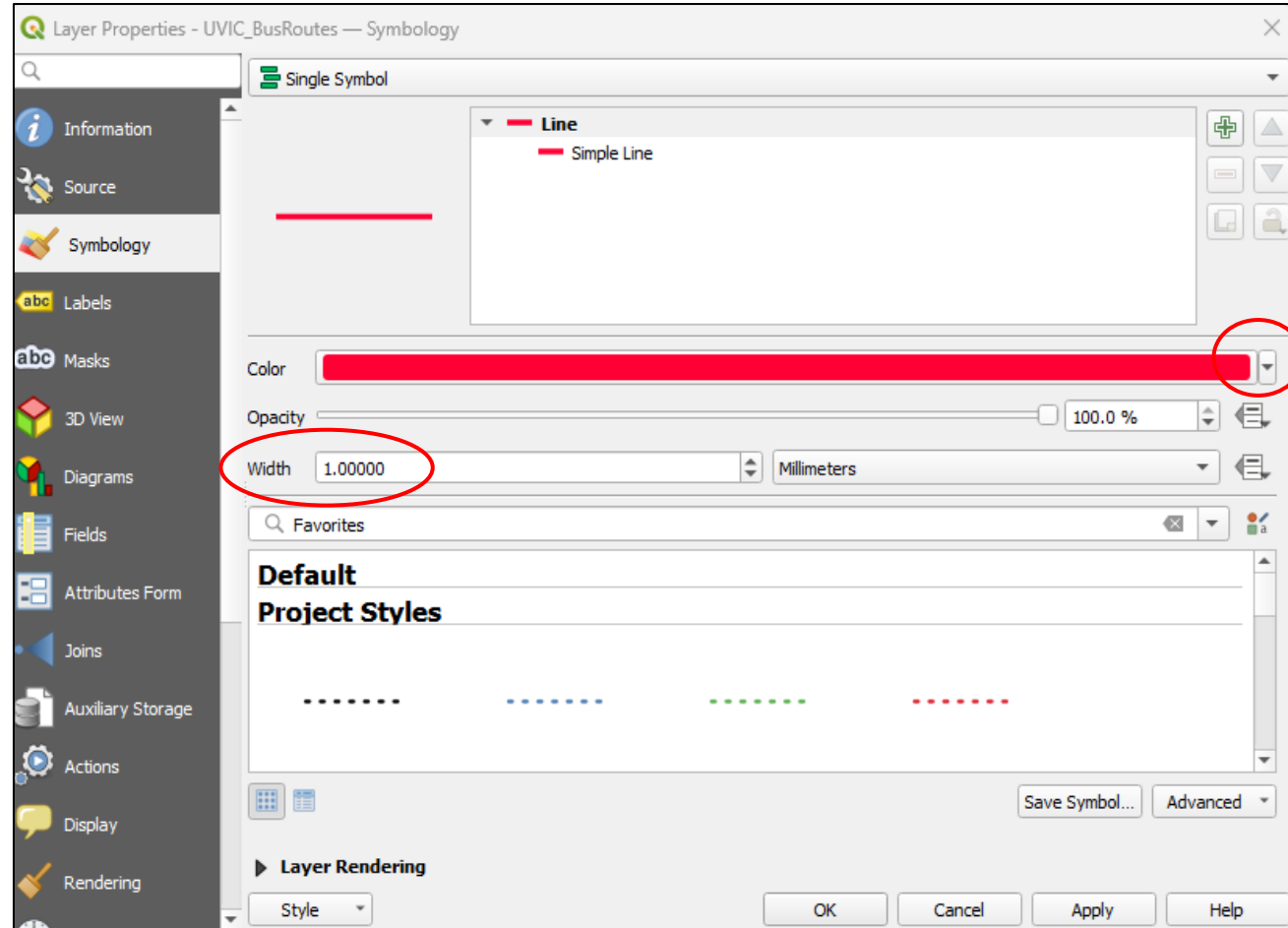


# Activity #6



# 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 #6

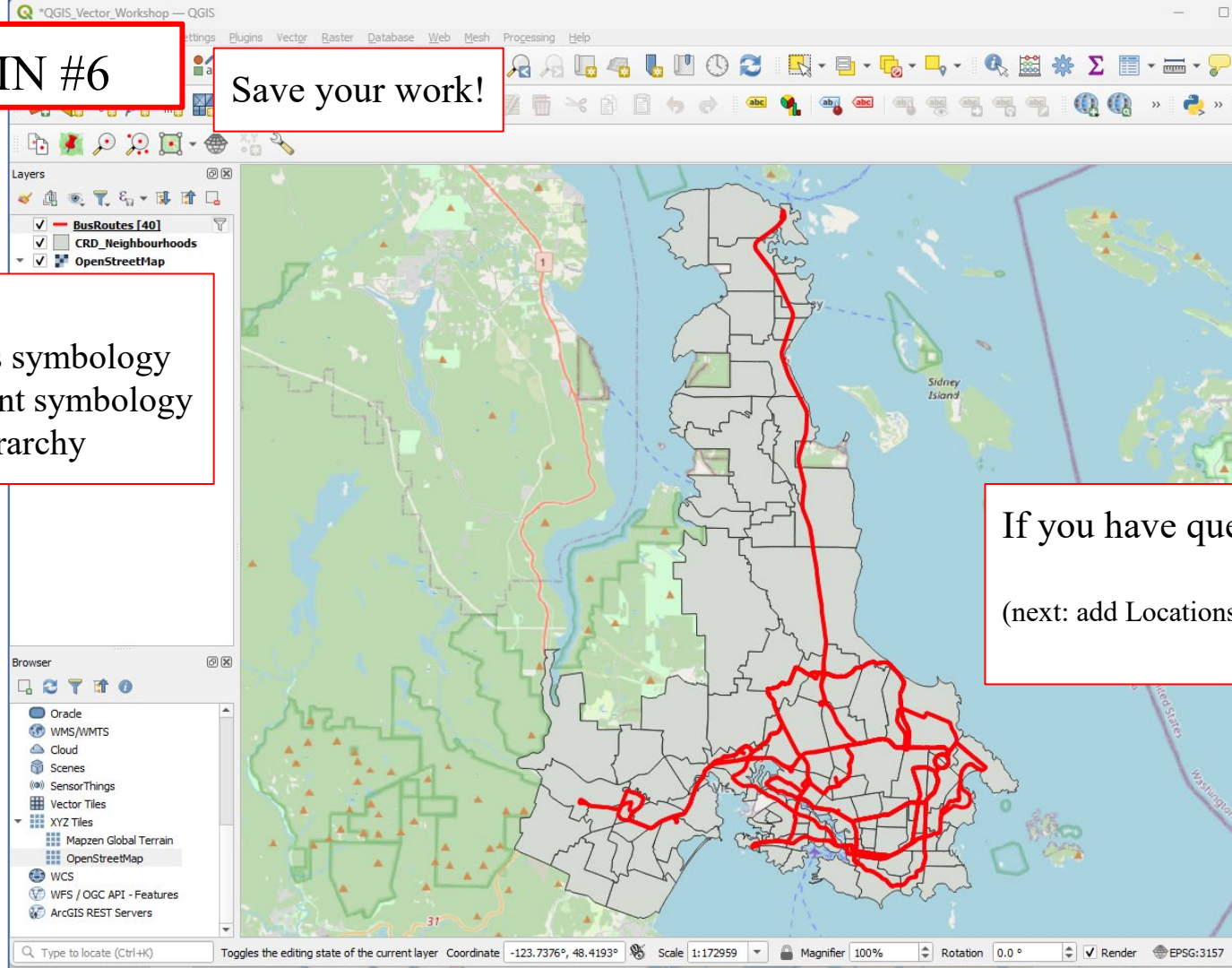
Save your work!

