# Location Services In Action

## Digital Platforms and Data Division
## Data Systems and Services Branch
## 2020

BRITISH COLUMBIA | Ministry of Citizens' Services

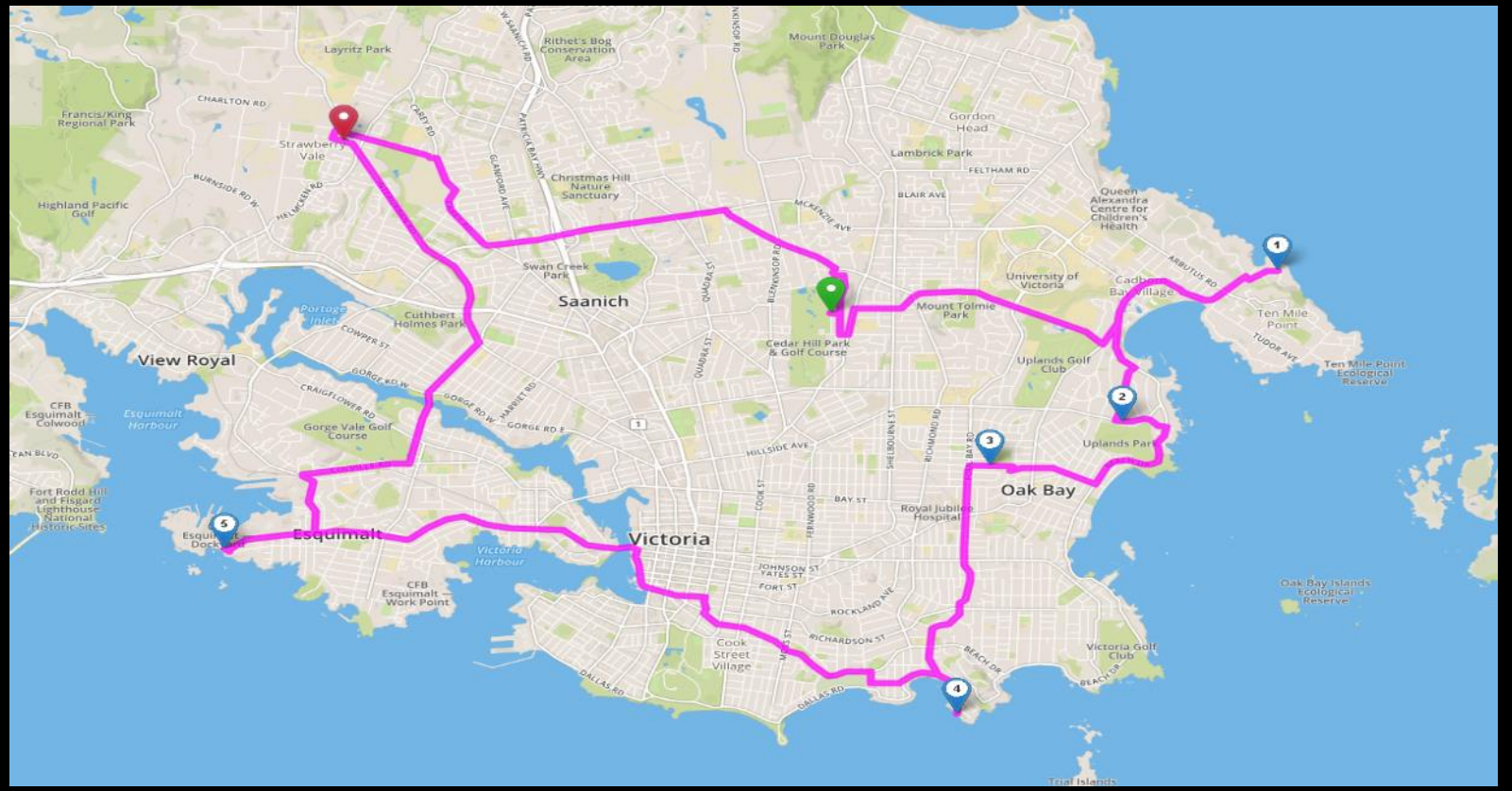
# Agenda

1. Introduction to Location Services

2. BC Route Planner
   - Online resources
   - Making a request
   - Understanding the response
   - Python scripts

3. BC Address Geocoder
   - Common Features and Proximity Searches
   - Python script

# BC Route Planner




**Fastest/shortest route | Turn by turn directions**
**Nearest by road | Optimal stop order**

# API Overview

- **directions**: Directions, path, distance, travel time between a series of points
- **distance**: Distance and travel time between two points
- **route: P**ath, distance and travel time between a series of points

# Scope for today

- **directions**:
  - **directions**
  - **optimalDirections**
  - **truck/directions**

- **distance**:
  - **distance/betweenPairs**

# BC Route Planner

## Online Resources

# Getting started

**Location Services Homepage**

https://data.gov.bc.ca/

- -> Geographic Services
    - **-> Location Services**

**Location Services in Action**

- https://ols-demo.apps.gov.bc.ca/index.html

ols-demo.apps.gov.bc.ca/index.html

Introduction

Address | Route | Businesses by Tag | Businesses by Name

Address

Address

Click on Map For Coordinates

Fastest
Shortest

Round Trip
Optimize Order
Nearest Stop

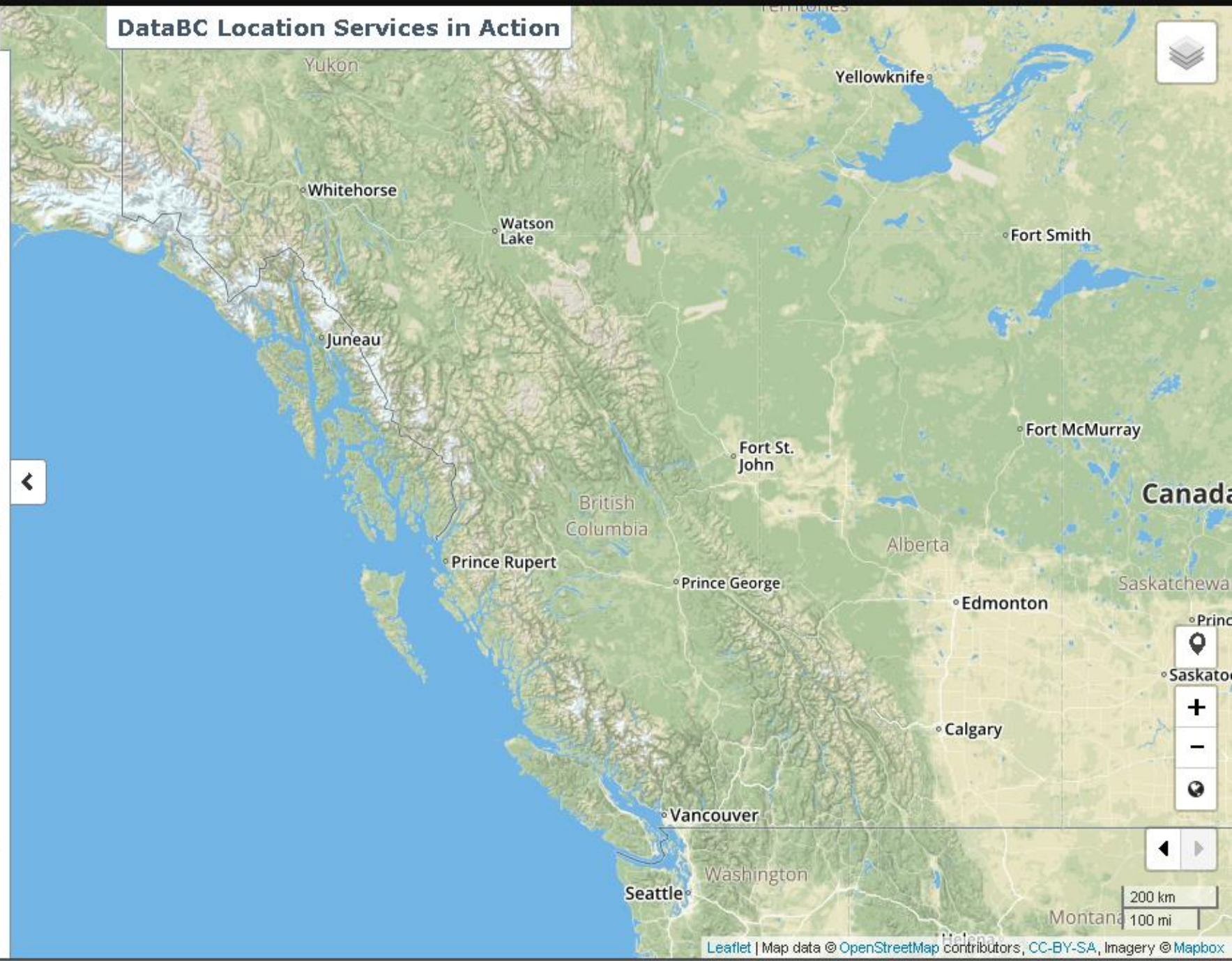
Ferry Schedules
Traffic
Events
Global Distortion Field
Local Distortion Field
Time Dependent
Turn Restrictions
Crossing Costs
Turn Costs

Start Date/Time: 2020-04-09 1:30pm

Correct Side

Truck Mode
Follow Truck Route

| | |
|---|---|
| Truck Route Multiplier: | 9 |
| Height OAH (m): | |
| Width OAW (m): | |
| Length OAL (m): | |
| Weight GVW (kg): | |



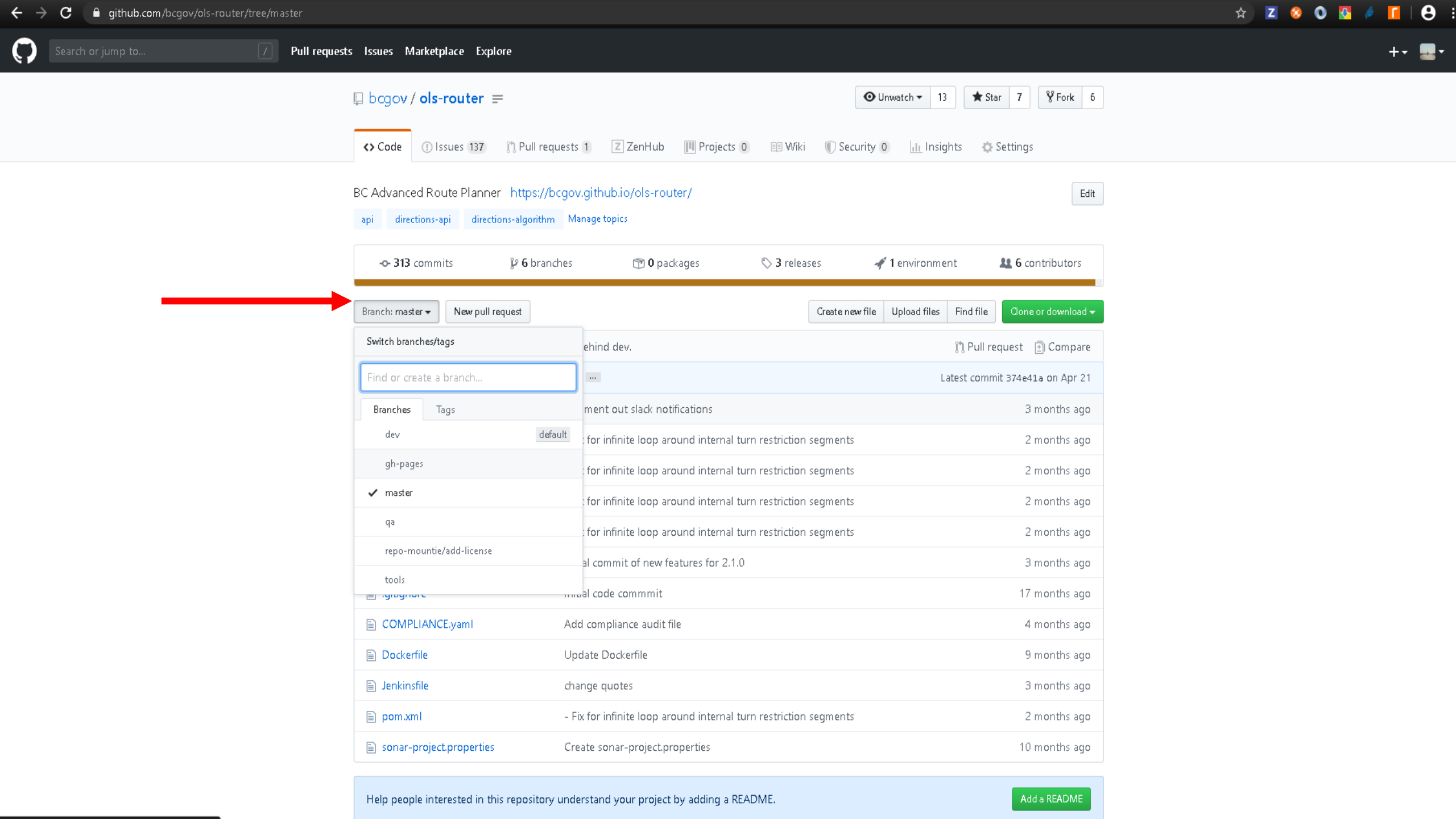
# Open development

**GitHub repo:**

- https://github.com/bcgov/ols-router
  - Explore the ‘gh-pages’ branch for more documentation

**Monitor progress:**

- https://github.com/bcgov/ols-router/issues


github.com/bcgov/ols-router/tree/master
Search or jump to...
Pull requests
Issues
Marketplace
Explore
bcgov / ols-router
Unwatch 13
Star 7
Fork 6
Code
Issues 137
Pull requests 1
ZenHub
Projects 0
Wiki
Security 0
Insights
Settings
BC Advanced Route Planner https://bcgov.github.io/ols-router/
Edit
api
directions-api
directions-algorithm
Manage topics
313 commits
6 branches
0 packages
3 releases
1 environment
6 contributors
Branch: master
New pull request
Create new file
Upload files
Find file
Clone or download
Switch branches/tags
Find or create a branch...
Branches
Tags
dev
default
gh-pages
master
qa
repo-mountie/add-license
tools
ehind dev.
Pull request
Compare
Latest commit 374e41a on Apr 21
ment out slack notifications
3 months ago
for infinite loop around internal turn restriction segments
2 months ago
for infinite loop around internal turn restriction segments
2 months ago
for infinite loop around internal turn restriction segments
2 months ago
for infinite loop around internal turn restriction segments
2 months ago
al commit of new features for 2.1.0
3 months ago
al code commmit
17 months ago
COMPLIANCE.yaml
Add compliance audit file
4 months ago
Dockerfile
Update Dockerfile
9 months ago
Jenkinsfile
change quotes
3 months ago
pom.xml
- Fix for infinite loop around internal turn restriction segments
2 months ago
sonar-project.properties
Create sonar-project.properties
10 months ago
Help people interested in this repository understand your project by adding a README.
Add a README

## New Issues

3 Issues - 0 Story Points

ols-router #232
Add missing license

ols-router #255
in route and directions resources, HTML format missing enable, partition, and partitions fields

bug low priority

ols-router #256
In truck resources, followTruckRoute should default to true

medium priority usability

## Icebox

74 Issues - 84 Story Points

ols-router #184
NFR - CICD with github actions

ROUTE PLANNER deployment enhancement estimate needed medium priority

ols-router #251
interesting cases

ROUTE PLANNER configuration data

ols-router #226
Don't generate U-turn restrictions that are already covered by basic turn restrictions

4 Routable BC Maker

ols-router #244
Add turn counts to test frameworks

ROUTE PLANNER enhancement low priority

ols-router #241
Add support for fold testing in router QA tools

## Backlog

0 Issues - 0 Story Points

Backlog

Add description +

## In Progress

13 Issues - 1 Story Point

ols-router #259
Create TransLink data flow diagram

ROUTE PLANNER task

ols-router #260
Can't route into Delta Port Entrance --

ROUTE PLANNER bug data low priority

ols-router #258
Update South Shore access

ols-router #245
Gaps in truck routes on Mt Seymour Parkway and in Maple Ridge

ROUTE PLANNER configuration

ols-router #243
Gap in truck route at River Rd and No. 2 Rd, Richmond

ROUTE PLANNER data

ols-router #254
Some ramps not classified as

## Review/QA

0 Issues - 0 Story Points

Review/QA

Add description +

## Done

38 Issues - 95 Story Points

ols-router #261
Verify March 2020 data is being used by router in production

QA ROUTE PLANNER prepared data

ols-router #257
Migrate Route Planner API 2.1.0 to production

Route Planner 2.1

ROUTE PLANNER admin app high priority prepared data task

ols-router #242
Router keeps truck away from residential area near destination

ROUTE PLANNER configuration

ols-router #224
Odd partition signatures

ROUTE PLANNER configuration data functional route planner

ols-router #212
Support one-way Weight Restrictions

Route Planner 2.1

# Diving in

## API Consoles

https://data.gov.bc.ca/

- -> Geographic Services
  - **-> Location Services**
    - BC Route Planner
      - Launch REST API Console (API Key Required)
    - BC Address Geocoder
      - Launch REST API Console

Enter API Key | Get API Key | Manage API Keys | API Key Help

Server

https://router.api.gov.bc.ca/

## directions

| | | |
|---|---|---|
| GET | /directions.{outputFormat} | Get the directions, path, distance and travel time between a series of geographic points |
| POST | /directions.{outputFormat} | Get the directions, path, distance and travel time between a series of geographic points |
| GET | /optimalDirections.{outputFormat} | Get the directions, optimal path, distance and travel time between a start point and a series of end points which are reordered to minimize total distance or time. |
| POST | /optimalDirections.{outputFormat} | Get the directions, optimal path, distance and travel time between a start point and one or more end points which are reordered to minimize total distance or time. |
| GET | /truck/directions.{outputFormat} | Get the directions, path, distance and travel time between a series of geographic points for a commercial vehicle |
| POST | /truck/directions.{outputFormat} | Get the directions, path, distance and travel time between a series of geographic points |
| GET | /truck/optimalDirections.{outputFormat} | Get the directions, optimal path, distance and travel time between a start point and a series of end points which are reordered to minimize total distance or time for a commercial vehicle |
| POST | /truck/optimalDirections.{outputFormat} | Get the directions, optimal path, distance and travel time between a start point and one or more end points which are reordered to minimize total distance or time. |

## distance

| | | |
|---|---|---|
| GET | /distance.{outputFormat} | Get distance and travel time between two geographic points |
| POST | /distance.{outputFormat} | Get distance and travel time between two geographic points |
| GET | /distance/betweenPairs.{outputFormat} | Get distance and travel time between each pair of geographic points |
| POST | /distance/betweenPairs.{outputFormat} | Get distance and travel time between each pair of geographic points |

Enter API Key | Get API Key | Manage API Keys | API Key Help

Server

https://router.api.gov.bc.ca/

## directions

GET `/directions.{outputFormat}` Get the directions, path, distance and travel time between a series of geographic points

Represents the turn-by-turn directions, geometry, distance, and time of the shortest path or fastest path between given start and end points