You have:

- edited Lines symbology
- used different symbology for visual hierarchy

If you have questions, **ask!**

(next: add Locations point data)

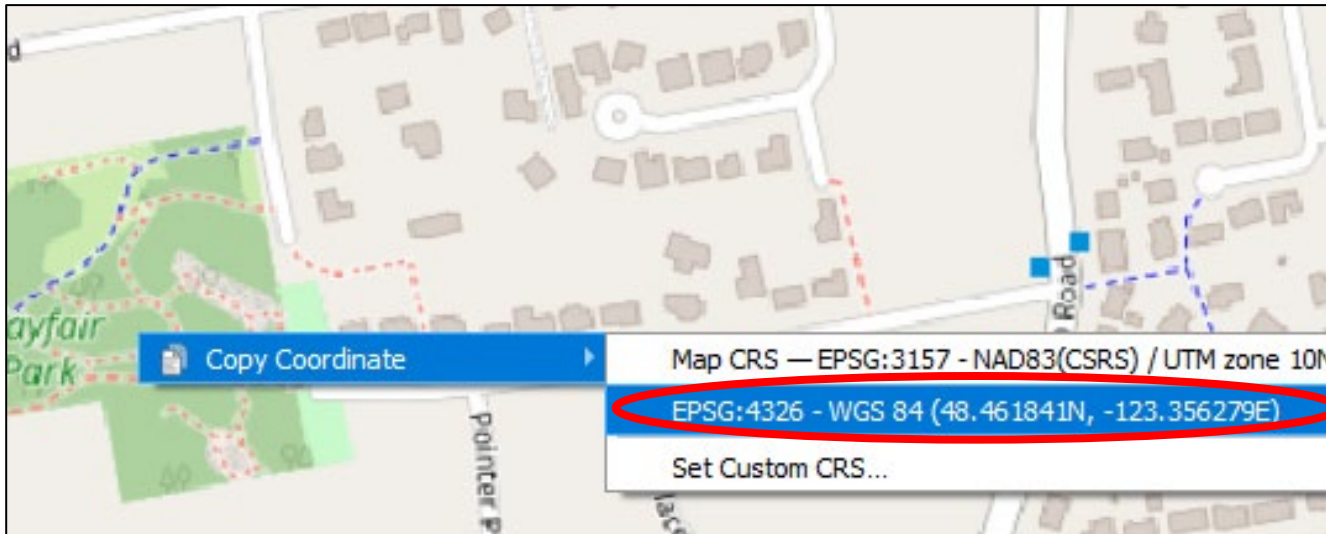
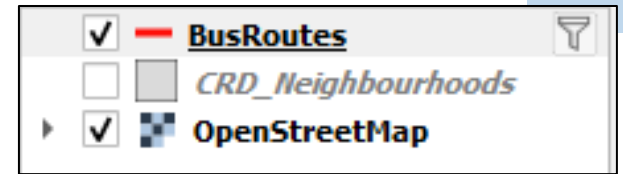


# Activity #7



# 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)



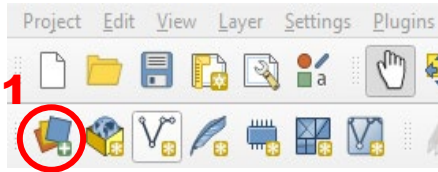
# Work with Locations.csv point data

- 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
  - Can also change name of location (e.g. “My House”) if desired
- Save the .csv (**must be .csv**)

<b>Name</b>	<b>Latitude</b>	<b>Longitude</b>
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**

2

3

4

Note: need EPSG 4326

Data Source Manager — Delimited Text

File name: C:\Users\gabriellegwade\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)
- Regular expression delimiter
- Custom delimiters

**Record and Fields Options**

**Geometry Definition**

- Point coordinates
- 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

**Layer Settings**

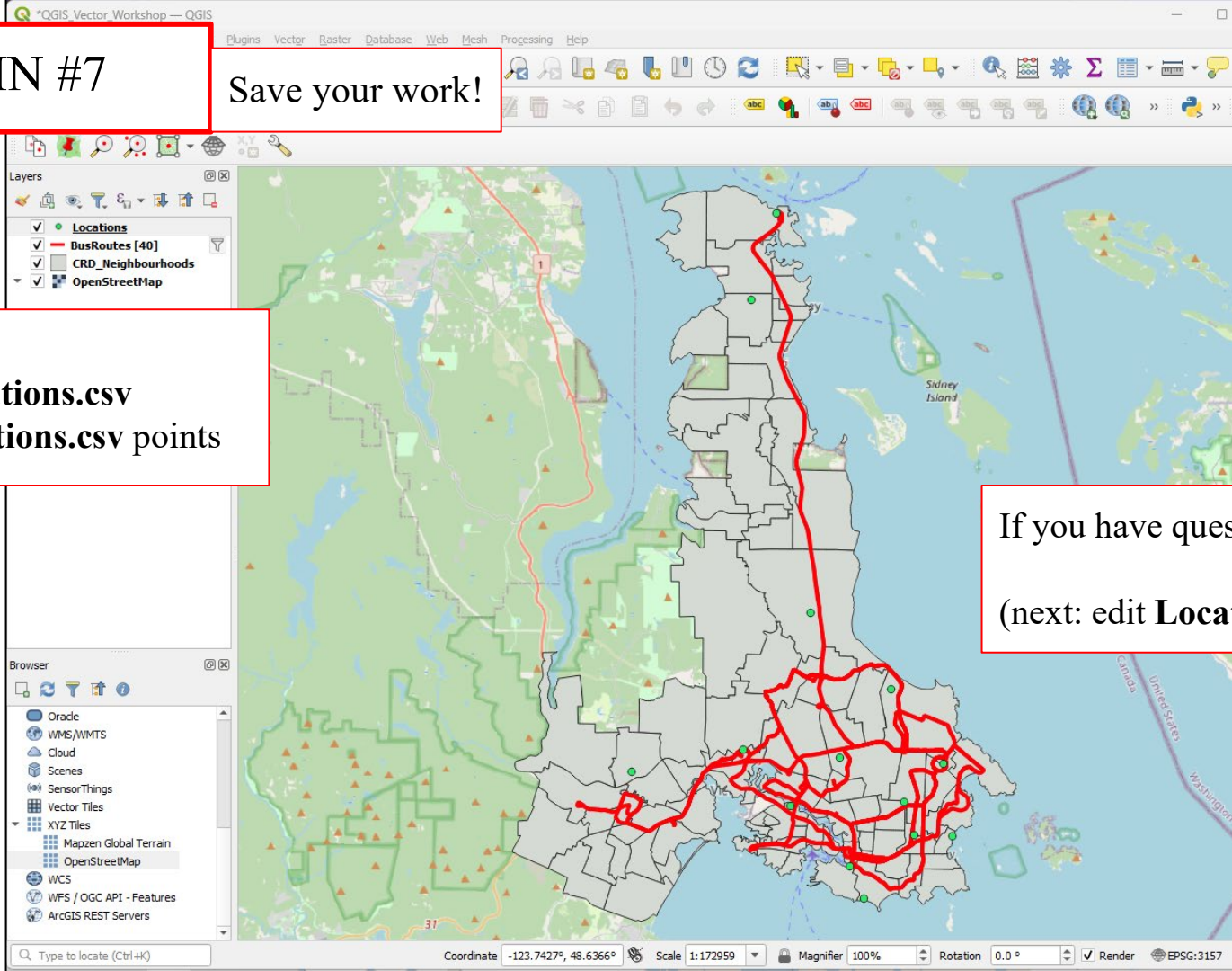
**Sample Data**

	Name	Latitude	Longitude
	abc Text (string)	1.2 Decimal (double)	1.2 Decimal (double)
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 30

# CHECK IN #7

Save your work!



You have:

- Edited **Locations.csv**
- added **Locations.csv** points

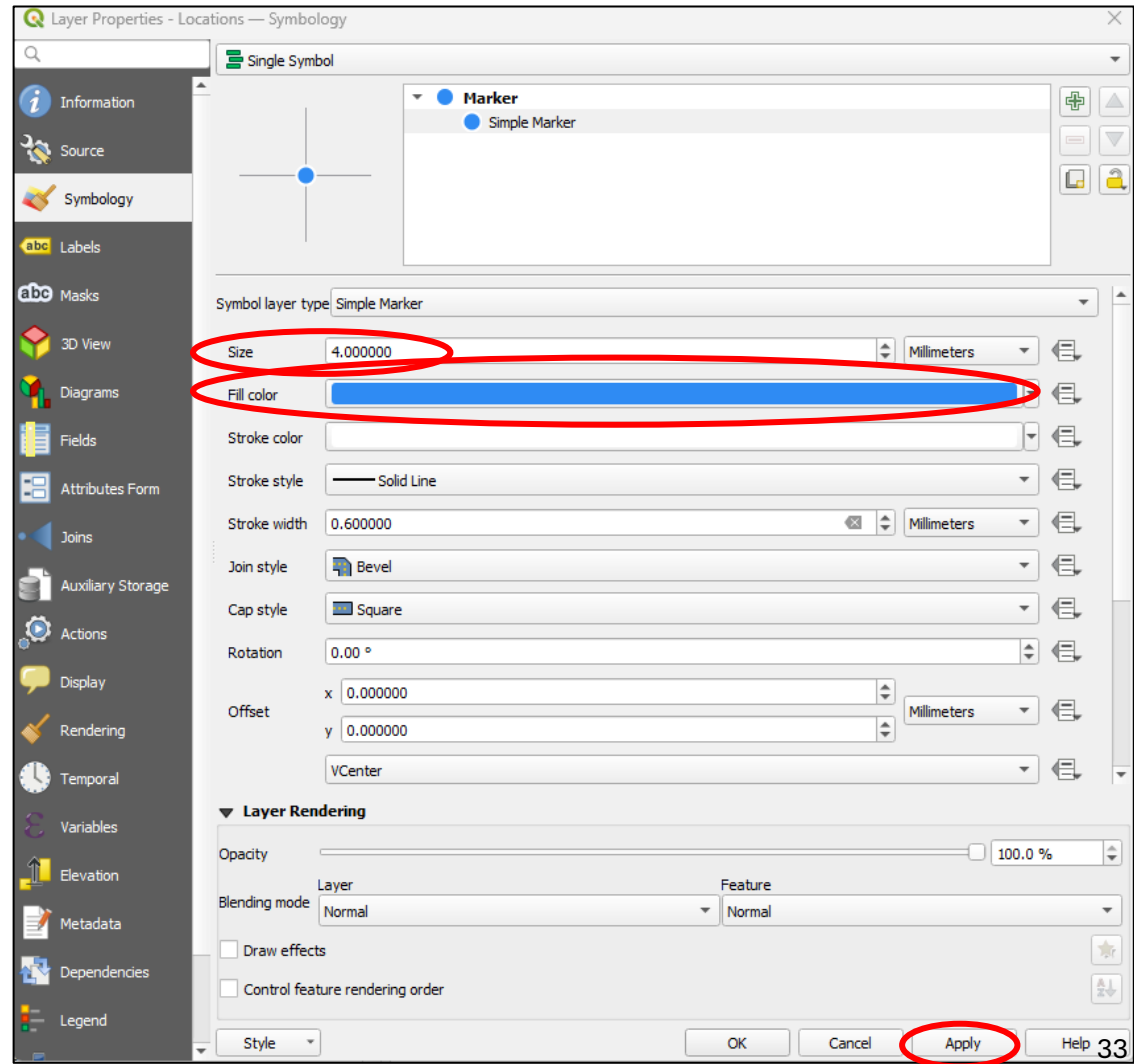
If you have questions, **ask!**  
(next: edit **Locations.csv**...)