Parameters | Cancel

| Name | Description |
|---|---|
| **outputFormat** * required<br>string<br>*(path)* | Format of representation<br>Json |
| **points** * required<br>string<br>*(query)* | A list of any number of route points in start to end order. See points<br>-123.70794,48.77869,-123.53785,48.38200 |
| outputSRS<br>integer<br>*(query)* | The EPSG code of the spatial reference system (SRS) to use for output geometries. See outputSRS<br>4326 |
| criteria<br>string<br>*(query)* | Routing criteria to optimize (e.g., shortest, fastest). Default is shortest.<br>fastest |
| distanceUnit<br>string<br>*(query)* | distance unit of measure (e.g., km, mi). Default is km.<br>km |
| roundTrip<br>boolean<br>*(query)* | If true, route ends at start point. Default is false.<br>false |

Execute | Clear

## Responses

### Curl

```
curl -X GET "https://router.api.gov.bc.ca/directions.json?points=-123.70794%2C48.77869%2C-123.53785%2C48.38200&outputSRS=4326&criteria=fastest&distanceUnit=km&roundTrip=false&correctSide=true" -H "accept: */*" -H "apikey:
```

### Request URL

```
https://router.api.gov.bc.ca/directions.json?points=-123.70794%2C48.77869%2C-123.53785%2C48.38200&outputSRS=4326&criteria=fastest&distanceUnit=km&roundTrip=false&correctSide=true
```

Server response

Open Request URL

| Code | Details |
|---|---|
| 200 | Response body |


```
{
  "routeDescription": null,
  "searchTimestamp": "2020-04-08 16:33:58",
  "executionTime": 80,
  "version": "2.1.0",
  "disclaimer": "https://www2.gov.bc.ca/gov/content?id=79FB3E018712422FBC8E674A67A70535",
  "privacyStatement": "https://www2.gov.bc.ca/gov/content?id=9E890E16955E4FF4BF3B0E07B4722932",
  "copyrightNotice": "Copyright 2020 Province of British Columbia - Open Government License",
  "copyrightLicense": "https://www2.gov.bc.ca/gov/content?id=A519A56BC2BF44E4A008B33FCF527F61",
  "srsCode": 4326,
  "criteria": "fastest",
  "enable": "gdf,ldf,tc,tr,xc",
  "distanceUnit": "km",
  "points": [
    [
      -123.70794,
      48.77869
    ],
    [
      -123.53785,
      48.382
    ]
  ],
  "routeFound": true,
  "distance": 55.544,
  "time": 3143.1414137662987,
  "timeText": "52 minutes 23 seconds",
  "route": [
    [
      -123.70793,
      48.7785
    ],
    [
      -123.70831,
```

# Diving in

**Developer Guides**

https://data.gov.bc.ca/

- -> Geographic Services
  - **-> Location Services**
    - BC Route Planner
      - https://github.com/bcgov/ols-router/blob/gh-pages/router-developer-guide.md
    - BC Address Geocoder
      - https://github.com/bcgov/ols-geocoder/blob/gh-pages/geocoder-developer-guide.md

# Tools

- **Chrome apps**
  - ARC (Advanced REST client)
- **Chrome extensions**
  - JSONView
  - ZenHub
- **Chrome developer console**
  - CTRL + Shift + J
- **Fiddler**

# BC Route Planner

## Making a Request

# outputFormat

- The file format for the response (*required*)

| Formats |
| --- |
| json |
| kml |
| html |

https://router.api.gov.bc.ca/directions**.json**

# points

- The points parameter (*required*) is a list of route points in order of start to finish.
- Listed as X1,Y1,...Xn,Yn in the projection specified by the 'outputSRS' parameter.

https://router.api.gov.bc.ca/directions.json?points=-123.1124558,49.2751466,-123.1168642,49.288516

# outputSRS

- The EPSG code of the spatial reference system

| Code | |
|---|---|
| 4326 | WGS84 |
| 3005 | BC Albers |
| 26907, 26908, 26909, 269010, 26911 | NAD83/UTM Zones 7N through 11N |

https://router.api.gov.bc.ca/directions.json?points=-123.1124558,49.2751466,-123.1168642,49.288516**&outputSRS=4326**

ℹ️efault is -> 4326

# distanceUnit

- The distance unit of measure

| units | |
|---|---|
| km | Kilometres (default) |
| mi | Miles |

https://router.api.gov.bc.ca/directions.json?points=-123.1124558,49.2751466,-123.1168642,49.288516&outputSRS=4326**&distanceUnit=km**

ℹ️efault is -> ‘km’

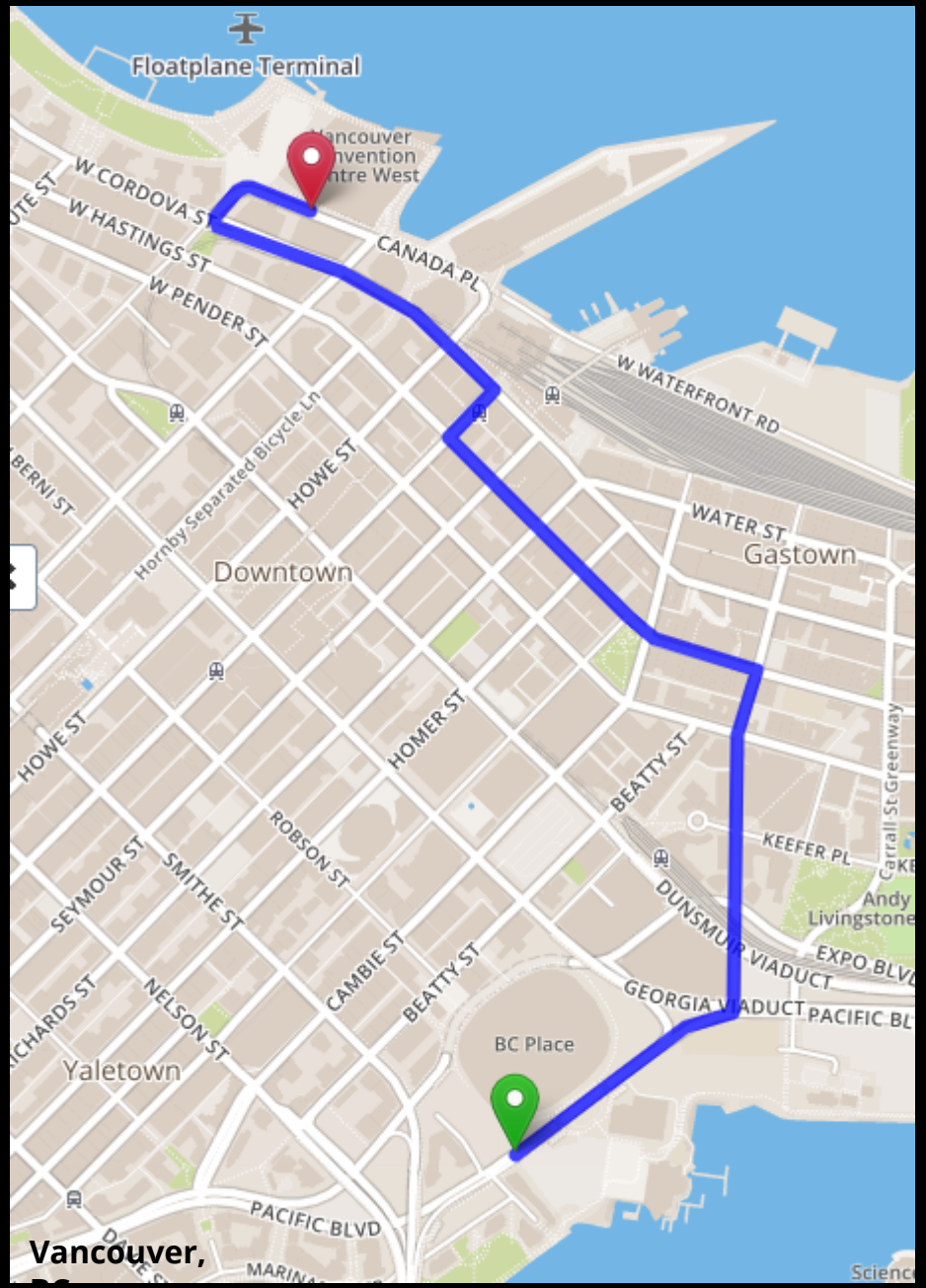
# camelCase

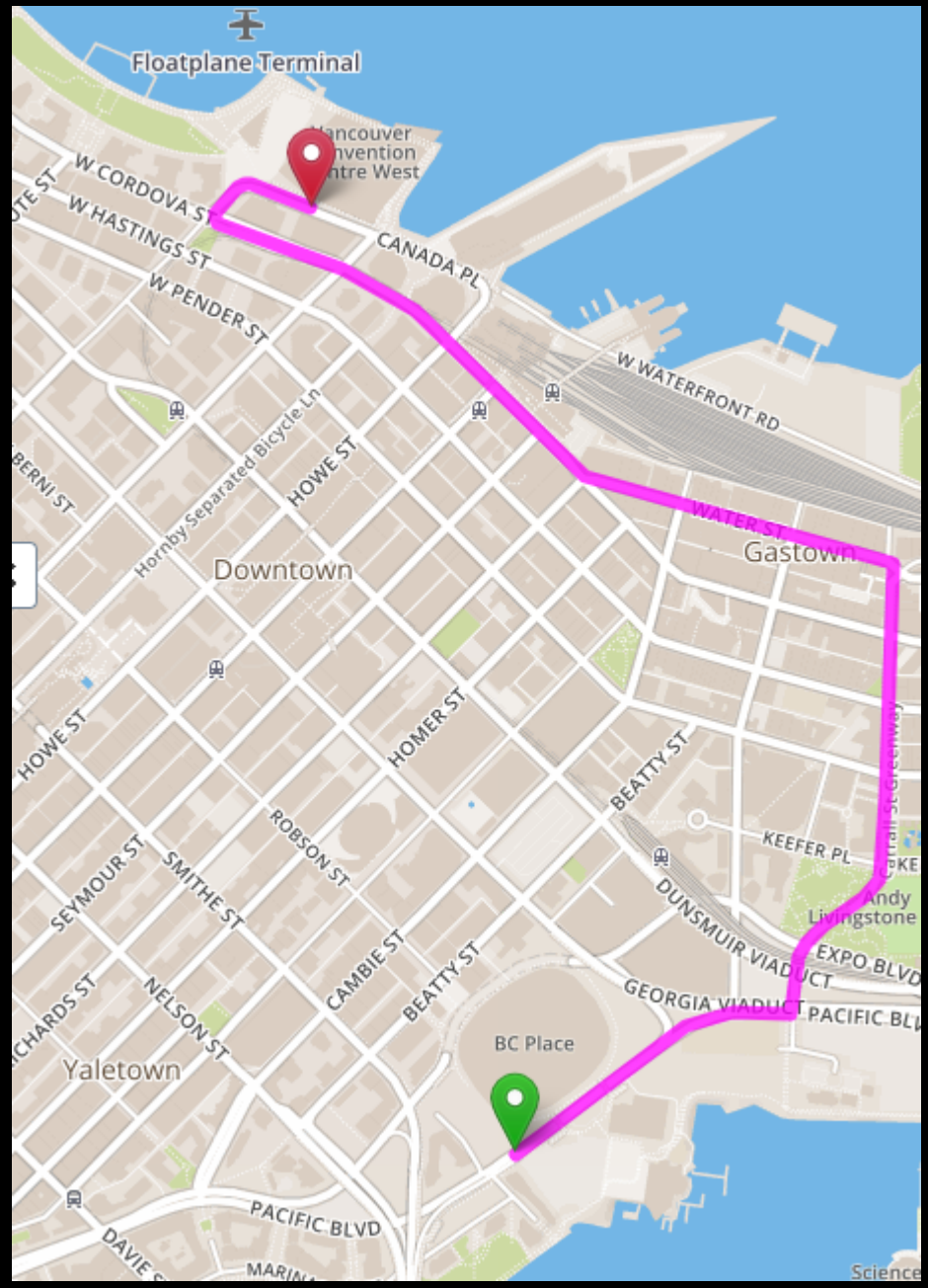
- https://router.api.gov.bc.ca/directions.json?points=-123.33801,49.37924,-123.14850,49.33004**&distanceunit=mi**
  - Returns kilometers (default)

- https://router.api.gov.bc.ca/directions.json?points=-123.33801,49.37924,-123.14850,49.33004**&distanceUnit=mi**
  - Returns miles

# Shortest Route vs. Fastest Route

/directions



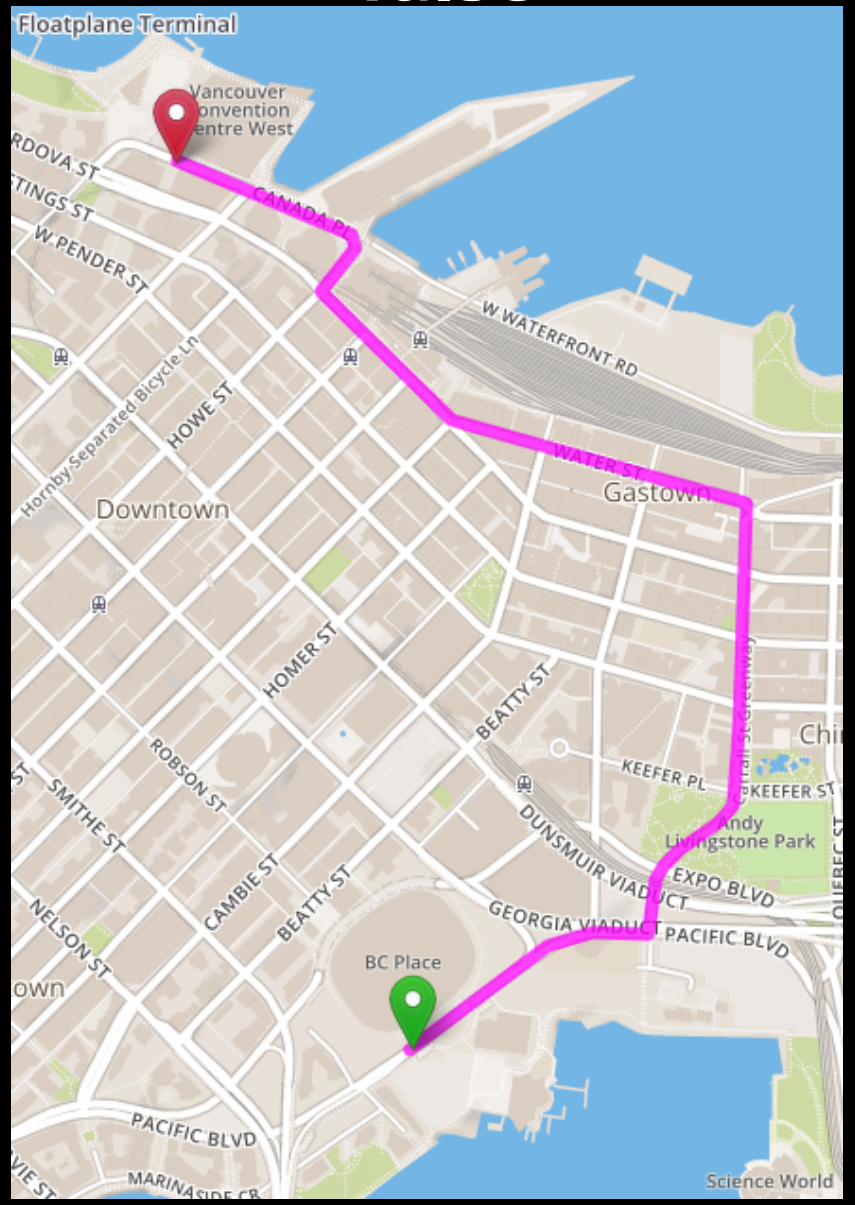

Vancouver,

https://router.api.gov.bc.ca/directions.json?points=-123.1124558,49.2751466,-123.1168642,49.288516&outputSRS=4326&distanceUnit=km&criteria=shortest

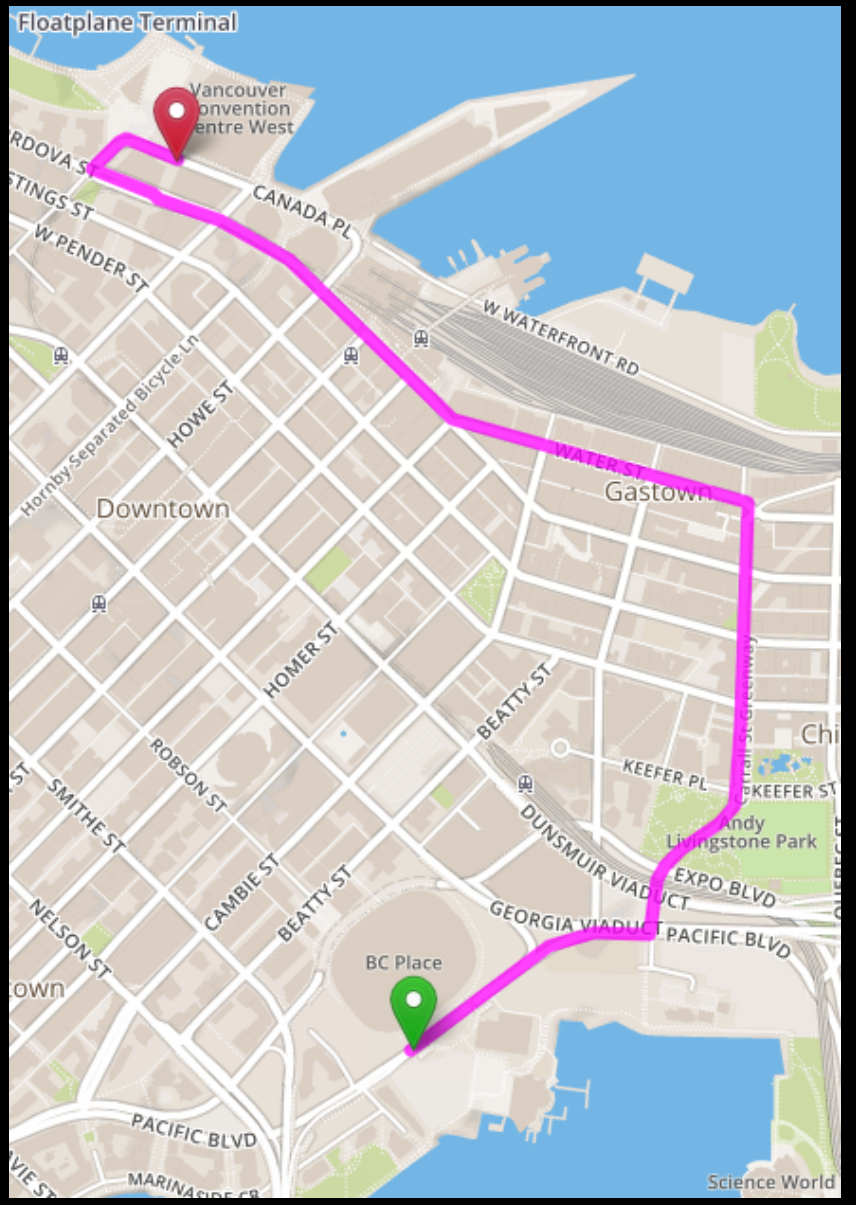
ℹ default is -> ‘fastest’