# Activity #8



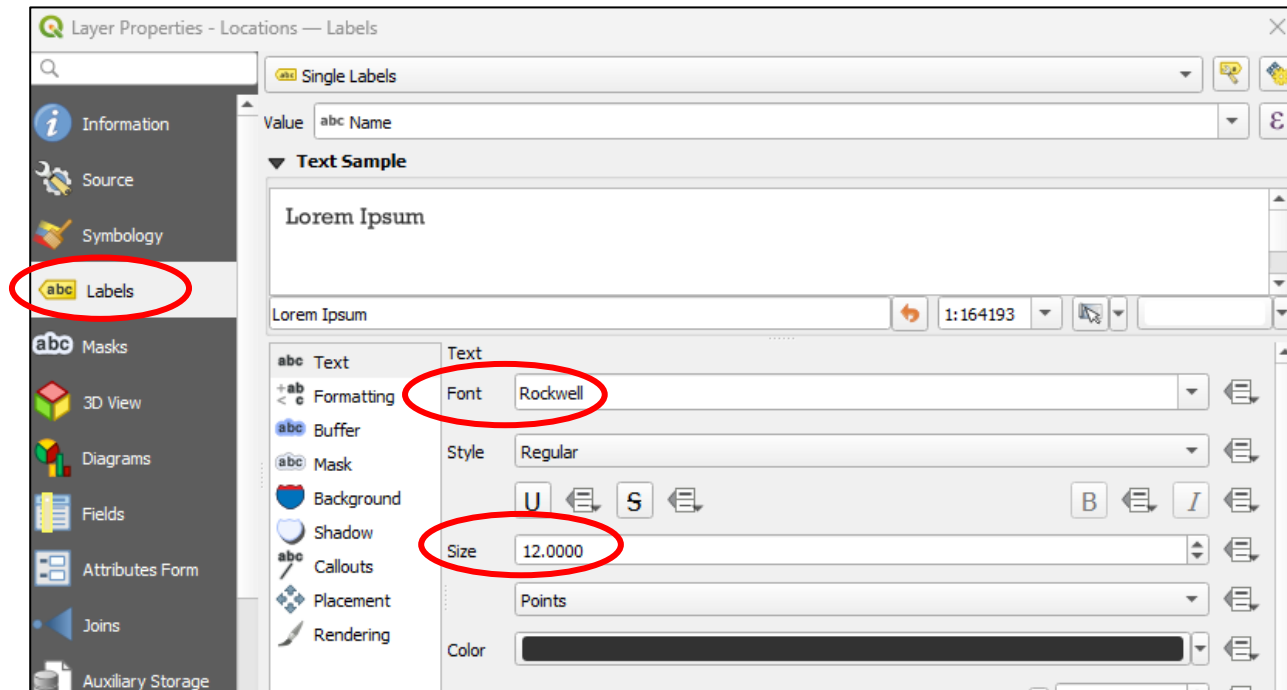
# edit Locations.csv symbology

- 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



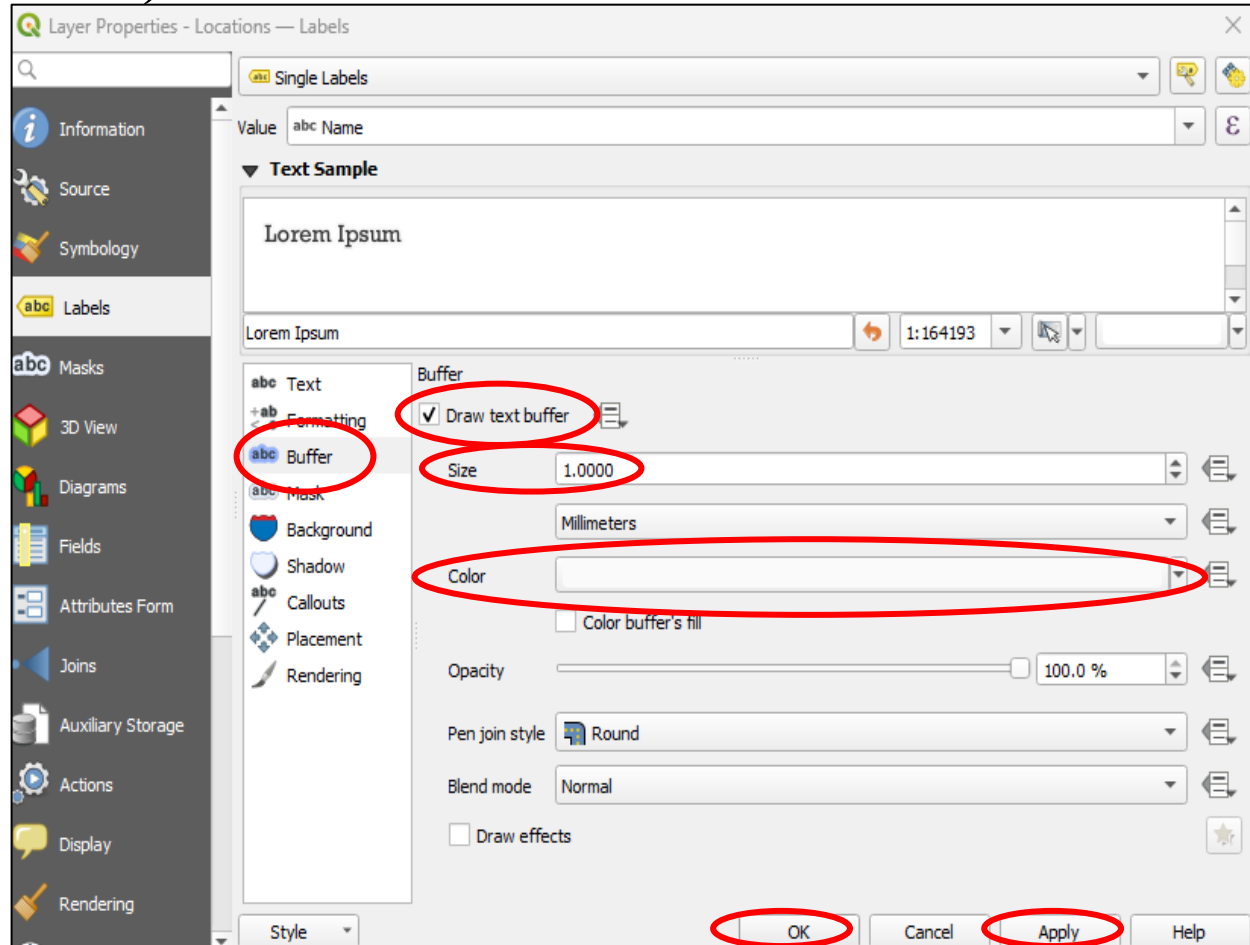
# Label Locations.csv

- 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**



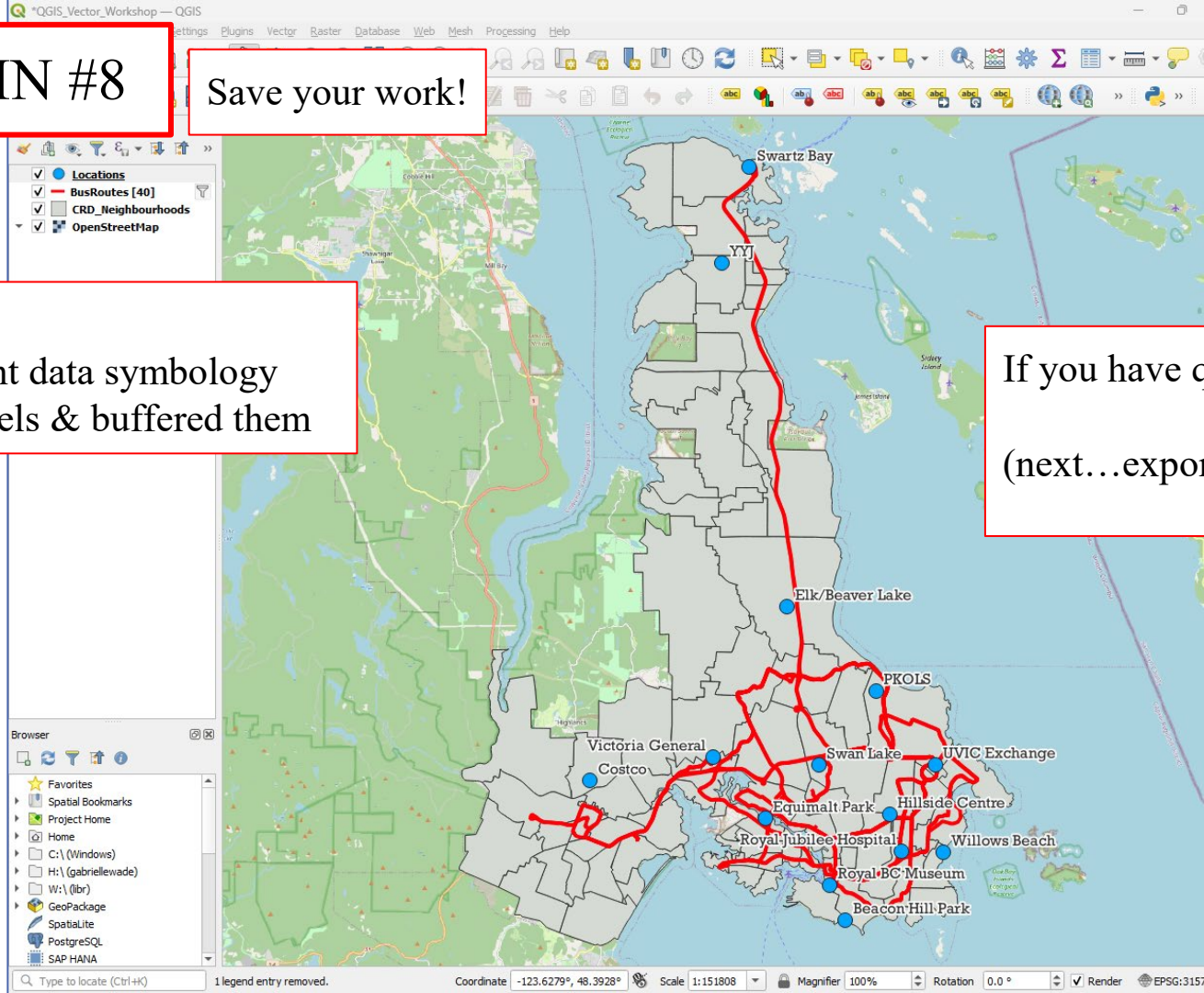
# CHECK IN #8

Save your work!

You have:

- edited point data symbology
- added Labels & buffered them

If you have questions, **ask!**  
(next...export 'quick' map)



# Activity #9



# Export “quick” map

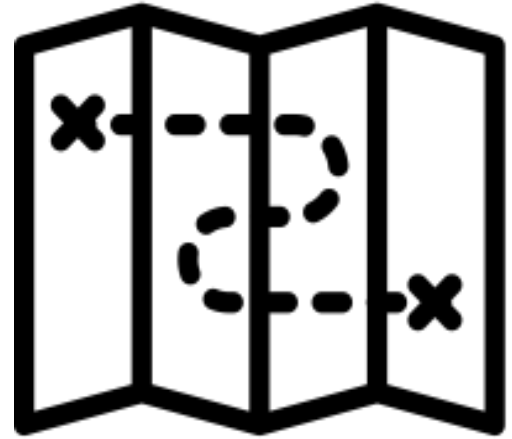
- .pdf
- several raster files

**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)

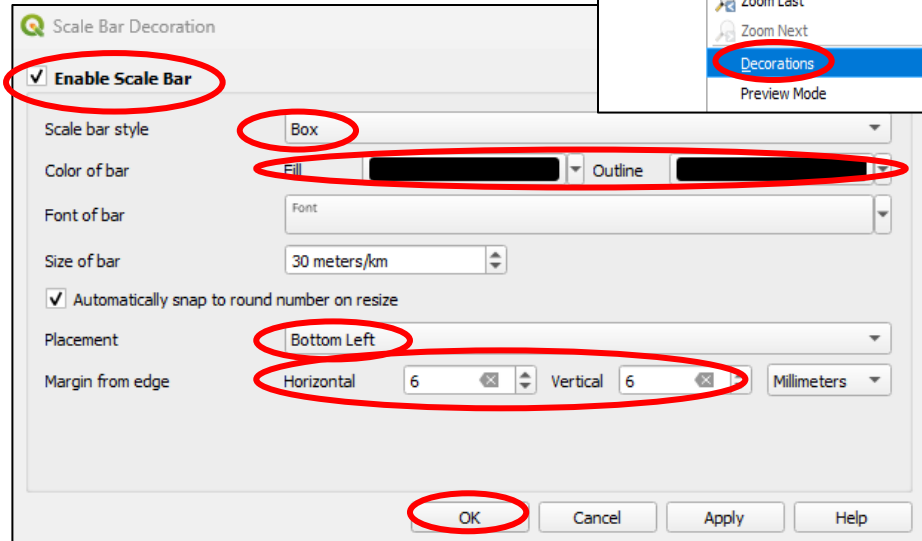
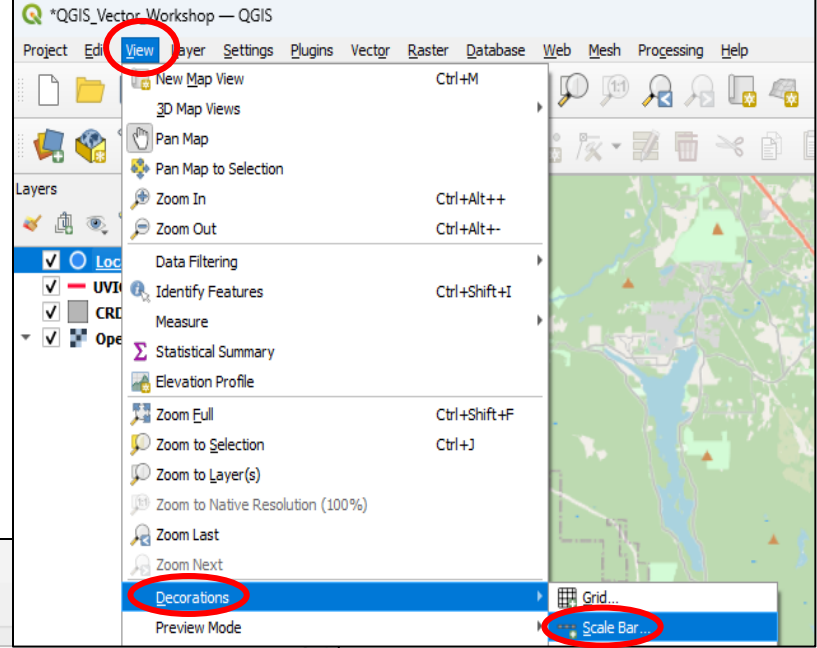