# correctSide

## =false




## =true

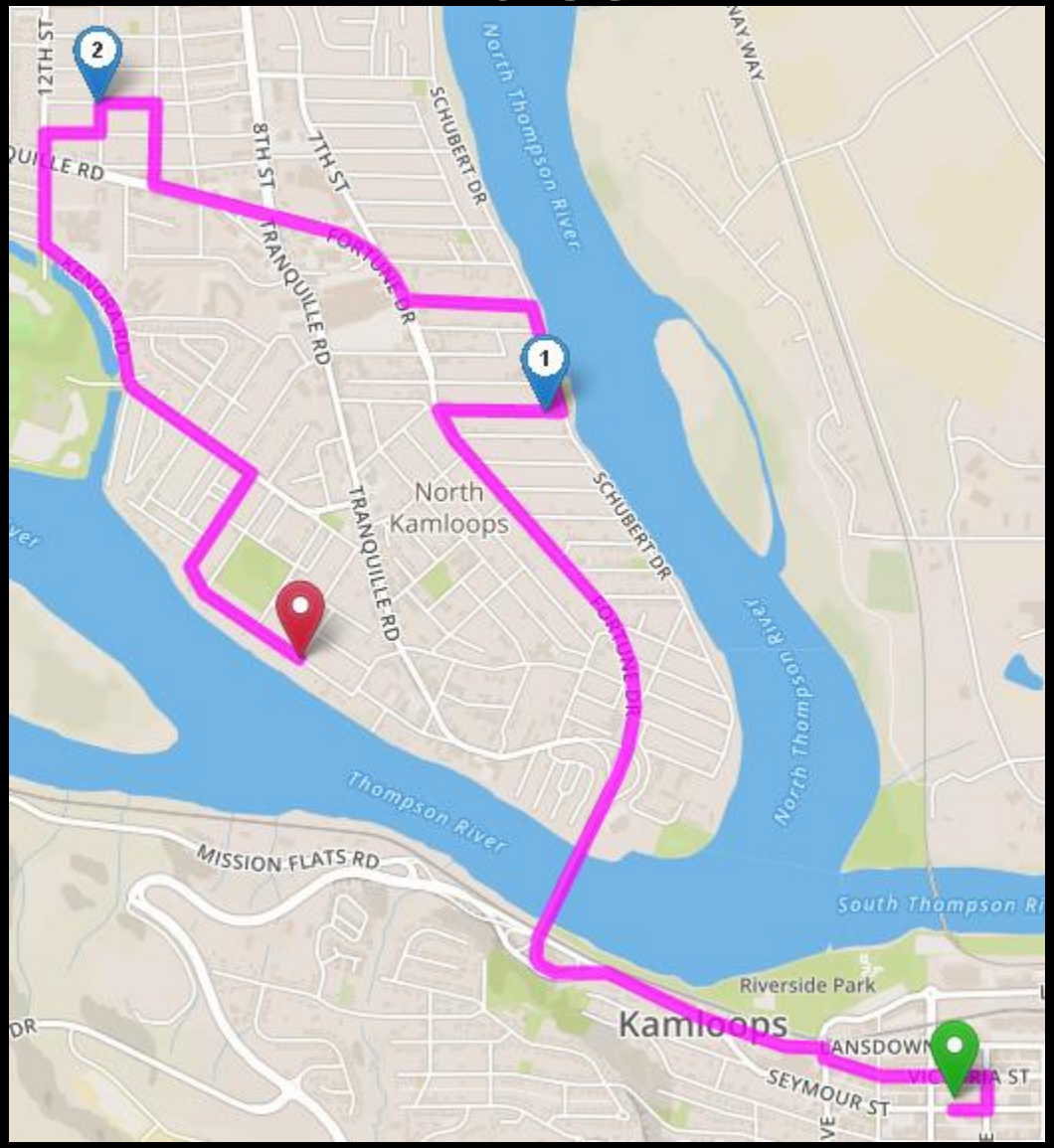


https://router.api.gov.bc.ca/directions.json?points=-123.1124558,49.2751466,-123.1168642,49.288516&outputSRS=4326&distanceUnit=km**&correctSide=true**

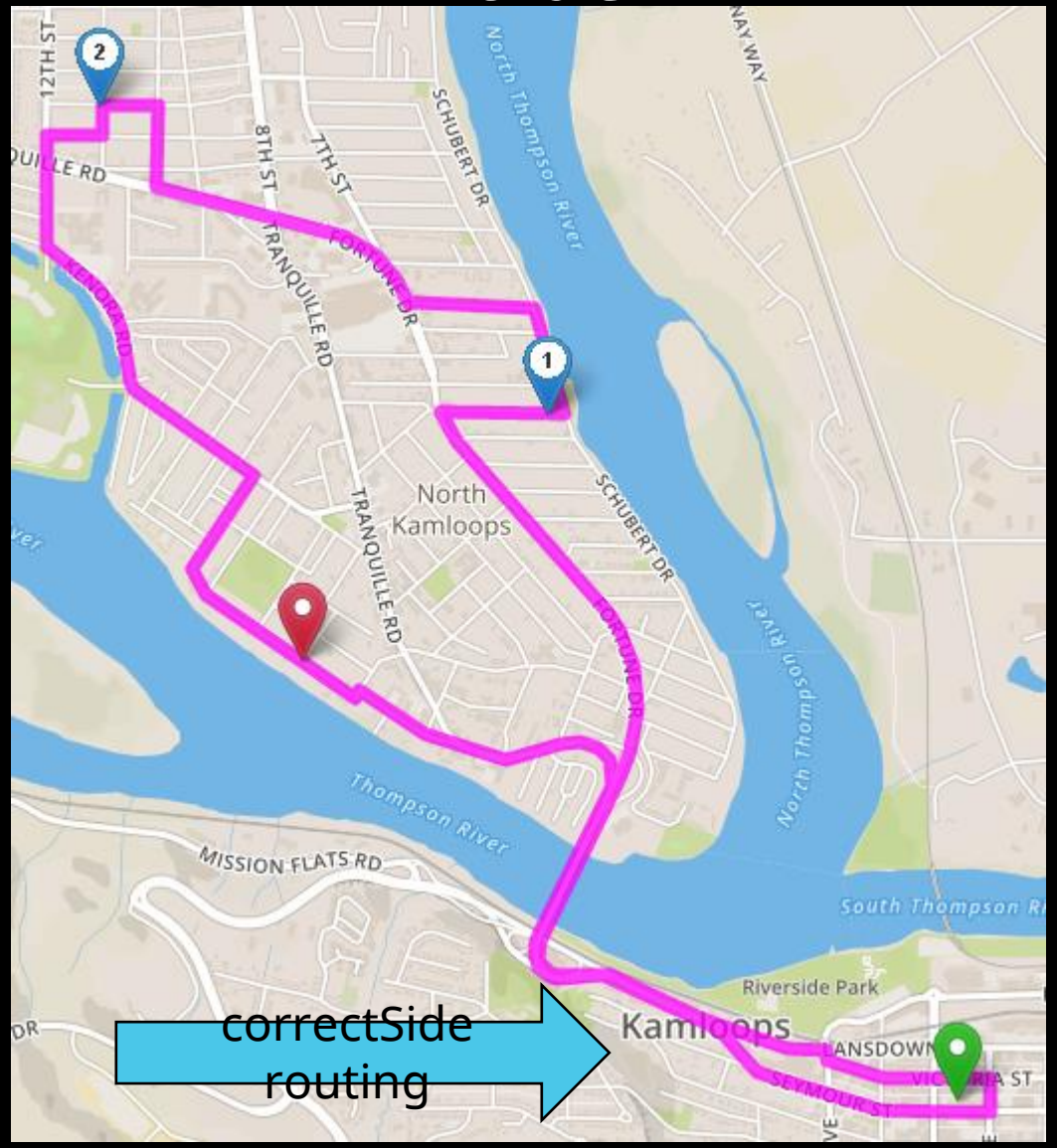
ℹ️efault is -> ‘false’

# roundTrip

## =false




## =true



https://router.api.gov.bc.ca/directions.json?points=-123.1124558,49.2751466,-123.1168642,49.288516&outputSRS=4326&distanceUnit=km
&correctSide=true
**&roundTrip=true**

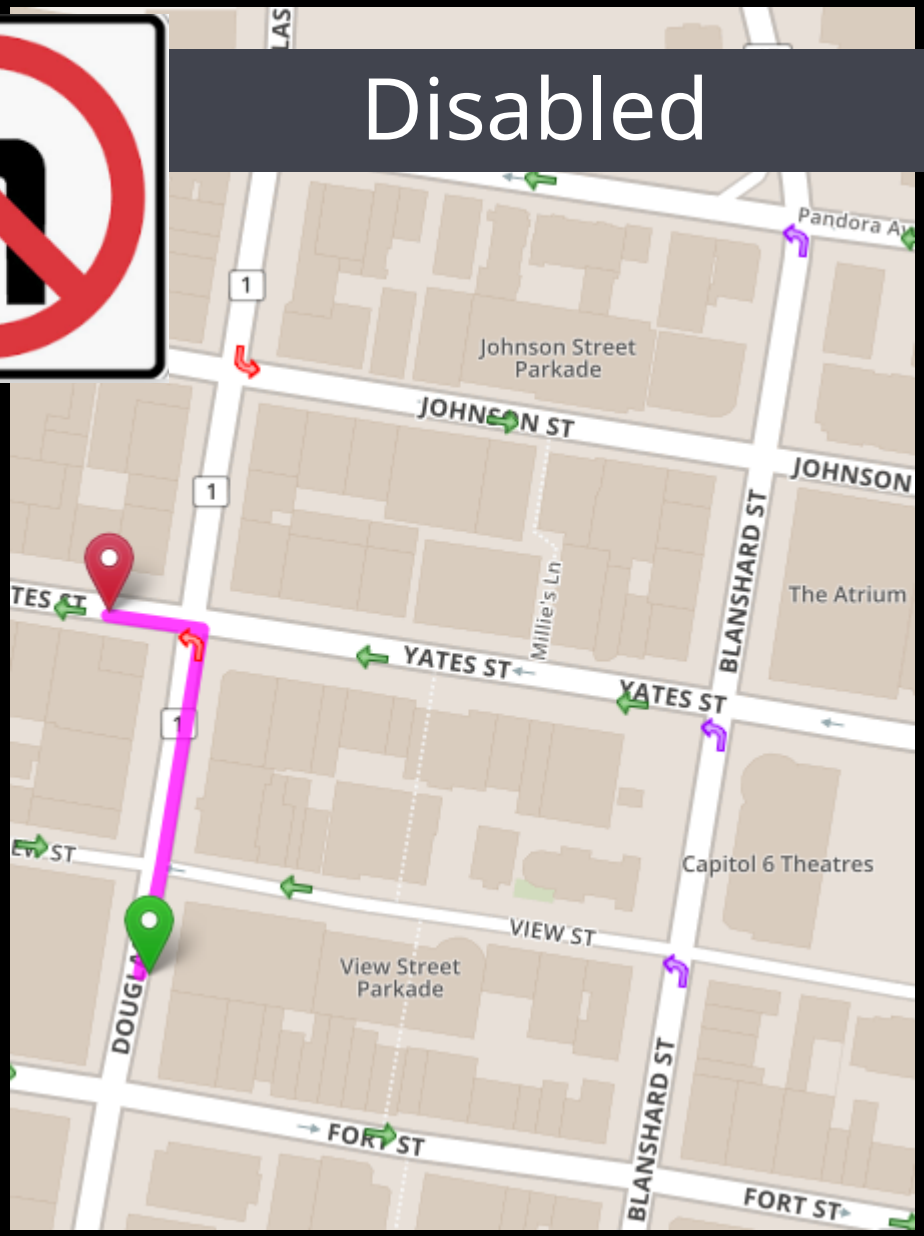
ⓘefault is -> ‘false’

# Turn Restrictions

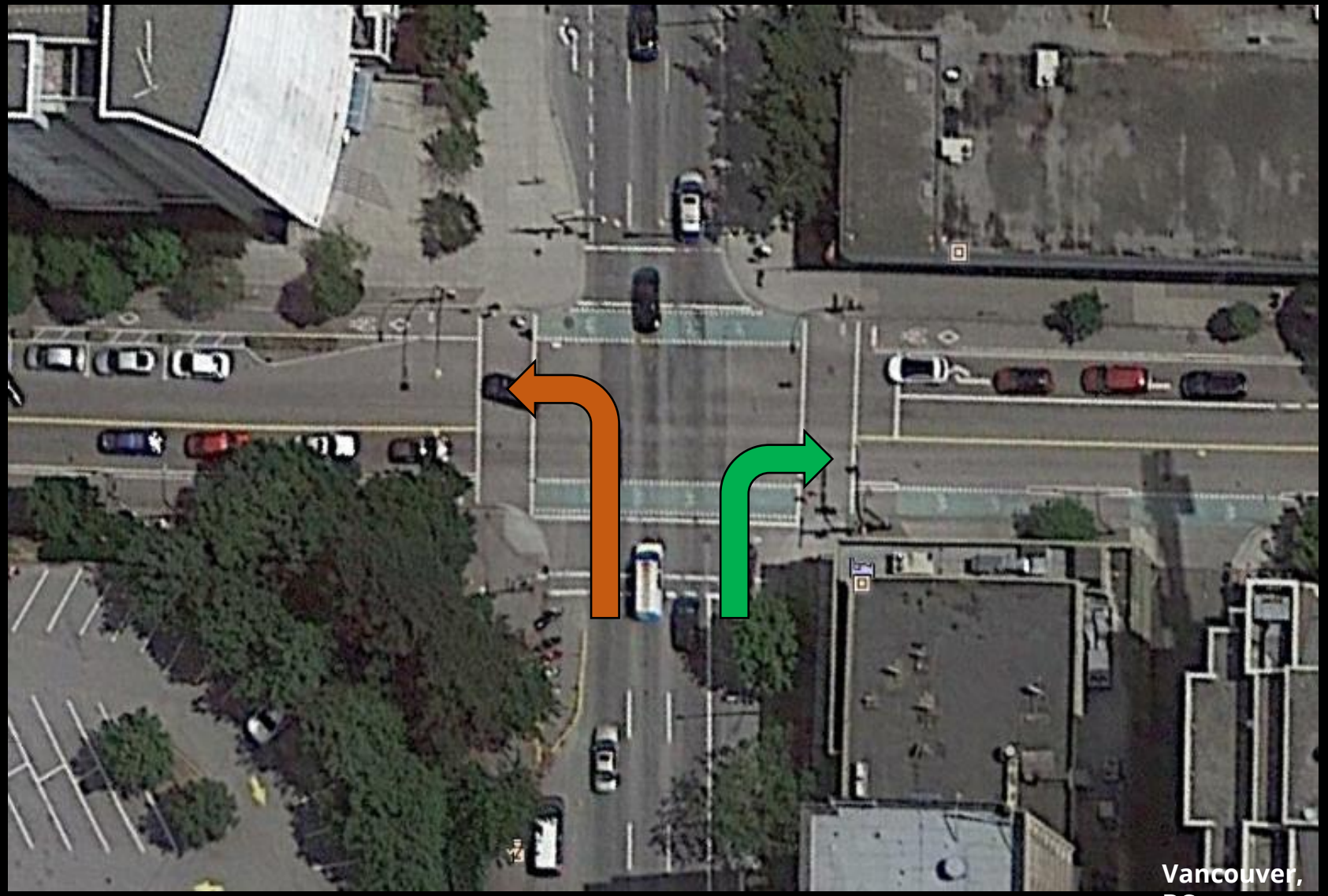
## Enabled

## Disabled

Victoria, BC



# Turn Costs



# Crossing Costs

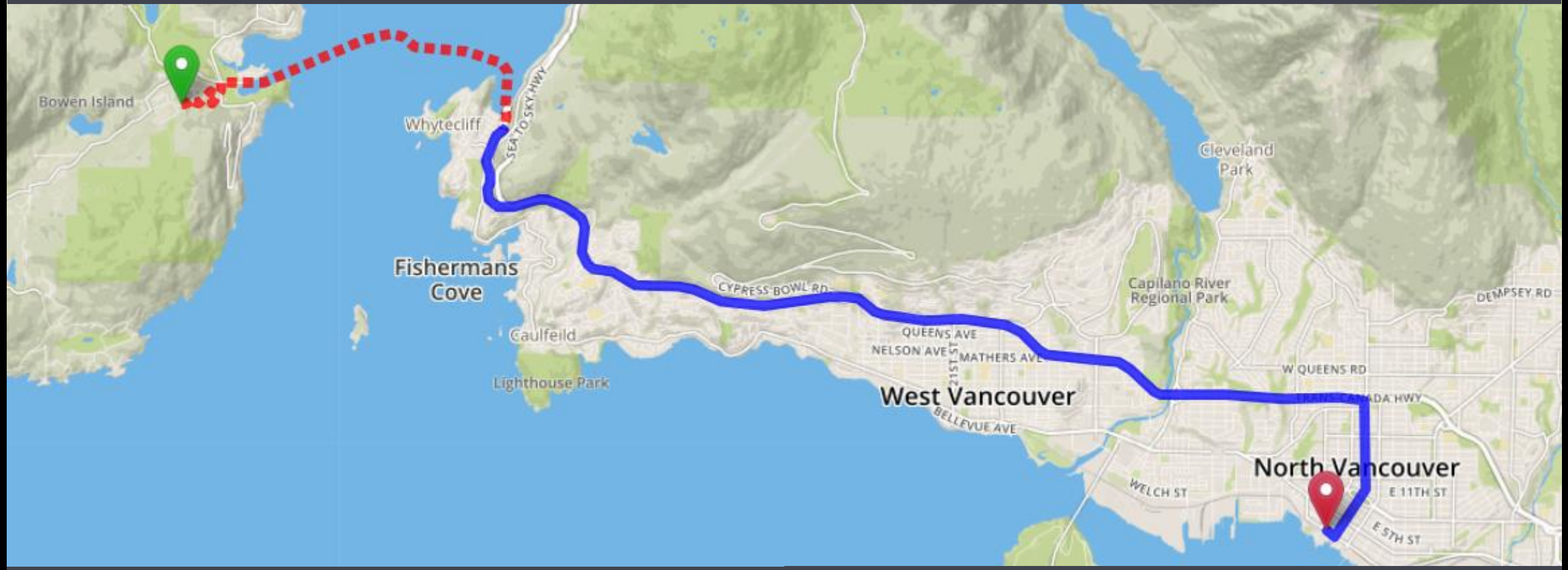
## Yield or Roundabout vs. Sign vs. Light

ⓘnabled by default

# Time dependency & Ferry Schedules



Depart at 10:37am




## Enabled

Route travels 27.636 km in 2 hours 2 minutes
1hr 18min until next sailing

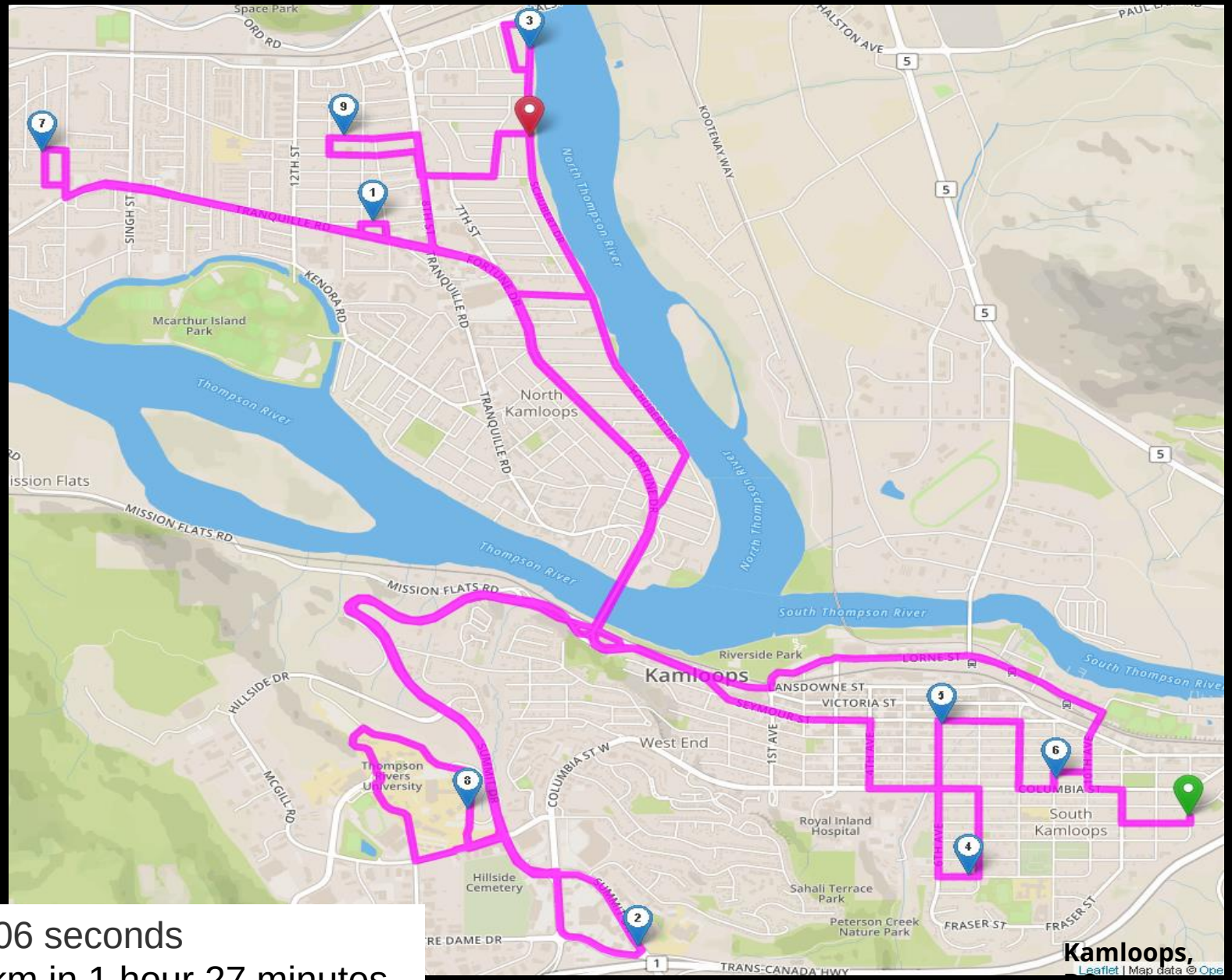
## Disabled (default)

Route travels 27.636 km in 54 minutes 51 seconds
Defaults to a 10 minute wait

https://router.api.gov.bc.ca/directions.json?points=-123.3470,49.3763,-123.0814,49.3118
**&enable=td,sc**
**&departure**=2020-05-15T10:37:00-07:00

# Adding many points (waypoints)

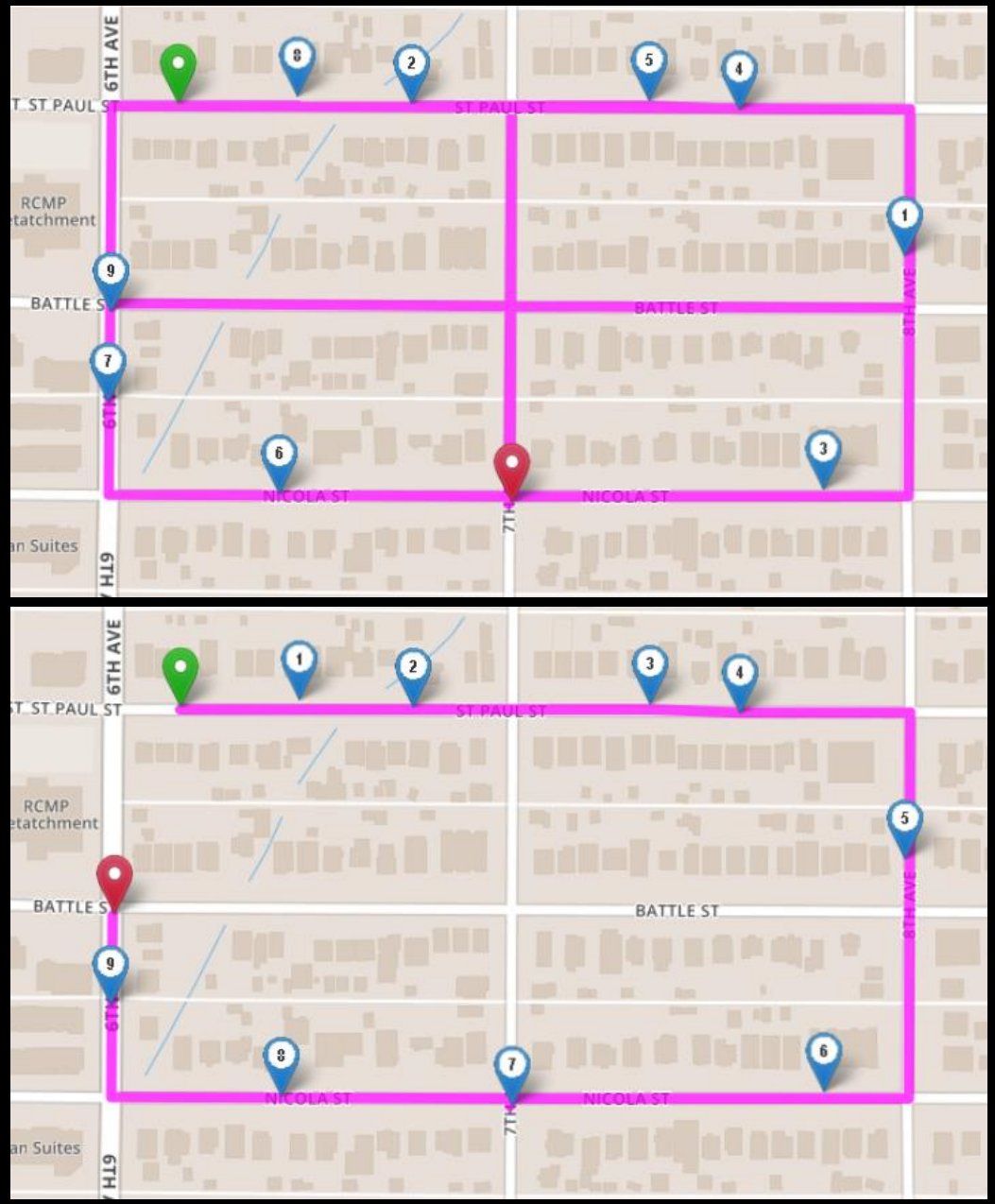
/directions




Route calculated in 0.06 seconds
Route travels 59.994 km in 1 hour 27 minutes

# optimalDirections






**Route #1**:
2.85 km in 5:26 min

/directions

**Route #2**:
1.06 km in 2:09 min

/optimalDirections

# optimalDirections

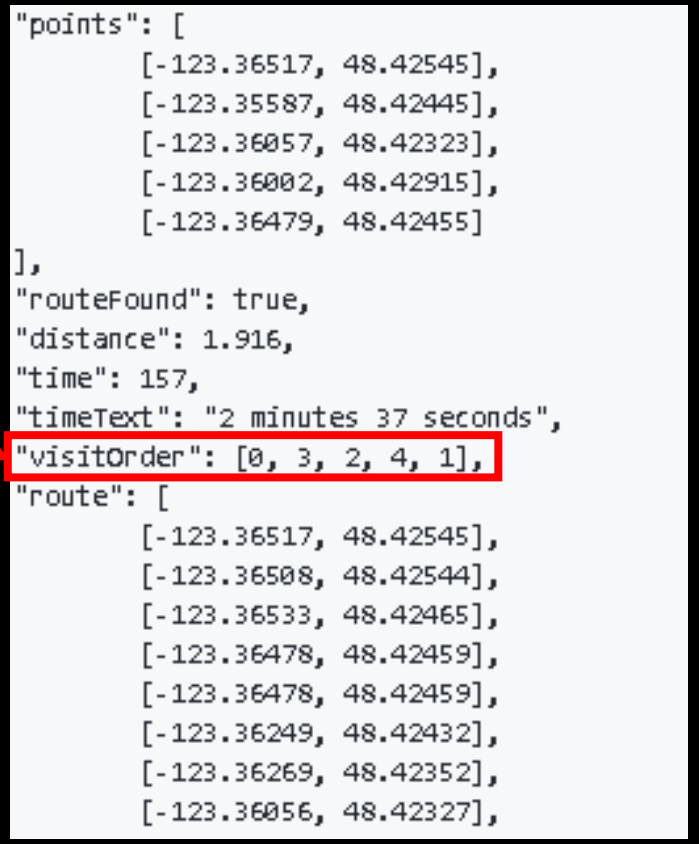


**Request:**

- https://router.api.gov.bc.ca/optimalDirections.json?points=<LIST OF POINTS>

**Response:**

- Now includes ‘visitOrder’



```
"points": [
        [-123.36517, 48.42545],
        [-123.35587, 48.42445],
        [-123.36057, 48.42323],
        [-123.36002, 48.42915],
        [-123.36479, 48.42455]
],
"routeFound": true,
"distance": 1.916,
"time": 157,
"timeText": "2 minutes 37 seconds",
"visitOrder": [0, 3, 2, 4, 1],
"route": [
        [-123.36517, 48.42545],
        [-123.36508, 48.42544],
        [-123.36533, 48.42465],
        [-123.36478, 48.42459],
        [-123.36478, 48.42459],
        [-123.36249, 48.42432],
        [-123.36269, 48.42352],
        [-123.36056, 48.42327],
```

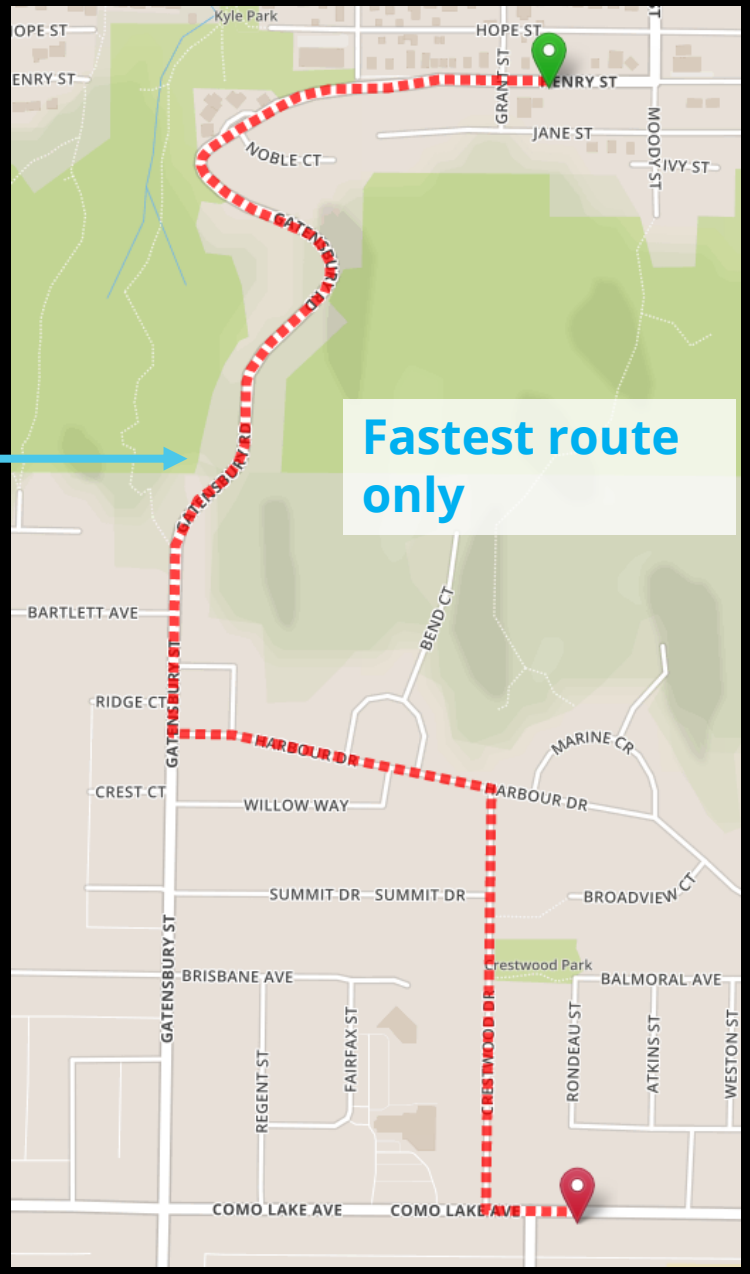
# Distortion Fields

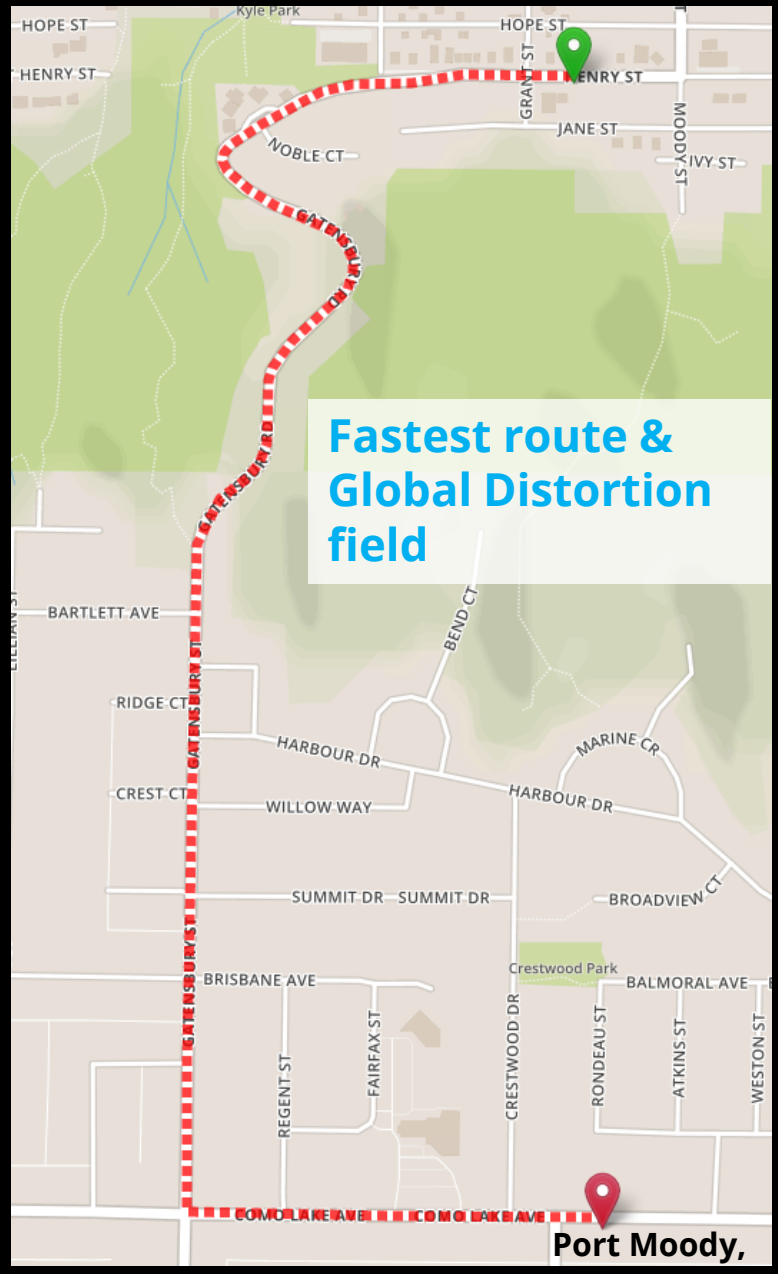
- **Global Distortion Field**
  - Encourage vehicles to use more major roads
- **Local Distortion Field**
  - Special cases

ⓘnabled by default

# Global Distortion Field

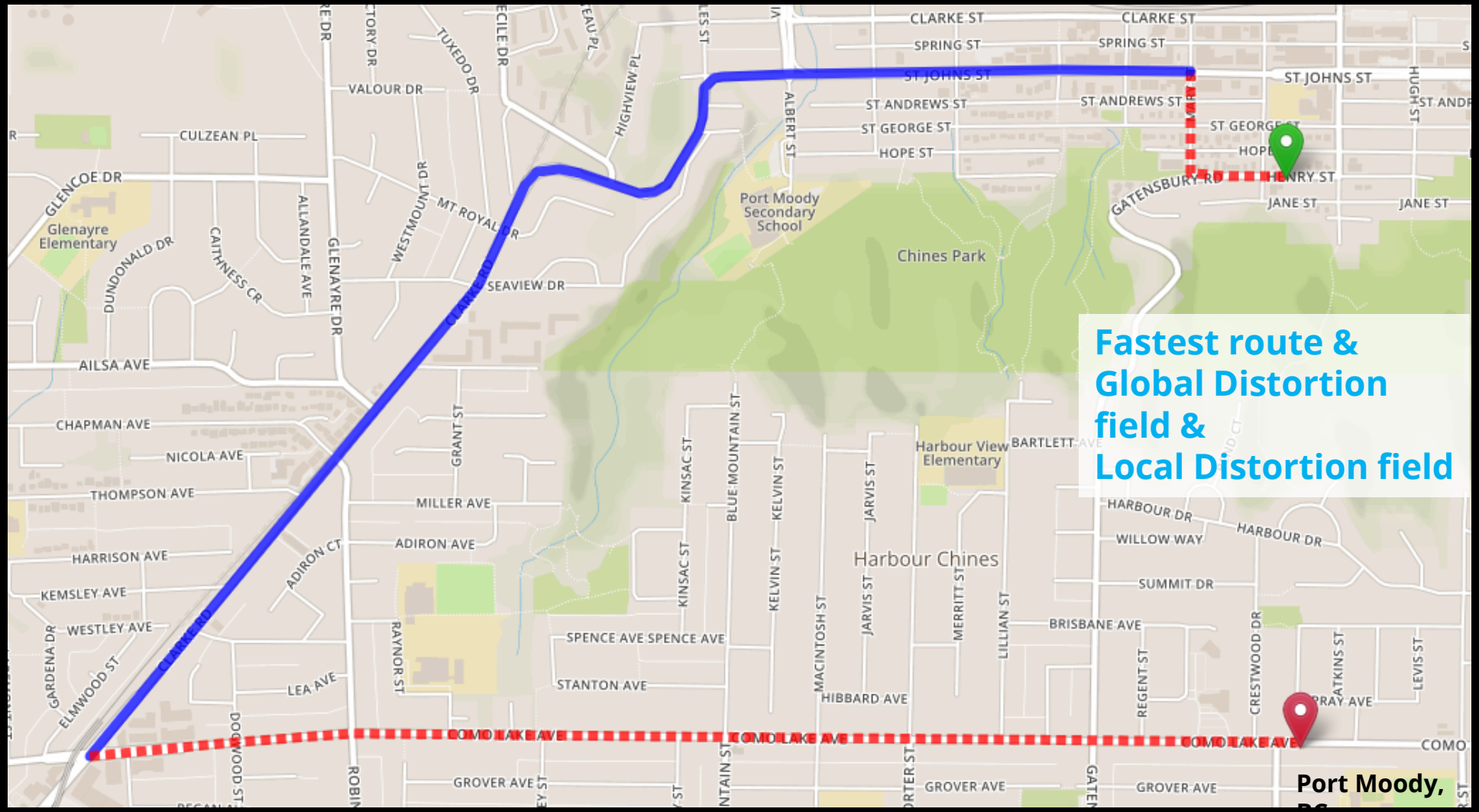
Municipality: Discourage travel on Gatensbury Rd