# Export “quick” map

Add scale bar →

## Scale bar options:

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

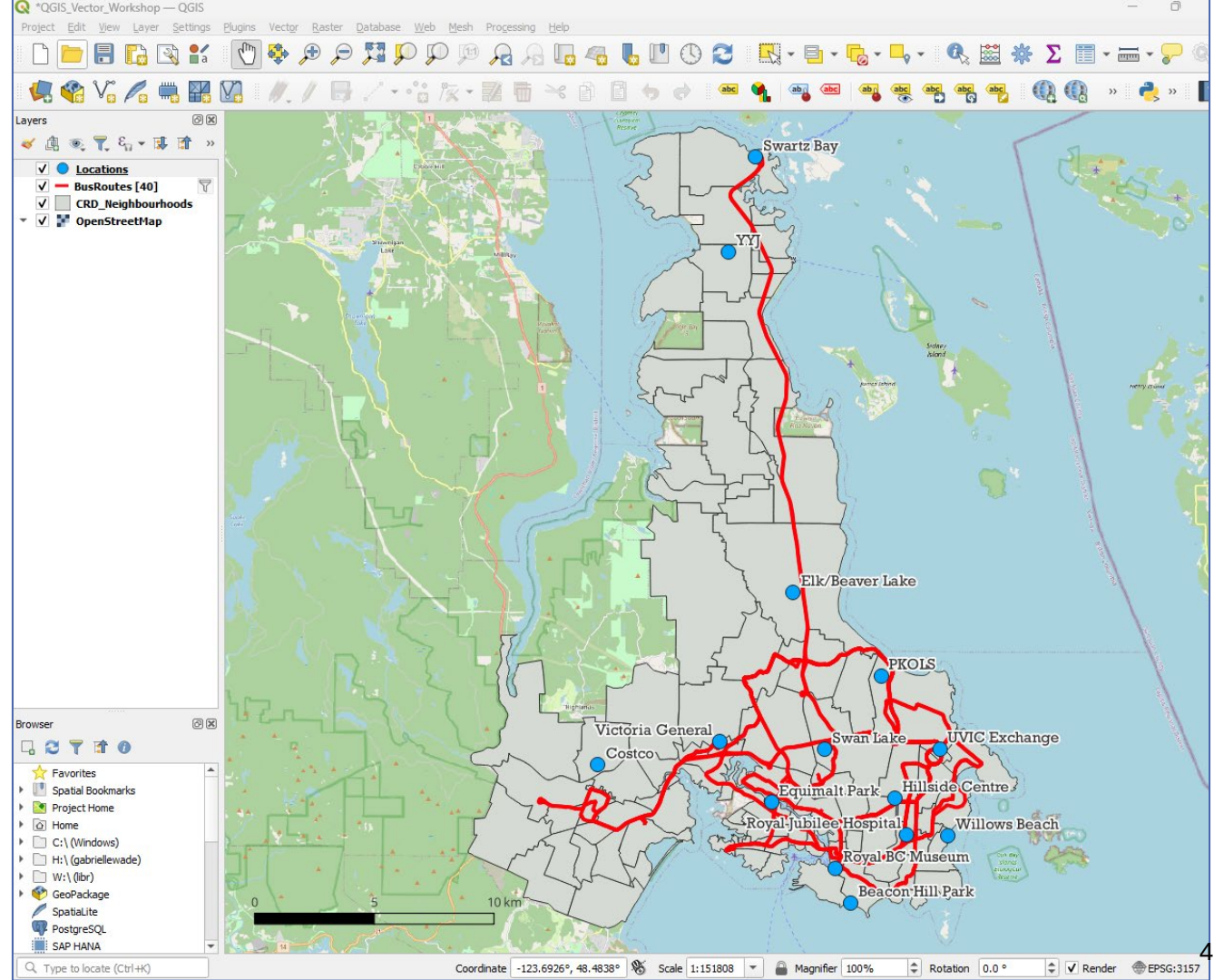


# Export “quick” map

Scale bar added

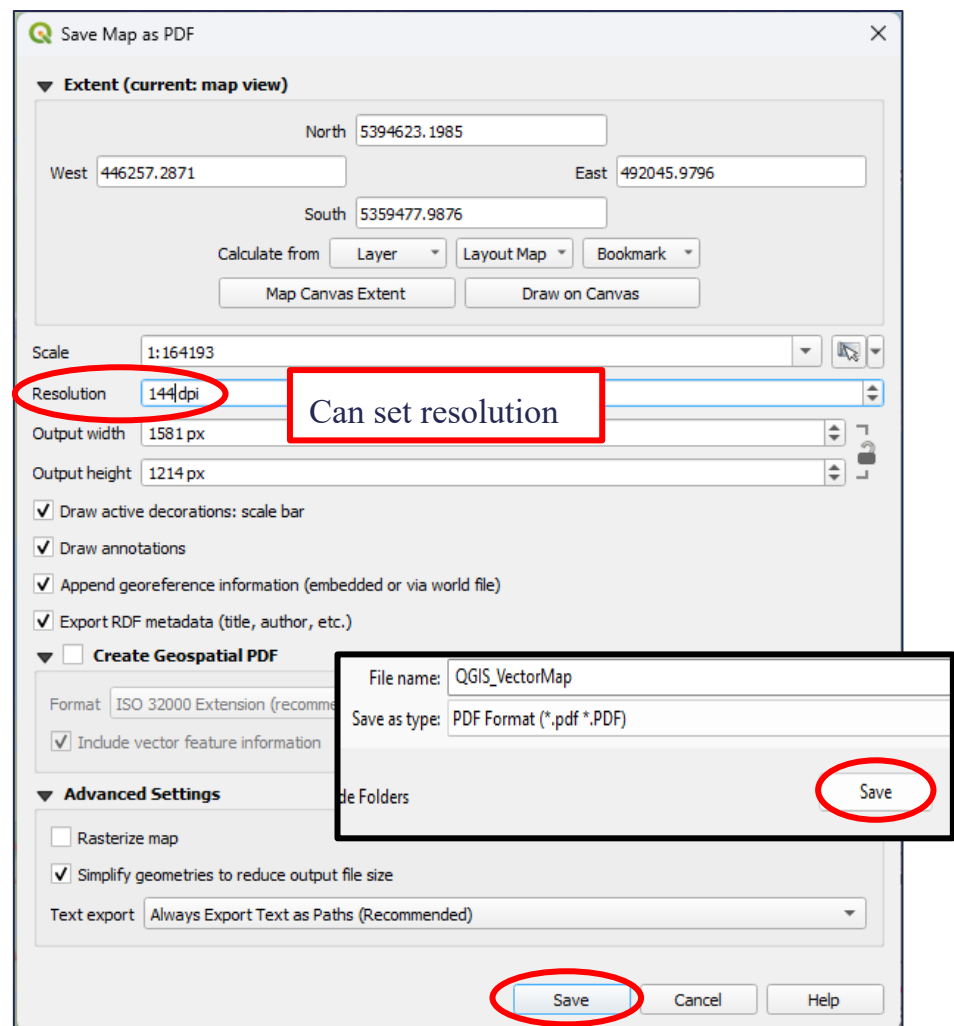
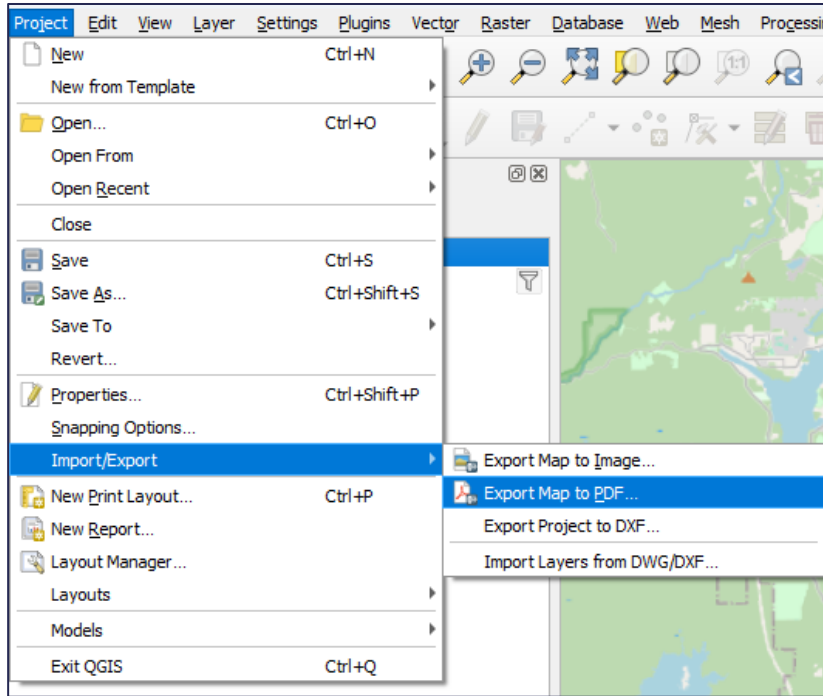
(other options to add: **not** today)

- Title
- North Arrow
- Grid
- etc



# Export “quick” map

## Export map



# CHECK IN #9

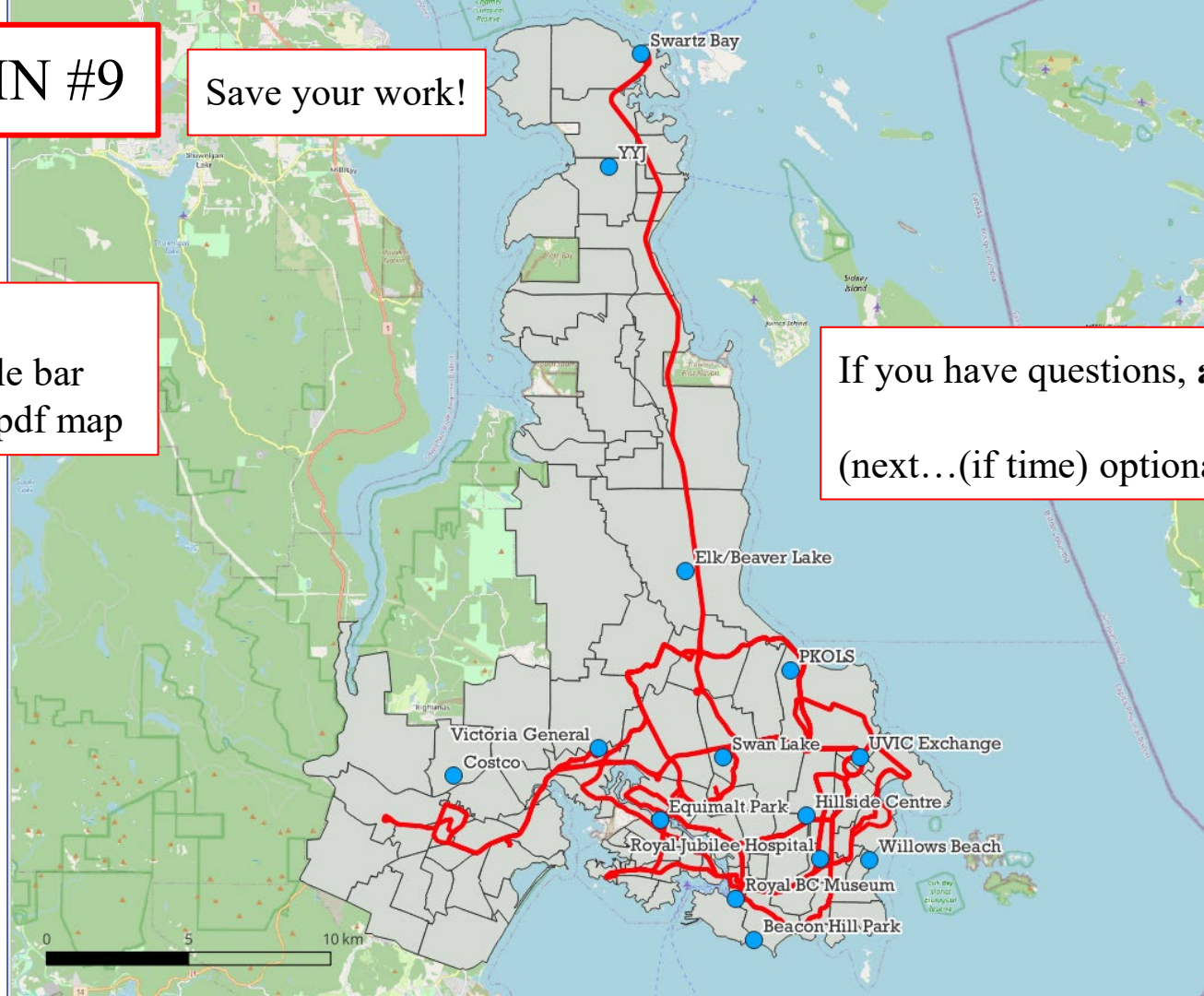
Save your work!