# Local Distortion Field



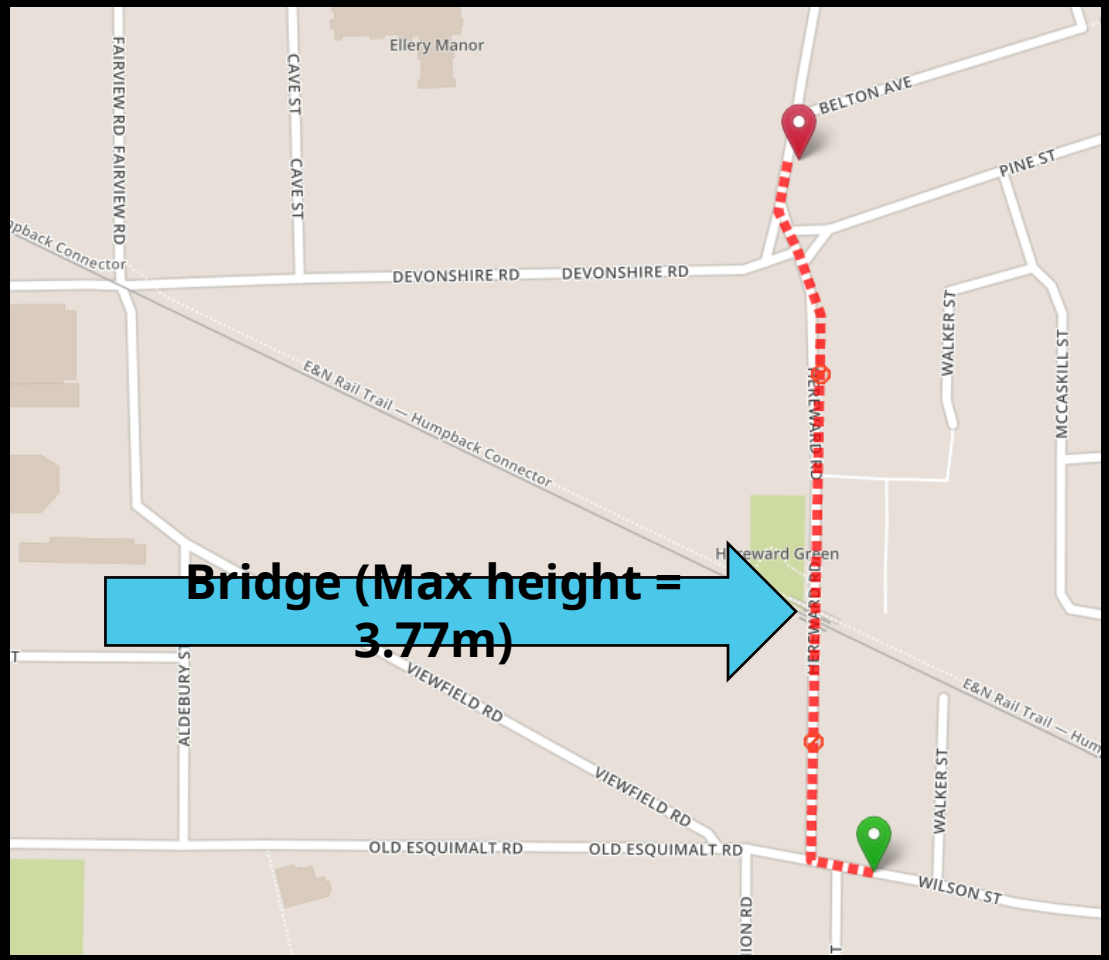


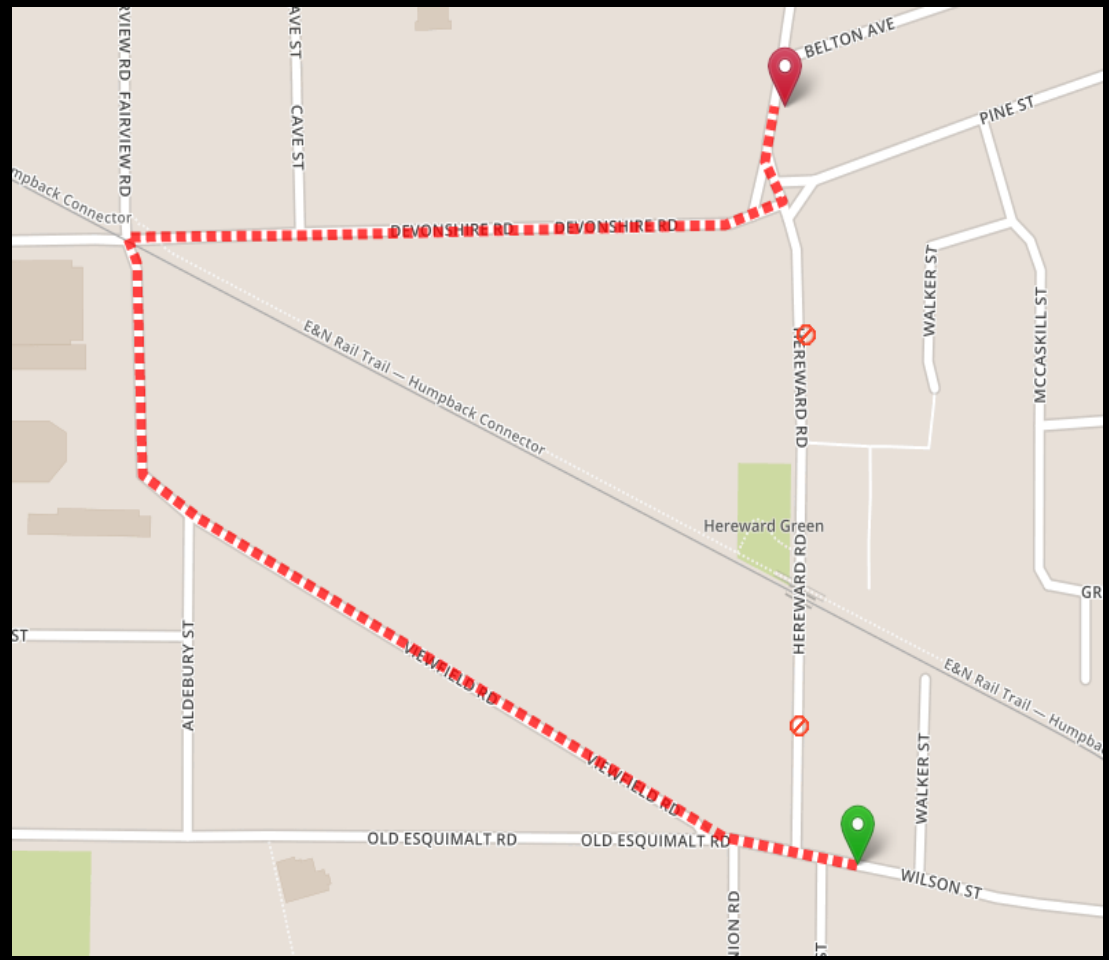
https://router.api.gov.bc.ca/truck/directions.json?points=-122.8544,49.2746,-122.8512,49.2633&outputSRS=4326&distanceUnit=km&correctSide=true

# Truck Directions

/truck/directions

## Height (m)



# Truck Directions

/truck/directions

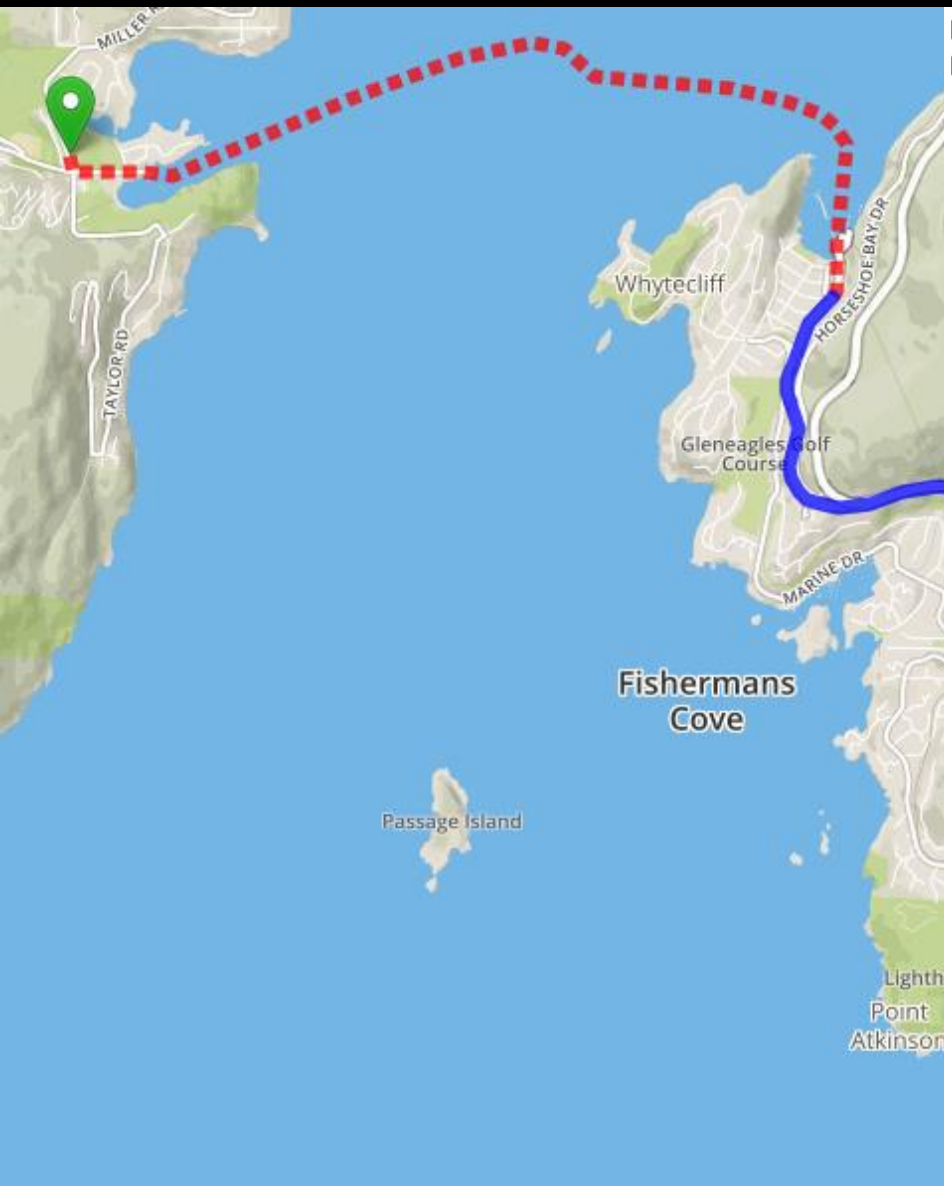
https://router.api.gov.bc.ca/truck/directions.json?
points=<LIST OF POINTS>...&height=3.8

*You can also include – Length (m), Width (m), Weight (kg)*

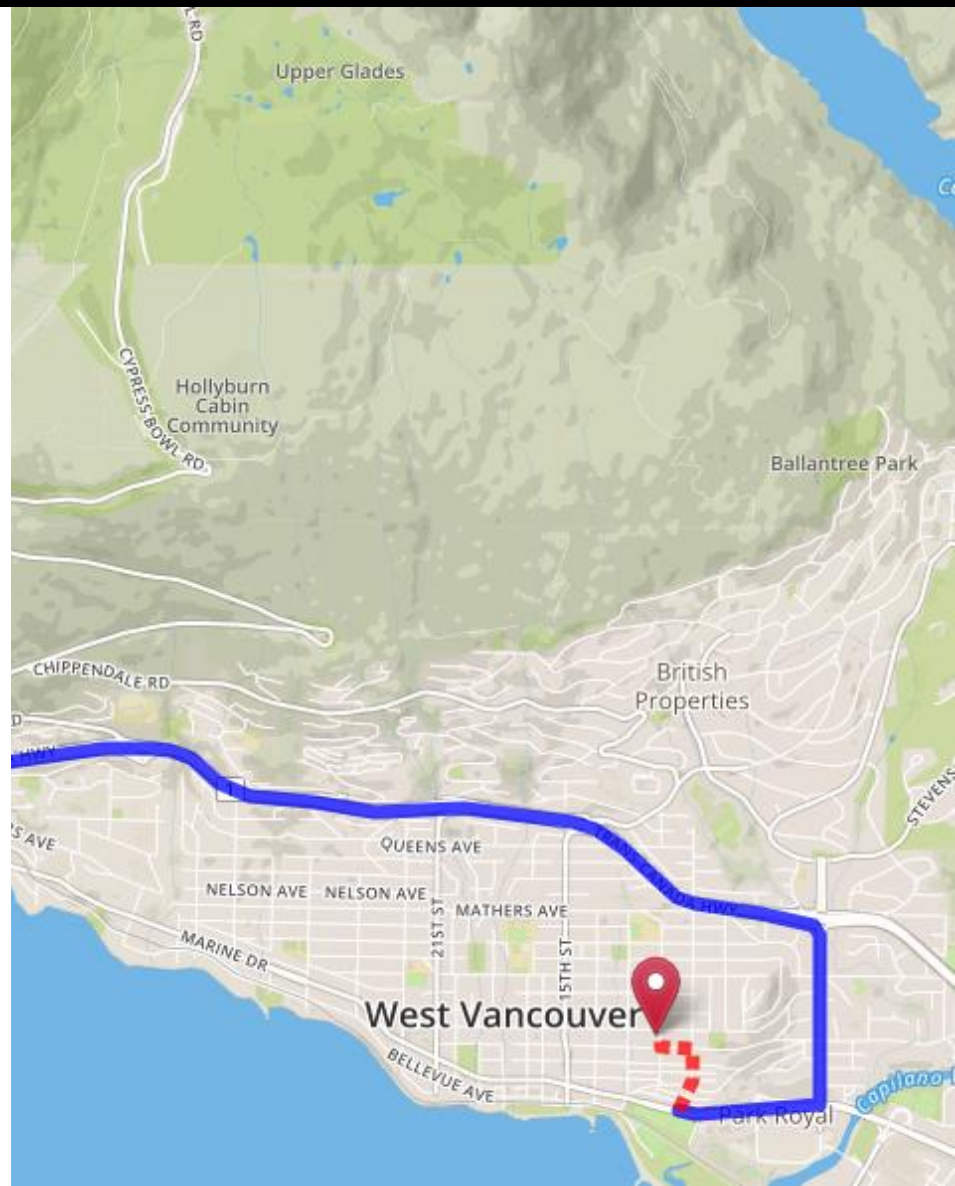
https://router.api.gov.bc.ca/truck/directions.json?
points=<LIST OF POINTS>...
&height=3.8&width=5&length=30&weight=12000

/truck/directions

# Truck Route Partitioning




```
partition: "isFerry,isTruckRoute,locality",
partitions: [
  - {
        index: 0,
        isFerry: false,
        isTruckRoute: false,
        locality: "Bowen Island"
    },
  - {
        index: 5,
        isFerry: true,
        isTruckRoute: false,
        locality: "Ferry"
    },
  - {
        index: 22,
        isFerry: false,
        isTruckRoute: false,
        locality: "West Vancouver"
    },
  - {
        index: 24,
        isFerry: false,
        isTruckRoute: true,
        locality: "West Vancouver"
    },
  - {
        index: 195,
        isFerry: false,
        isTruckRoute: false,
        locality: "West Vancouver"
    }
],
```

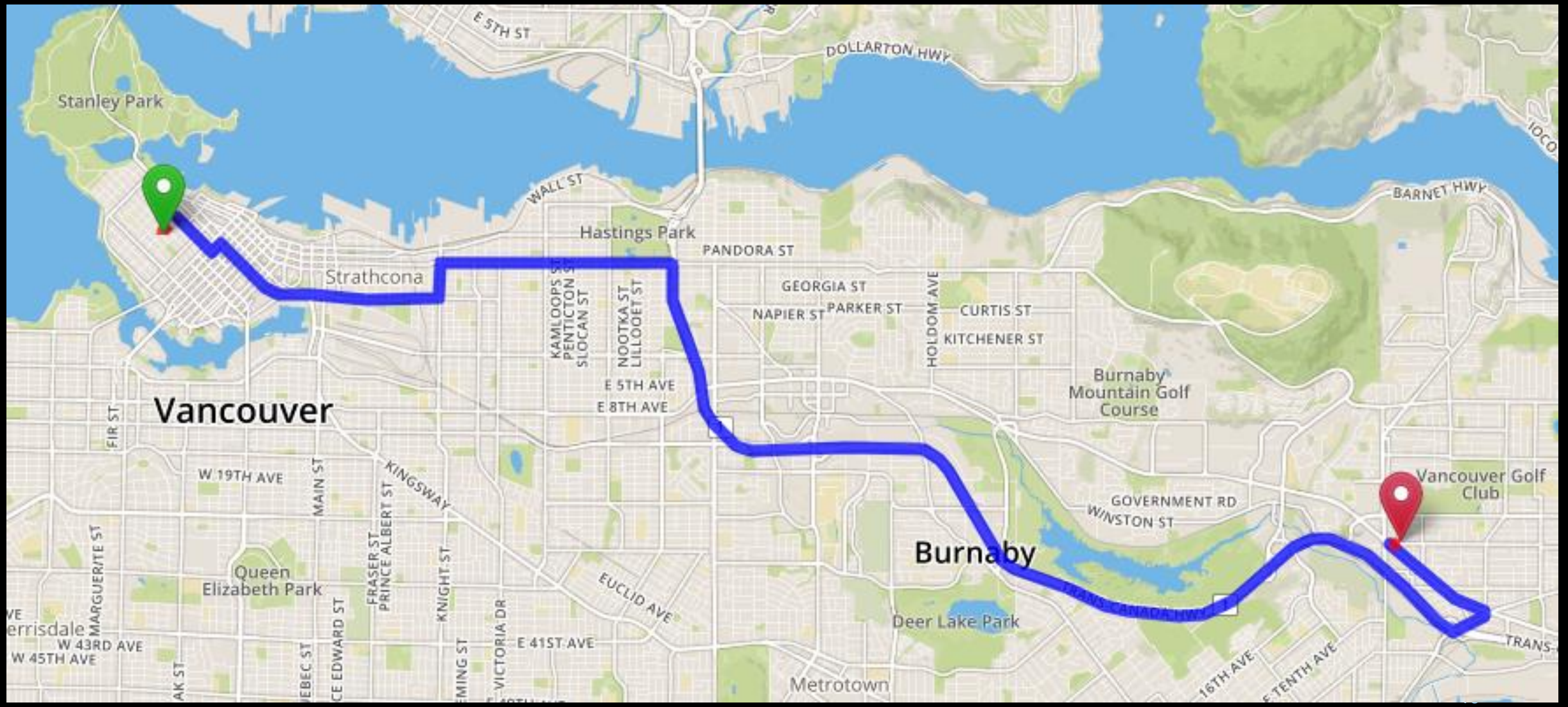


# Truck Route Partitioning

https://router.api.gov.bc.ca/truck/directions.json?
points=<LIST OF POINTS>...
&partition=isTruckRoute,isFerry,locality

/truck/directions

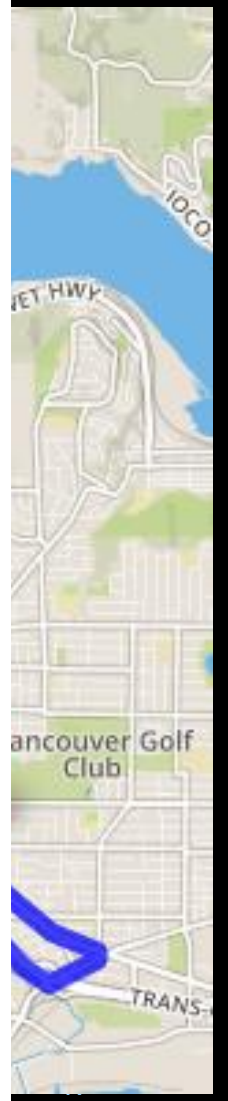
# Truck Route Notifications



/truck/directions

# Truck Route Notifications

```
- {
    type: "TURN_RIGHT",
    name: "Robson St",
    distance: 0.691,
    time: 83,
    text: "Turn right onto Robson St for 700 m (1 minute 23 seconds)",
  - point: [
        -123.12854,
        49.287
    ],
  - notifications: [
    - {
          type: "TruckRestriction",
          message: "Vehicles over 15.25 meters in length may only use this road between 7:00 am and 6:00 pm, Monday to Sunday"
      }
    ]
},
- {
    type: "TURN_LEFT",
    name: "Hornby St",
    distance: 0.173,
    time: 29,
    text: "Turn left onto Hornby St for 150 m (29 seconds)",
  - point: [
        -123.12176,
        49.28264
    ],
  - notifications: [
    - {
          type: "TruckRestriction",
          message: "Vehicles over 15.25 meters in length may only use this road between 7:00 am and 6:00 pm, Monday to Sunday"
      }
    ]
},
```

# Truck Route Notifications

- There is no ‘notification’ request parameter
- Provided automatically (where applicable) by requesting a truck route using /truck/directions or /truck/optimalDirections

https://router.api.gov.bc.ca/truck/directions.json
https://router.api.gov.bc.ca/truck/optimalDirections.json

# BC Route Planner

## Understanding the Response

# HTTP Response



- Different for requests to /distance vs. /directions vs. /route
- Full list provided in the developer guide
  - https://bcgov.github.io/ols-router/router-developer-guide.html

# /distance /directions /route

| Attribute Name | Type |
|---|---|
| routeDescription | String |
| searchTimestamp | Datetime |
| executionTime | Real |
| version | String |
| disclaimer | String |
| privacyStatement | String |
| copyrightNotice | String |
| copyrightLicense | String |
| srsCode | Integer |
| criteria | String |
| enable | String |
| distanceUnit | String |
| points | list of Point |
| routeFound | Boolean |
| distance | String |
| time | Integer |
| timeText | String |

| Attribute Name | Type |
|---|---|
| routeDescription | String |
| searchTimestamp | Datetime |
| executionTime | Real |
| version | String |
| disclaimer | String |
| privacyStatement | String |
| copyrightNotice | String |
| copyrightLicense | String |
| srsCode | Integer |
| criteria | String |
| enable | String |
| distanceUnit | String |
| points | List of Point |
| routeFound | Boolean |
| distance | String |
| time | Integer |
| timeText | String |
| partition | String |
| partitions | String |
| route | List of Point |
| notifications | String |
| directions | String |

| Attribute Name | Type |
|---|---|
| routeDescription | String |
| searchTimestamp | Datetime |
| executionTime | Real |
| version | String |
| disclaimer | String |
| privacyStatement | String |
| copyrightNotice | String |
| copyrightLicense | String |
| srsCode | Integer |
| criteria | String |
| enable | String |
| distanceUnit | String |
| points | list of Point |
| routeFound | Boolean |
| distance | String |
| time | Integer |
| timeText | String |
| partition | String |
| partitions | String |
| route | List of Point |

# /distance response






```
{
  "routeDescription": null,
  "searchTimestamp": "2020-04-17 21:13:20",
  "executionTime": 48,
  "version": "2.1.0",
  "disclaimer": "https://www2.gov.bc.ca/gov/content?id=79F93E018712422FBC8E674A67A70535",
  "privacyStatement": "https://www2.gov.bc.ca/gov/content?id=9E890E16955E4FF4BF3B0E07B4722932",
  "copyrightNotice": "Copyright 2020 Province of British Columbia - Open Government License",
  "copyrightLicense": "https://www2.gov.bc.ca/gov/content?id=A519A56BC2BF44E4A008B33FCF527F61",
  "srsCode": 4326,
  "criteria": "fastest",
  "enable": "gdf,ldf,tc,tr,xc",
  "distanceUnit": "km",
  "points": [
    [
      -123.70794,
      48.77869
    ],
    [
      -123.53785,
      48.382
    ]
  ],
  "routeFound": true,
  "distance": 55.296,
  "time": 3110.129311972462,
  "timeText": "51 minutes 50 seconds"
}
```

# /directions response

slide 1 of 3


```
{
  "routeDescription": null,
  "searchTimestamp": "2020-04-17 20:53:51",
  "executionTime": 49,
  "version": "2.1.0",
  "disclaimer": "https://www2.gov.bc.ca/gov/content?id=79F93E018712422FBC8E674A67A70535",
  "privacyStatement": "https://www2.gov.bc.ca/gov/content?id=9E890E16955E4FF4BF3B0E07B4722932",
  "copyrightNotice": "Copyright 2020 Province of British Columbia - Open Government License",
  "copyrightLicense": "https://www2.gov.bc.ca/gov/content?id=A519A56BC2BF44E4A008B33FCF527F61",
  "srsCode": 4326,
  "criteria": "fastest",
  "enable": "gdf,ldf,tc,tr,xc",
  "distanceUnit": "km",
  "points": [
    [
      -123.70794,
      48.77869
    ],
    [
      -123.53785,
      48.382
    ]
  ],
```

# /directions response

slide 2 of 3


```
"routeFound": true,
"distance": 55.296,
"time": 3110.129311972462,
"timeText": "51 minutes 50 seconds",
"route": [
  [
    -123.70793,
    48.7785
  ],
  [
    -123.70719,
    48.77851
  ],
  [
    -123.7069,
    48.77769
  ],
  [
    -123.7066,
    48.77685
  ],
  [
    -123.70657,
```

# /directions response

slide 3 of 3


```
"directions": [
  {
    "type": "START",
    "name": "Kenneth St",
    "distance": 0.055,
    "time": 17,
    "heading": "EAST",
    "text": "Head east on Kenneth St for 55 m (17 seconds)",
    "point": [
      -123.70793,
      48.7785
    ]
  },
  {
    "type": "TURN_RIGHT",
    "name": "Canada Ave",
    "distance": 0.189,
    "time": 25,
    "text": "Turn right onto Canada Ave for 200 m (25 seconds)",
    "point": [
      -123.70719,
      48.77851
    ]
```

```
"route": [
  [
    -123.70793,
    48.7785
  ],
```

# /route response

slide 1 of 2


```
{
  "routeDescription": null,
  "searchTimestamp": "2020-04-17 20:53:51",
  "executionTime": 49,
  "version": "2.1.0",
  "disclaimer": "https://www2.gov.bc.ca/gov/content?id=79F93E018712422FBC8E674A67A70535",
  "privacyStatement": "https://www2.gov.bc.ca/gov/content?id=9E890E16955E4FF4BF3B0E07B4722932",
  "copyrightNotice": "Copyright 2020 Province of British Columbia - Open Government License",
  "copyrightLicense": "https://www2.gov.bc.ca/gov/content?id=A519A56BC2BF44E4A008B33FCF527F61",
  "srsCode": 4326,
  "criteria": "fastest",
  "enable": "gdf,ldf,tc,tr,xc",
  "distanceUnit": "km",
  "points": [
    [
      -123.70794,
      48.77869
    ],
    [
      -123.53785,
      48.382
    ]
  ],
```

# /route response

slide 2 of 2


```
"routeFound": true,
"distance": 55.296,
"time": 3110.129311972462,
"timeText": "51 minutes 50 seconds",
"route": [
  [
    -123.70793,
    48.7785
  ],
  [
    -123.70719,
    48.77851
  ],
  [
    -123.7069,
    48.77769
  ],
  [
    -123.7066,
    48.77685
  ],
  [
    -123.70657,
```

# BC Route Planner

## Practical examples and Scripting

# betweenPairs



- A sample betweenPairs script
  - https://github.com/bcgov/ols-devkit/tree/gh-pages/bps
- Input csv file

| fromPoints | Latitude1 | Longitude1 | toPoints | Latitude2 | Longitude2 |
|---|---|---|---|---|---|
| CAMPBELL RIVER LAW COURTS | | | GANGES | 48.859991 | -123.509222 |
| COURTENAY LAW COURTS | 49.6895 | | GOLD RIVER | 49.781045 | -126.04761 |
| DUNCAN LAW COURTS | 48.7779 | | PORT HARDY LAW COURTS | 50.718948 | -127.508532 |
| NANAIMO LAW COURTS | 49.16812 | | SIDNEY PROVINCIAL | 48.651152 | -123.397845 |

- Output csv file

| | GANGES | GOLD RIVER | PORT HARDY LAW COURTS | SIDNEY PROVINCIAL | TAHISIS | TOFINO |
|---|---|---|---|---|---|---|
| CAMPBELL RIVER LAW COURTS | 207.364 | 87.95 | 235.061 | 237.883 | 153.308 | 268.992 |
| COURTENAY LAW COURTS | 162.201 | 130.96 | 280.697 | 192.719 | 196.318 | 223.828 |
| DUNCAN LAW COURTS | 25.758 | 284.594 | 436.381 | 43.443 | 349.952 | 254.265 |
| NANAIMO LAW COURTS | 55.335 | 234.085 | 385.872 | 85.853 | 299.444 | 203.756 |
| PORT ALBERNI LAW COURTS | 137.05 | 229.519 | 381.306 | 167.569 | 294.878 | 126.5 |
| POWELL RIVER LAW COURTS | 203.658 | 168.527 | 315.818 | 234.177 | 233.886 | 265.286 |

# betweenPairs - Request



- Similar to previous requests, with two notable differences
- https://router.api.gov.bc.ca/distance/betweenPairs.json?
  **fromPoints**=<LIST OF POINTS>
  &**toPoints**=<LIST OF POINTS>
- **Or,**
  https://router.api.gov.bc.ca/truck/distance/betweenPairs.json?

# API Keys

- Web apps should pass the API key in the request header

- API keys can also be passed to a script as an argument
  - https://router.api.gov.bc.ca/optimalDirections.json?points=<LIST OF POINTS>&**apikey=32kj3j3lk34n234lk234n4n3l3**

- To acquire an API key
  - Developer / personal: https://github.com/bcgov/gwa/wiki/Developer-Guide
  - Production / organization: Email DataBC: Data@gov.bc.ca

/distance/betweenPairs

# Demo #1
# Advanced REST Client

https://install.advancedrestclient.com

# Demo #2
# API Console

https://www2.gov.bc.ca/gov/content/data/geographic-data-services/location-services/route-planner

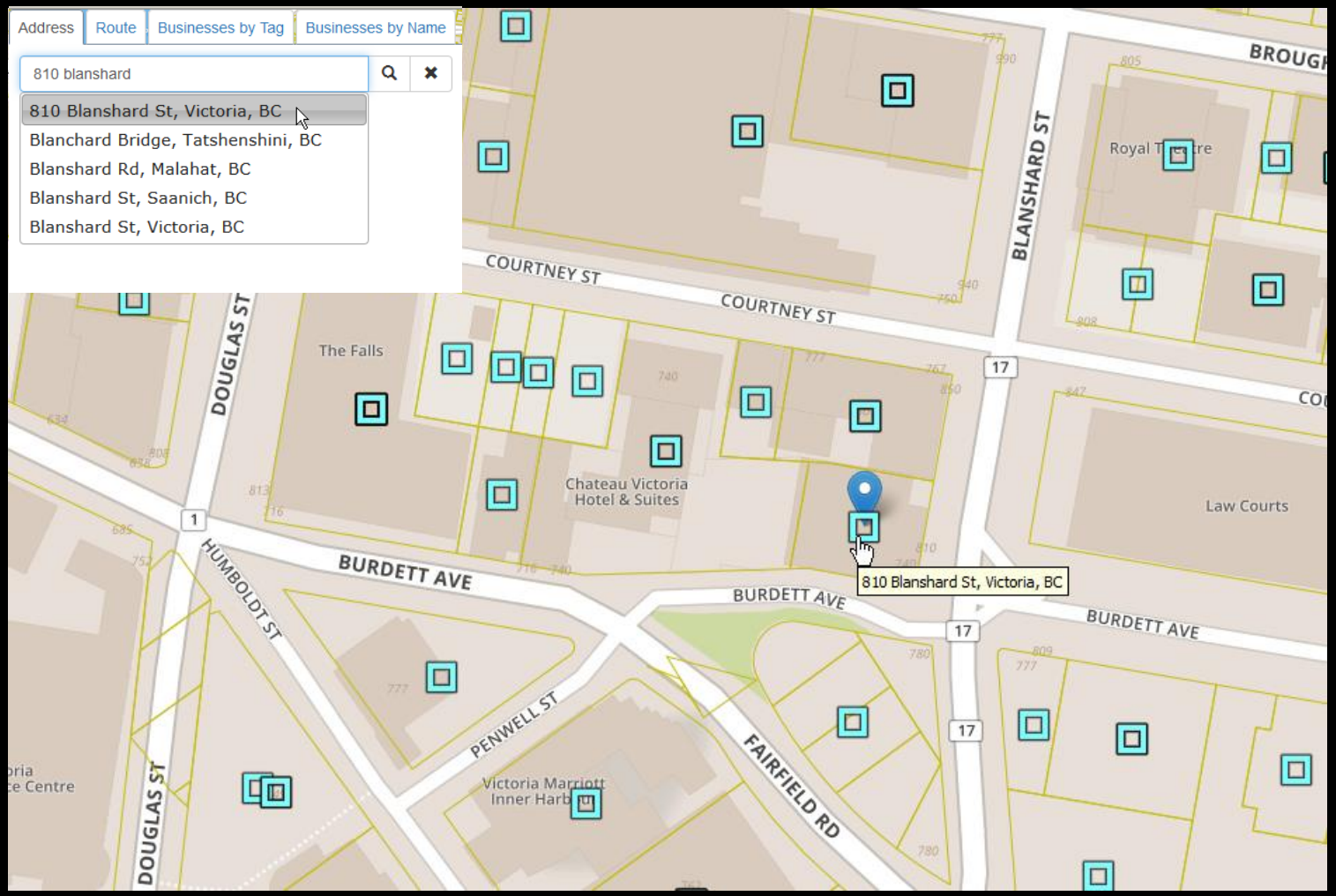
# Python example #1

https://github.com/bcgov/ols-devkit/tree/gh-pages/bps

# BC Address Geocoder

## Overview

# BC Address Geocoder

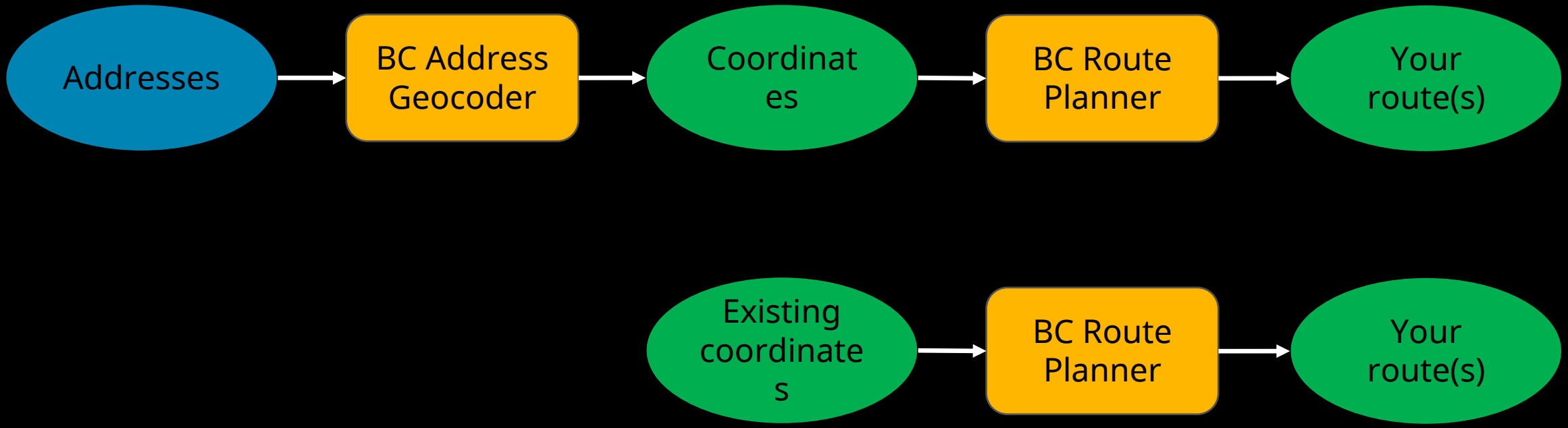



**Cleaning | Correction | Completion | Geocoding | Reverse geocoding**

# Tools List

| Application | Number of Requests | Viewer | Access |
|---|---|---|---|
| Address List Editor | 1 – 1,000 | Web browser | Public |
| Auto-completion Address Finder Widget | 1 | Web browser | Public |
| Batch Geocoder | 1 - Millions | Web browser | IDIR & BCeID |
| Batch Address List Submitter | 1 – Millions | Python | ‘cpf’ account |
| Location Services in Action | 1, M (within) | Web browser (modern) | Public |
| Physical Address Viewer | 1, M (within) | Google Earth | Public |
| REST API | 1 | Web browser | Public |