You have:

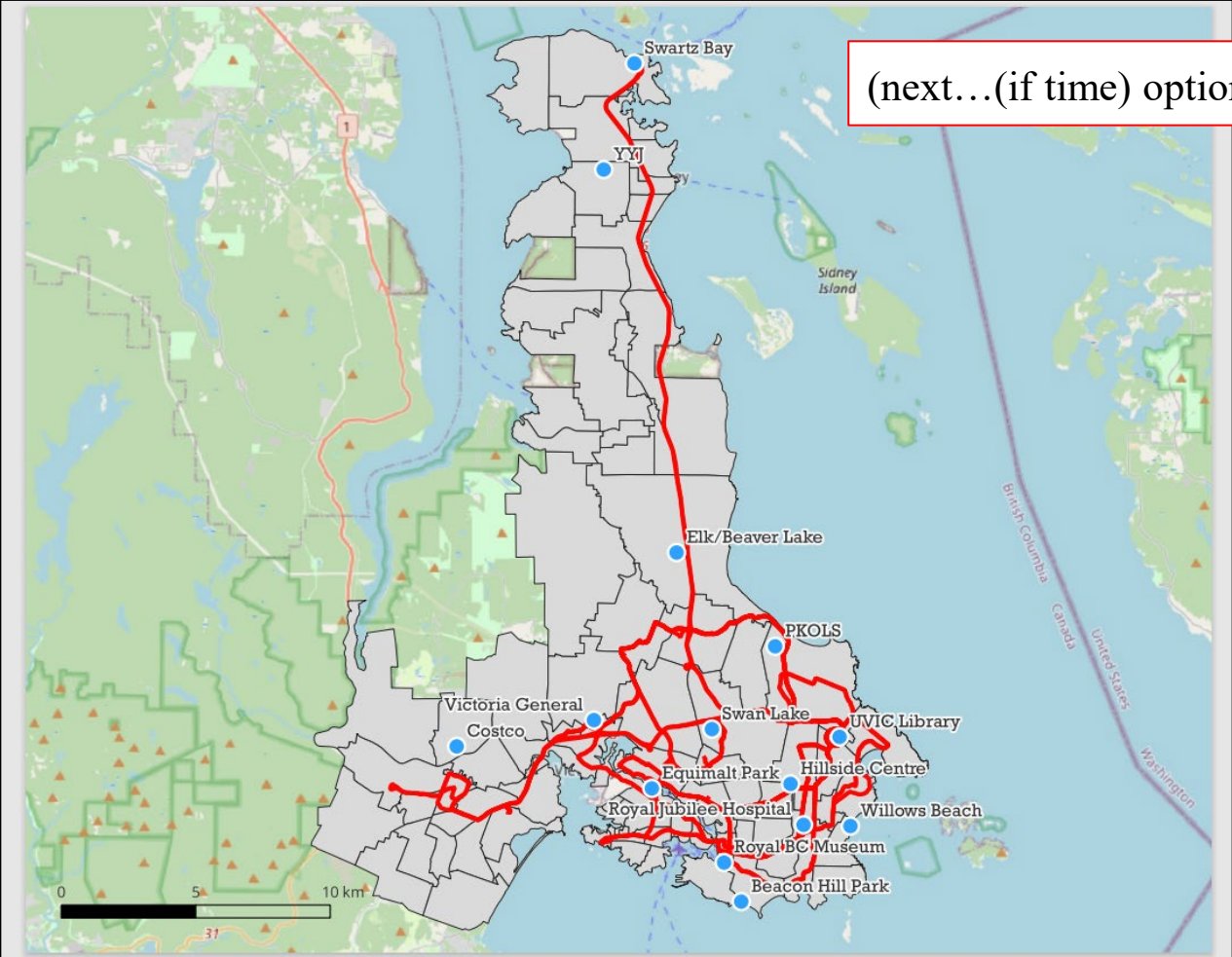
- Added scale bar
- Exported .pdf map

If you have questions, **ask!**

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



# Congratulations!



(next...(if time) optional activity...)

# Optional Activity

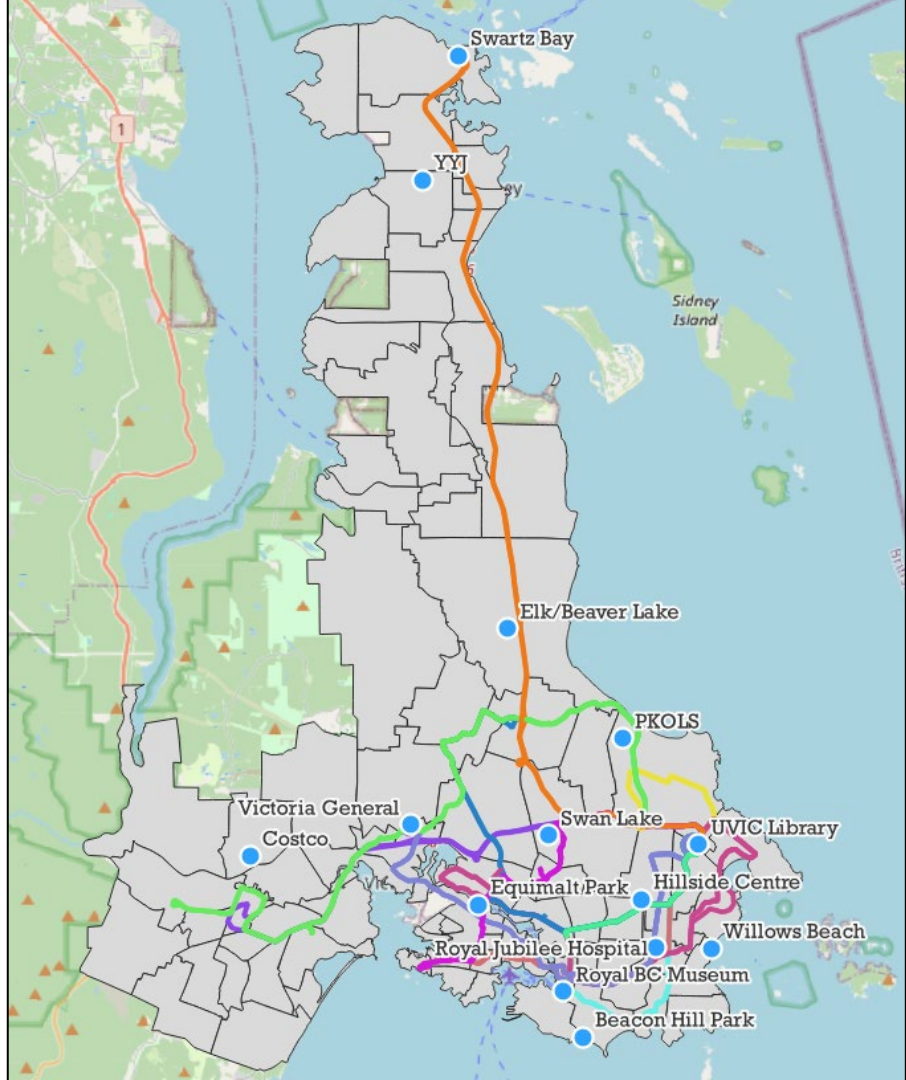


# Optional Exercise: 'Symbol' lines to differentiate between bus routes

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

The screenshot shows the QGIS interface with the 'Layer Properties - BusRoutes — Symbology' dialog open. The 'Layers' panel on the left shows 'BusRoutes' selected. The 'Symbology' tab is active, showing a 'Categorized' style. The 'Value' field contains 'abc Route'. The 'Classify' button is highlighted with a red circle and the number 4. The 'OK' button is highlighted with a red circle and the number 5. Other elements highlighted include the 'Symbology' tab icon (1), the 'Categorized' style dropdown (2), and the 'Value' field (3).