# Sample workflow



# BC Address Geocoder

## Common Features and Proximity Searches

# Available formats

## BC Address Geocoder

| Output Formats |
| --- |
| csv |
| geojson |
| gml |
| json |
| kml |
| shpz |
| xhtml |

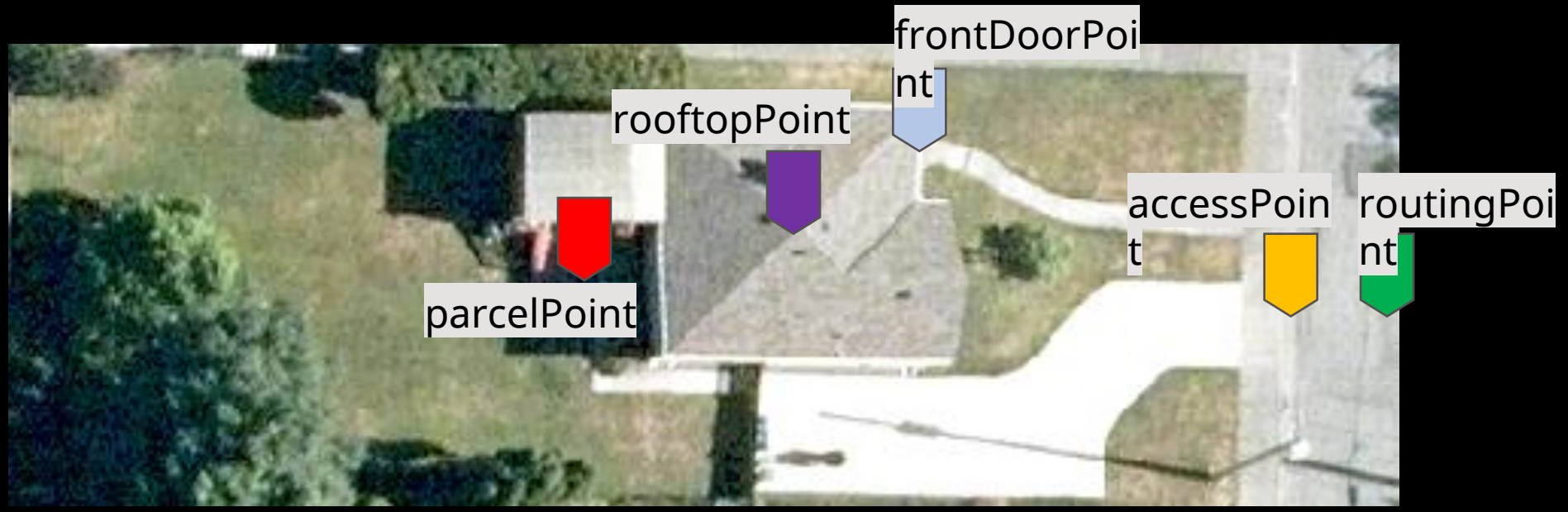
## Batch Geocoder

| Input Formats | Output Formats |
| --- | --- |
| csv | csv |
| GeoPackage | geojson |
| json | GeoPackage |
| shpz | gml |
| tsv | html |
| | xhtml |
| | json |
| | kml |
| | kmz |
| | shpz |
| | tsv |
| | xml |

https://geocoder.api.gov.bc.ca/addresses.**json**

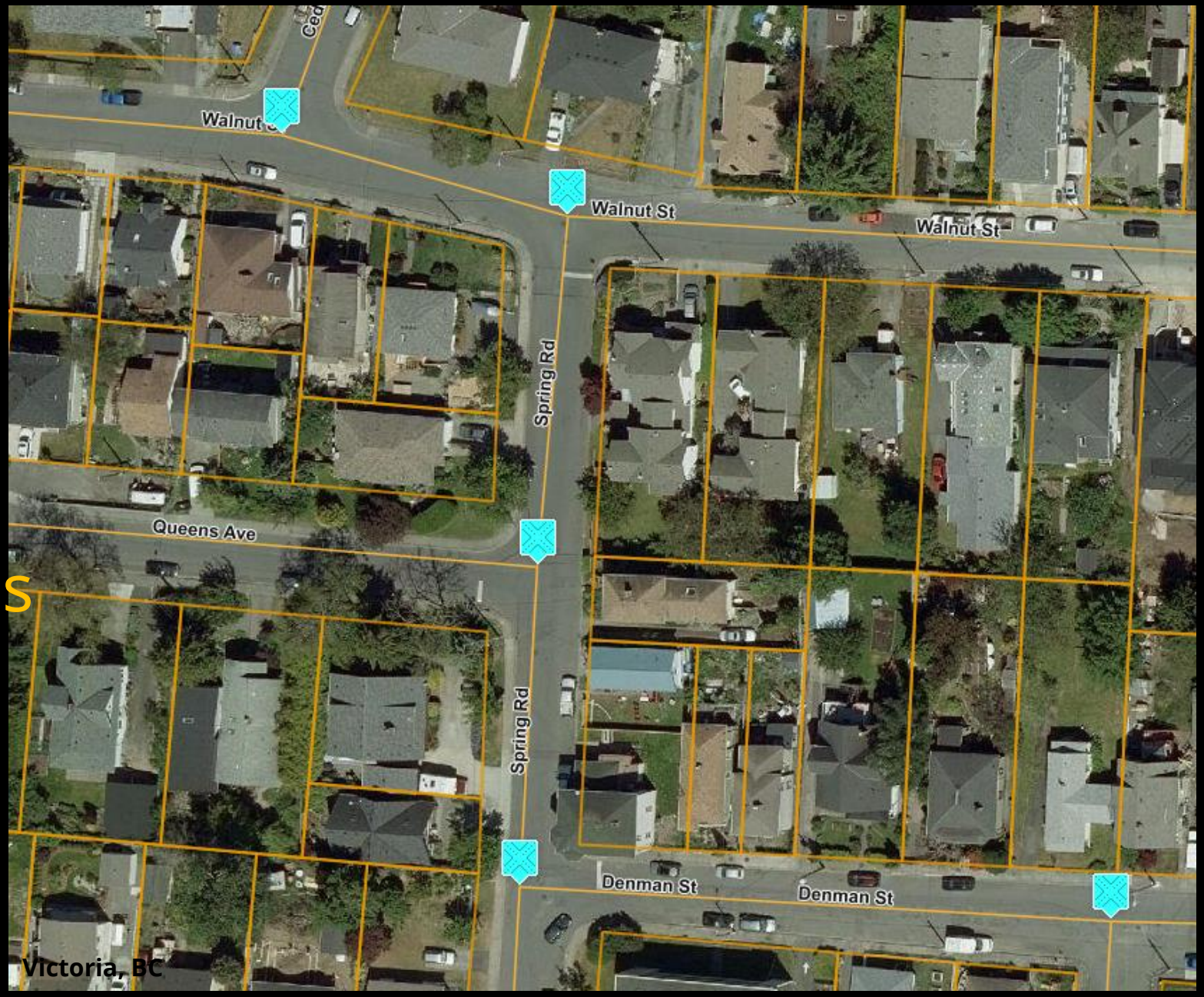
# LocationDescriptor

- any (default)
- accessPoint
- frontDoorPoint
- parcelPoint
- rooftopPoint
- routingPoint



# Intersections

Types:
- 2-way
- 3-way
- 4-way
- 5+
- Dead-ends




Victoria, BC

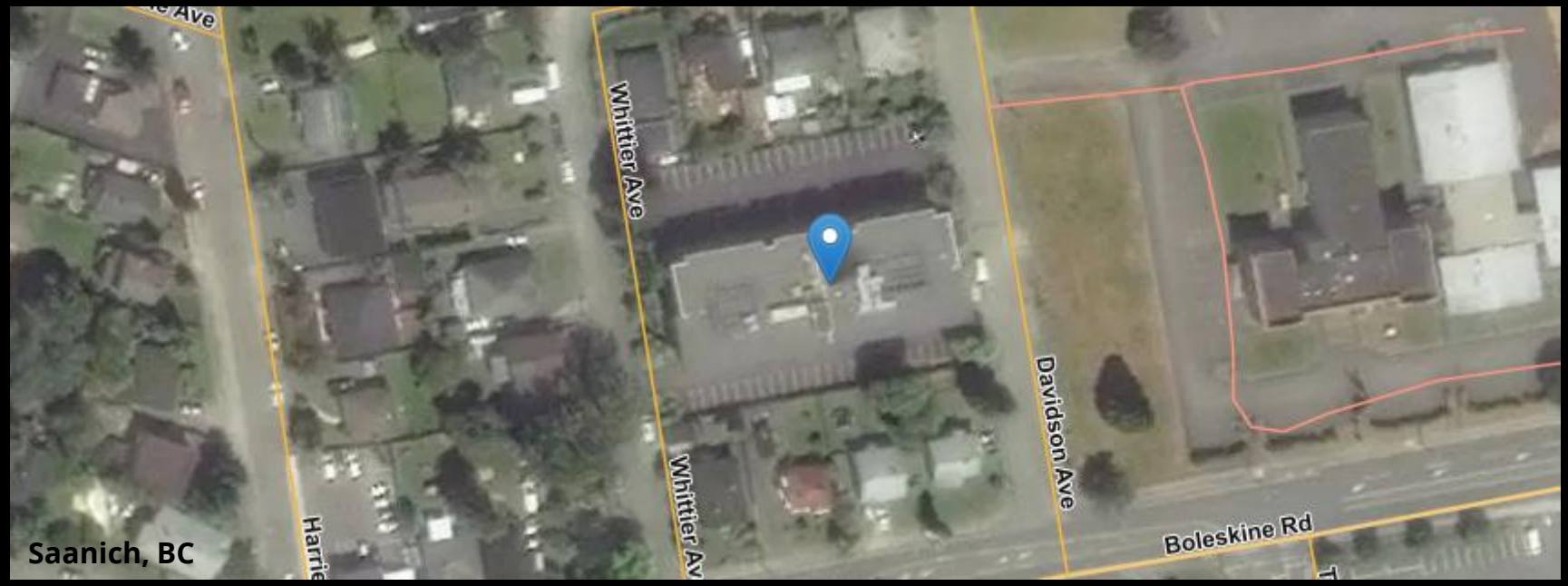
# Standardize and Geocode

- Input (addressString) = 3400 Da**vd**son Av**, Victoria**

- Output
  - (fullAddress) =3400 Da**vid**son **Ave**, **Saanich, BC**
  - Coordinates, faults etc. in the format of your choice

# Sample Request

- https://geocoder.api.gov.bc.ca/addresses.json?
  **addressString=**3400 Da**vd**son Av**, Victoria**
  **&locationDescriptor=**parcelPoint**&maxResults=**1
  **&minScore=**90



# /addresses response






```
{
  "type": "FeatureCollection",
  "queryAddress": "3400 Davdson Av, Victoria",
  "searchTimestamp": "2020-05-20 11:12:51",
  "executionTime": 2.068,
  "version": "4.0.0",
  "baseDataDate": "2020-04-14",
  "crs": {
    "type": "EPSG",
    "properties": {
      "code": 4326
    }
  },
  "interpolation": "adaptive",
  "echo": "true",
  "locationDescriptor": "parcelPoint",
  "setBack": 0,
  "minScore": 90,
  "maxResults": 1,
  "disclaimer": "http://www2.gov.bc.ca/gov/admin/disclaimer.page",
  "privacyStatement": "http://www2.gov.bc.ca/gov/admin/privacy.page",
  "copyrightNotice": "Copyright © 2020 Province of British Columbia - Open Government License",
  "copyrightLicense": "https://www2.gov.bc.ca/gov/content?id=A519A56BC2BF44E4A008B33FCF527F61",
```

# /addresses response






```
"features": [
  {
    "type": "Feature",
    "geometry": {
      "type": "Point",
      "crs": {
        "type": "EPSG",
        "properties": {
          "code": 4326
        }
      },
      "coordinates": [
        -123.3797449,
        48.4529005
      ]
    },
```

# /addresses response



**fullAddress vs. addressString**

**score**
**= (precisionPoints) – (faults)**
**= 100 – (4 + 2 + 1)**


```
"properties": {
  "fullAddress": "3400 Davidson Ave, Saanich, BC",
  "score": 93,
  "matchPrecision": "CIVIC_NUMBER",
  "precisionPoints": 100,
  "faults": [
    {
      "element": "LOCALITY",
      "fault": "isAlias",
      "penalty": 4
    },
    {
      "element": "STREET_NAME",
      "fault": "spelledWrong",
      "penalty": 2
    },
    {
      "element": "PROVINCE",
      "fault": "missing",
      "penalty": 1
    }
  ],
```

# /addresses response




```
        "siteName": "",
        "unitDesignator": "",
        "unitNumber": "",
        "unitNumberSuffix": "",
        "civicNumber": 3400,
        "civicNumberSuffix": "",
        "streetName": "Davidson",
        "streetType": "Ave",
        "isStreetTypePrefix": "false",
        "streetDirection": "",
        "isStreetDirectionPrefix": "",
        "streetQualifier": "",
        "localityName": "Saanich",
        "localityType": "District Municipality",
        "electoralArea": "",
        "provinceCode": "BC",
        "locationPositionalAccuracy": "high",
        "locationDescriptor": "parcelPoint",
        "siteID": "e9e4850f-b4c8-416a-9470-467f865f99a9",
        "blockID": 303247,
        "fullSiteDescriptor": "",
        "accessNotes": "",
        "siteStatus": "active",
        "siteRetireDate": "9999-12-31",
        "changeDate": "2020-04-16",
        "isOfficial": "true"
      }
    }
  ]
}
```


**Unique and change monthly**

# Viewing a response in HTML

# Proximity

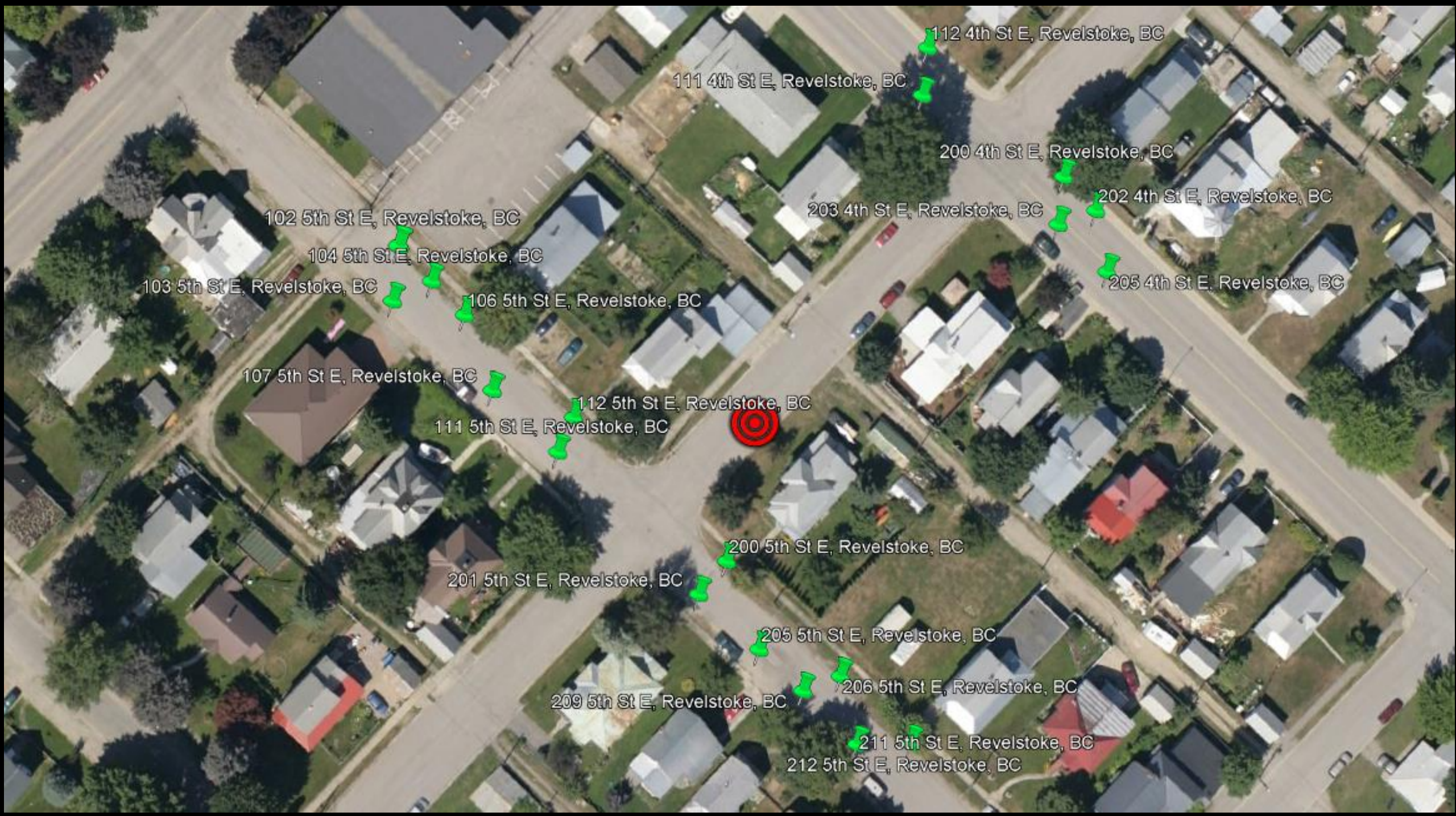
## Nearest Site

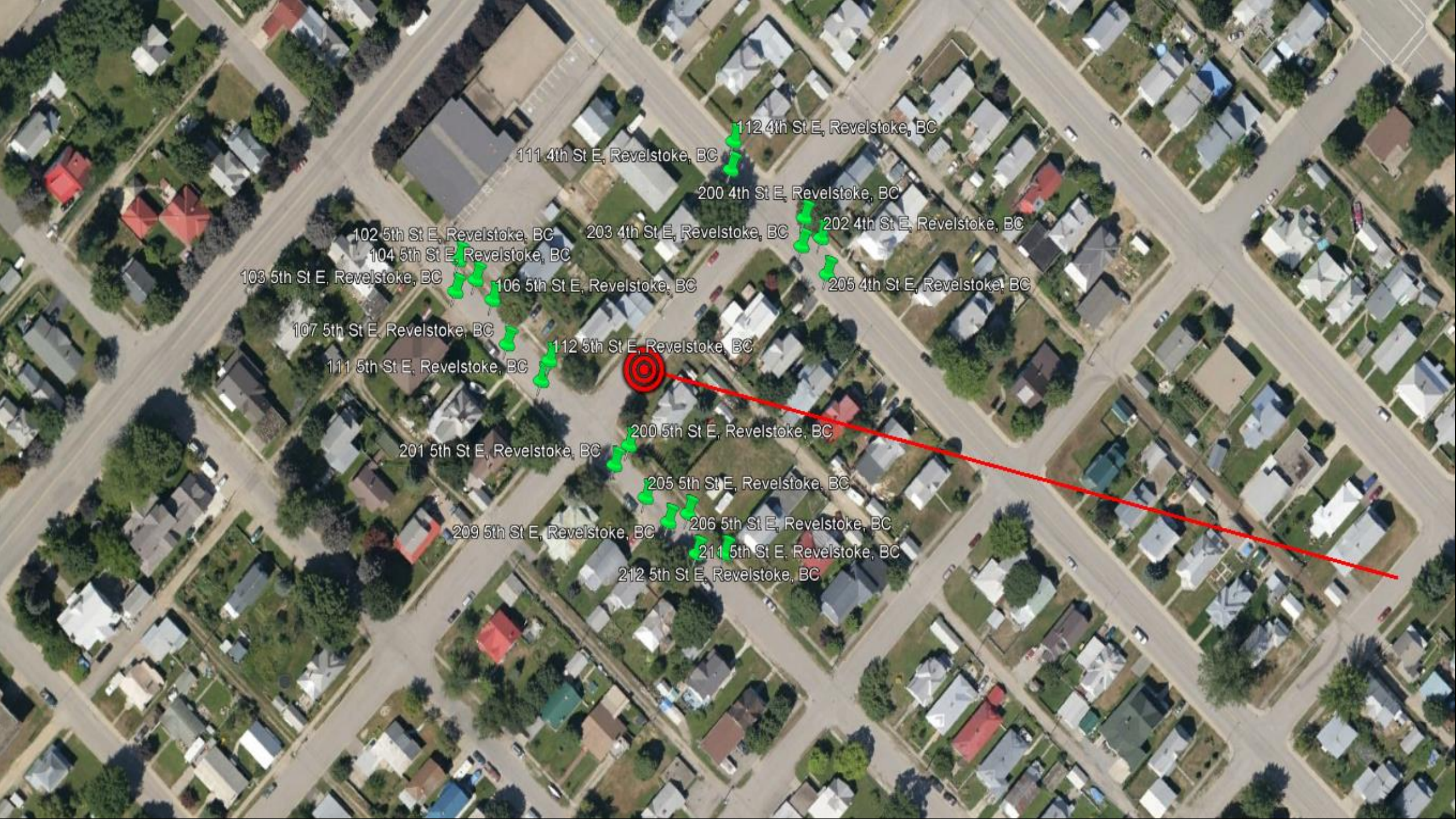
- https://geocoder.api.gov.bc.ca/**sites/nearest.kml**?**point**=-118.19724,50.99595&**maxDistance**=250 &**locationDescriptor**=accessPoint

# Proximity

## Near Sites

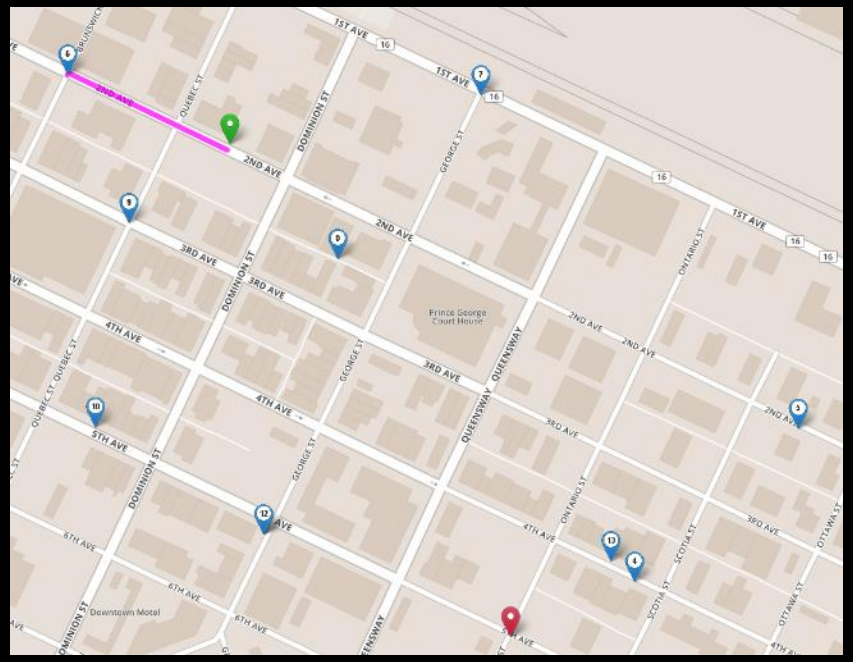
- https://geocoder.api.gov.bc.ca/**sites/near.kml**?**point**=-118.19724,50.99595&**maxDistance**=250 &**maxResults**=20&**locationDescriptor**=accessPoint

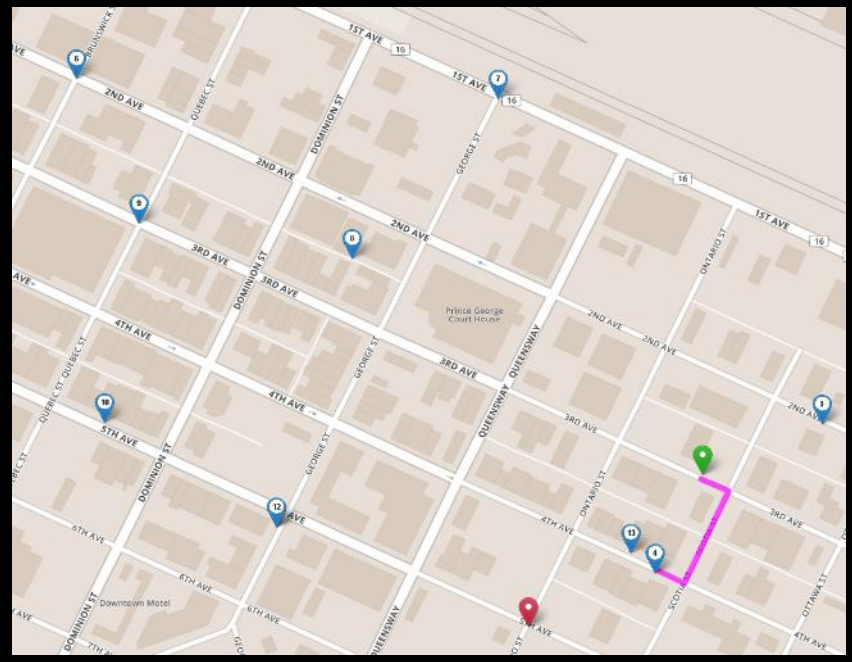

112 4th St E, Revelstoke, BC
111 4th St E, Revelstoke, BC
200 4th St E, Revelstoke, BC
202 4th St E, Revelstoke, BC
203 4th St E, Revelstoke, BC
205 4th St E, Revelstoke, BC
102 5th St E, Revelstoke, BC
104 5th St E, Revelstoke, BC
103 5th St E, Revelstoke, BC
106 5th St E, Revelstoke, BC
107 5th St E, Revelstoke, BC
112 5th St E, Revelstoke, BC
111 5th St E, Revelstoke, BC
200 5th St E, Revelstoke, BC
201 5th St E, Revelstoke, BC
205 5th St E, Revelstoke, BC
206 5th St E, Revelstoke, BC
209 5th St E, Revelstoke, BC
211 5th St E, Revelstoke, BC
212 5th St E, Revelstoke, BC

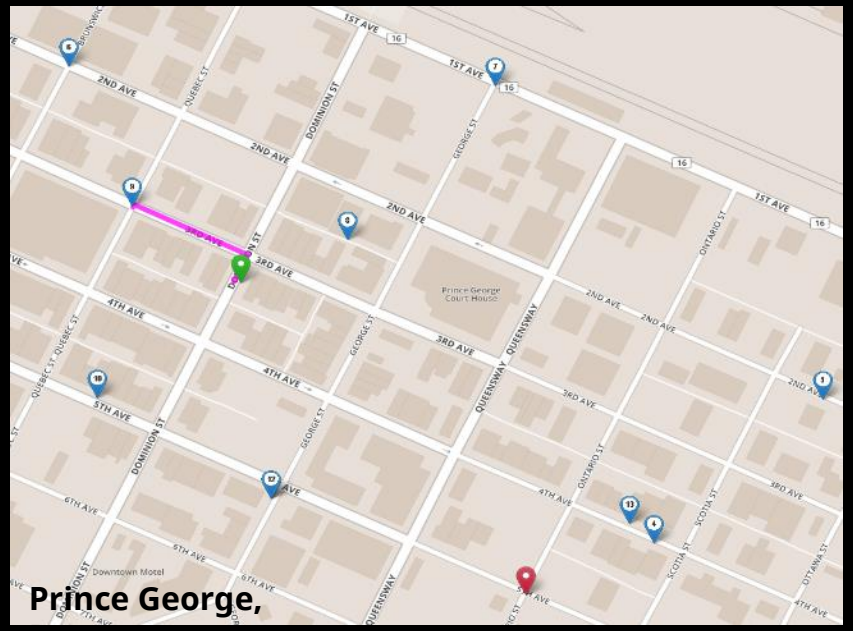

112 4th St E, Revelstoke, BC
111 4th St E, Revelstoke, BC
200 4th St E, Revelstoke, BC
202 4th St E, Revelstoke, BC
203 4th St E, Revelstoke, BC
102 5th St E, Revelstoke, BC
104 5th St E, Revelstoke, BC
103 5th St E, Revelstoke, BC
106 5th St E, Revelstoke, BC
205 4th St E, Revelstoke, BC
107 5th St E, Revelstoke, BC
112 5th St E, Revelstoke, BC
111 5th St E, Revelstoke, BC
200 5th St E, Revelstoke, BC
201 5th St E, Revelstoke, BC
205 5th St E, Revelstoke, BC
206 5th St E, Revelstoke, BC
209 5th St E, Revelstoke, BC
211 5th St E, Revelstoke, BC
212 5th St E, Revelstoke, BC

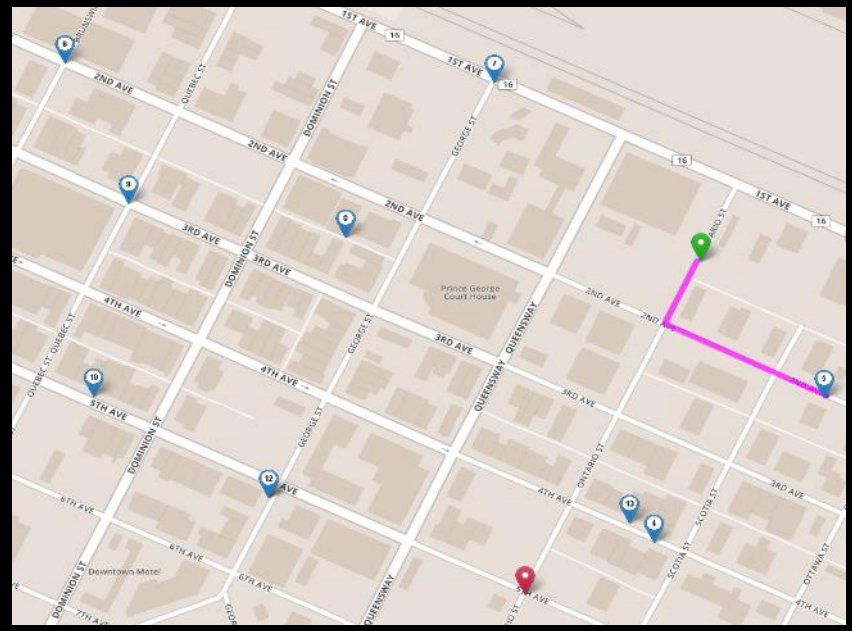
# Proximity





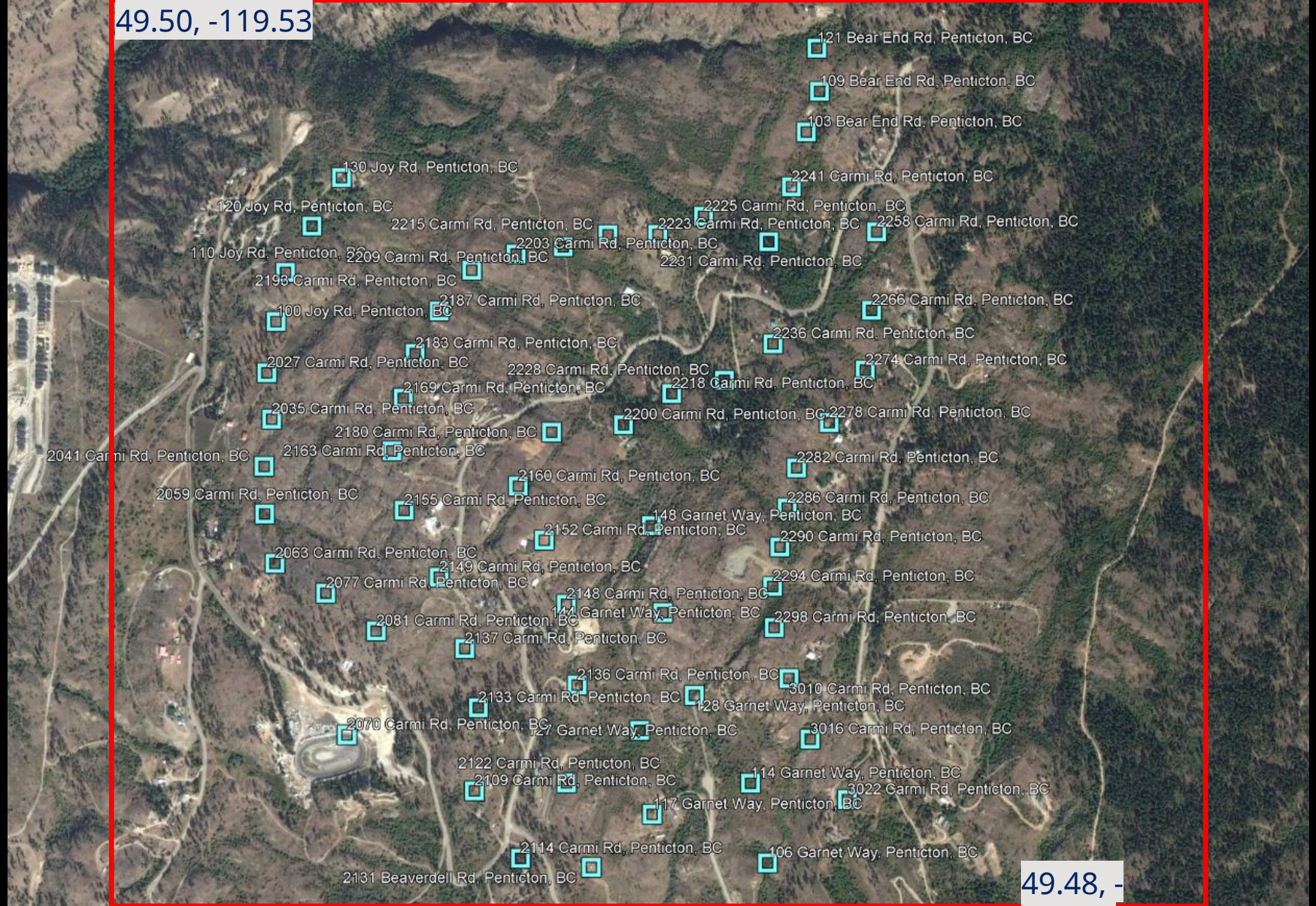




**Prince George,**

# Proximity

## Sites Within a BBOX

- https://geocoder.api.gov.bc.ca/**sites/within.kml**?**bbox**=-119.51,49.48,-119.53,49.50&outputSRS=4326&**maxResults**=100&locationDescriptor=parcelPoint


49.50, -119.53
121 Bear End Rd, Penticton, BC
109 Bear End Rd, Penticton, BC
103 Bear End Rd, Penticton, BC
130 Joy Rd, Penticton, BC
2241 Carmi Rd, Penticton, BC
120 Joy Rd, Penticton, BC
2225 Carmi Rd, Penticton, BC
2215 Carmi Rd, Penticton, BC
2223 Carmi Rd, Penticton, BC
2258 Carmi Rd, Penticton, BC
2203 Carmi Rd, Penticton, BC
110 Joy Rd, Penticton, BC
2209 Carmi Rd, Penticton, BC
2231 Carmi Rd, Penticton, BC
2198 Carmi Rd, Penticton, BC
2187 Carmi Rd, Penticton, BC
2266 Carmi Rd, Penticton, BC
100 Joy Rd, Penticton, BC
2236 Carmi Rd, Penticton, BC
2183 Carmi Rd, Penticton, BC
2027 Carmi Rd, Penticton, BC
2228 Carmi Rd, Penticton, BC
2274 Carmi Rd, Penticton, BC
2169 Carmi Rd, Penticton, BC
2218 Carmi Rd, Penticton, BC
2035 Carmi Rd, Penticton, BC
2200 Carmi Rd, Penticton, BC
2278 Carmi Rd, Penticton, BC
2180 Carmi Rd, Penticton, BC
2041 Carmi Rd, Penticton, BC
2163 Carmi Rd, Penticton, BC
2282 Carmi Rd, Penticton, BC
2160 Carmi Rd, Penticton, BC
2059 Carmi Rd, Penticton, BC
2155 Carmi Rd, Penticton, BC
2286 Carmi Rd, Penticton, BC
148 Garnet Way, Penticton, BC
2152 Carmi Rd, Penticton, BC
2290 Carmi Rd, Penticton, BC
2063 Carmi Rd, Penticton, BC
2149 Carmi Rd, Penticton, BC
2294 Carmi Rd, Penticton, BC
2077 Carmi Rd, Penticton, BC
2148 Carmi Rd, Penticton, BC
144 Garnet Way, Penticton, BC
2298 Carmi Rd, Penticton, BC
2081 Carmi Rd, Penticton, BC
2137 Carmi Rd, Penticton, BC
2136 Carmi Rd, Penticton, BC
3010 Carmi Rd, Penticton, BC
2133 Carmi Rd, Penticton, BC
128 Garnet Way, Penticton, BC
2070 Carmi Rd, Penticton, BC
127 Garnet Way, Penticton, BC
3016 Carmi Rd, Penticton, BC
2122 Carmi Rd, Penticton, BC
114 Garnet Way, Penticton, BC
2109 Carmi Rd, Penticton, BC
3022 Carmi Rd, Penticton, BC
117 Garnet Way, Penticton, BC
2114 Carmi Rd, Penticton, BC
106 Garnet Way, Penticton, BC
2131 Beaverdell Rd, Penticton, BC
49.48, -

# BC Address Geocoder

## Batch List Submitter

# Batch Address List Submitter

## Accessible from the **DataBC website**

## Hosted on **GitHub**

- https://bcgov.github.io/ols-devkit/als/

BRITISH COLUMBIA | DataBC

# Thank you

https://data.gov.bc.ca/
Email: data@gov.bc.ca