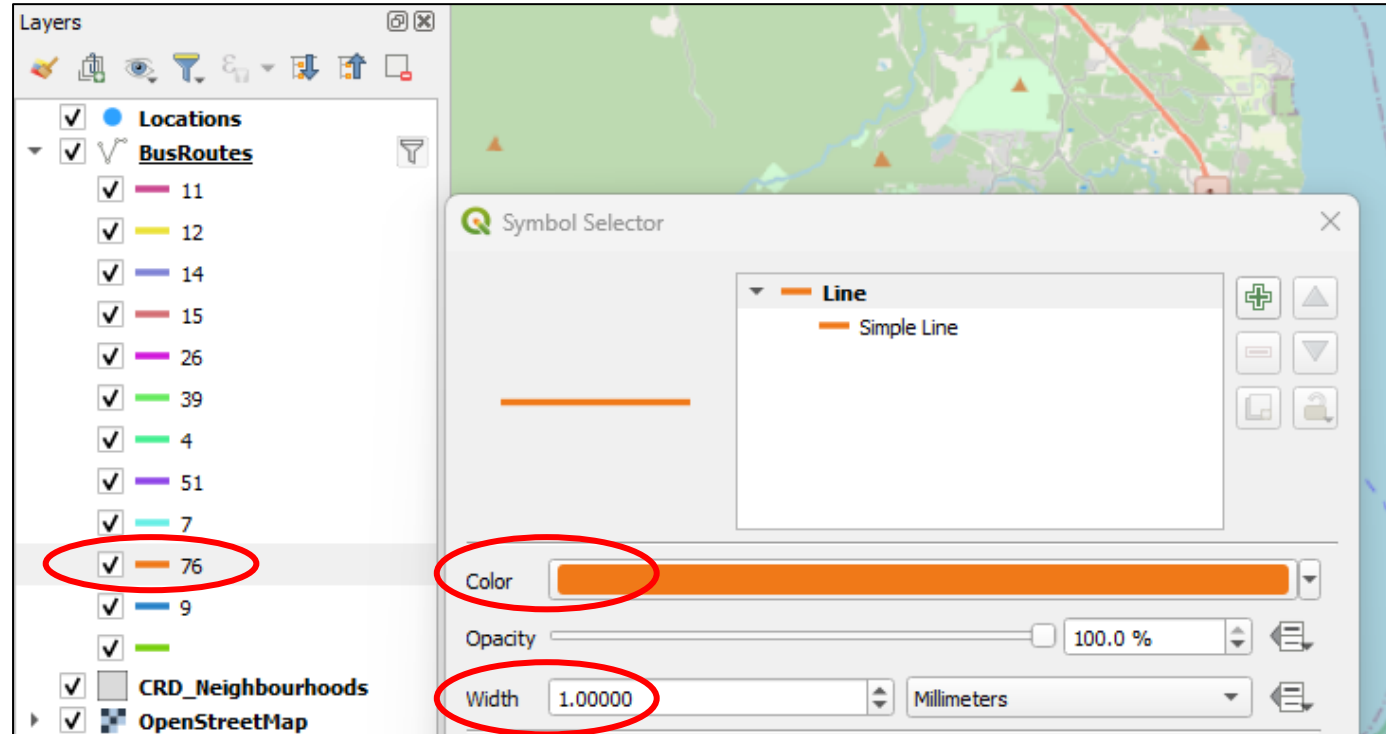
All bus routes are different  
(random) colours, but...



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

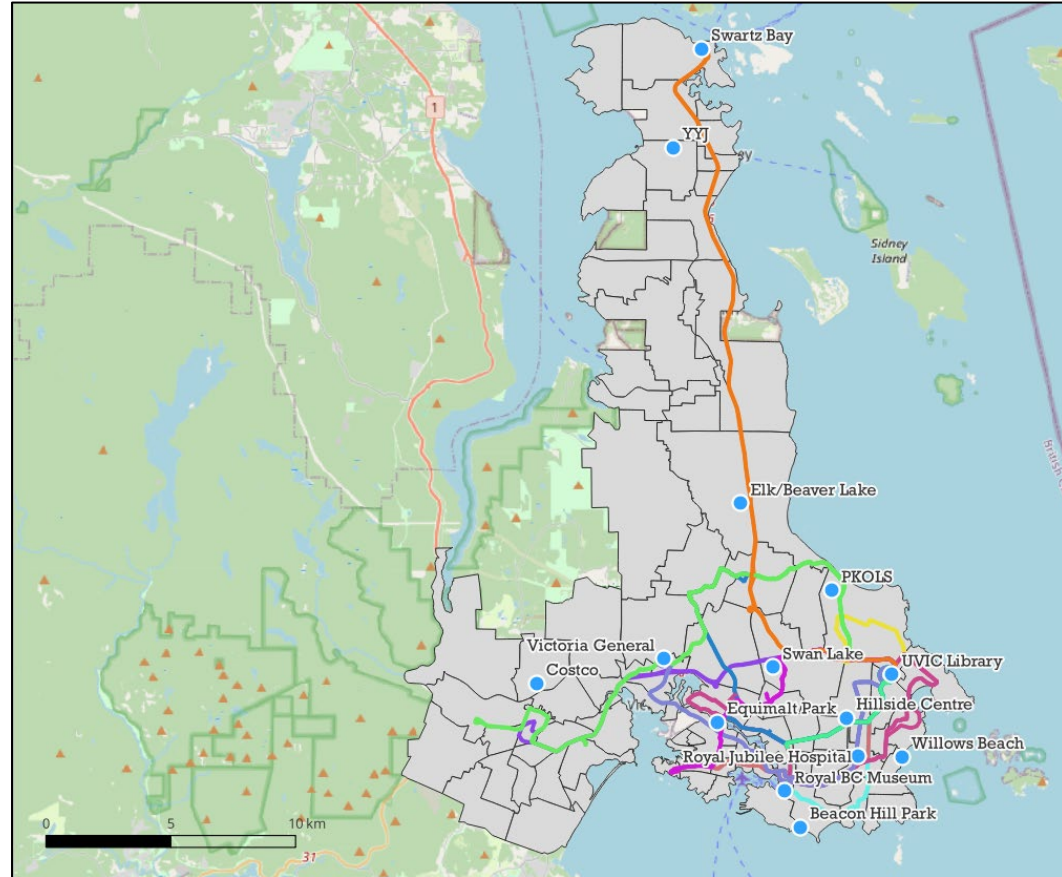
**Many styling options!**



# 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 – additional resources:

- QGIS Training Manual: [https://docs.qgis.org/3.40/en/docs/training\\_manual/index.html](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](https://docs.qgis.org/3.40/en/docs/user_manual/index.html)
- QGIS Tutorials & Tips: <https://www.qgistutorials.com/>

## Find data:

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

## Questions or problems:

- UVic Geospatial Librarian ([danielbm@uvic.ca](mailto:danielbm@uvic.ca)) or YCW Geospatial Intern ([gabriellewade@uvic.ca](mailto:gabriellewade@uvic.ca))

## 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>