

Introduction to Quality Assurance (QA)

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What is Quality Assurance?

Wikipedia says: “Quality Assurance is a way of preventing mistakes or defects in manufactured products...”

But OpenStreetMap has **no** approval process for edits...

So how can we find and fix errors to maintain a high quality map and the underlying database?

You can visualize the data, find known/suspect errors and query for features. I'll cover all three.

QA Area

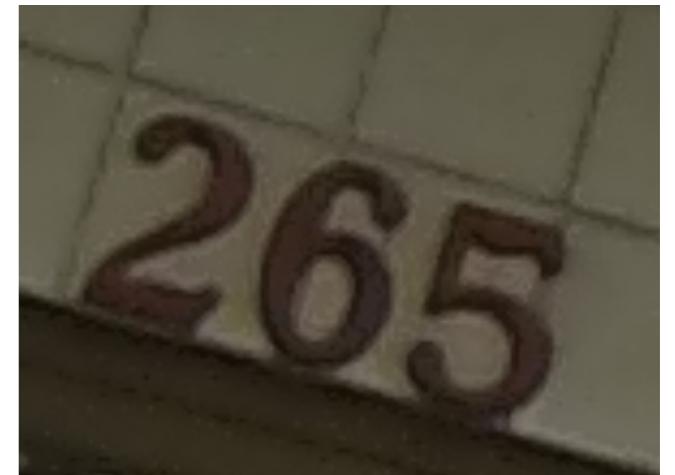
- I'm interested in the Lower 48 states and Puerto Rico



QA Scope

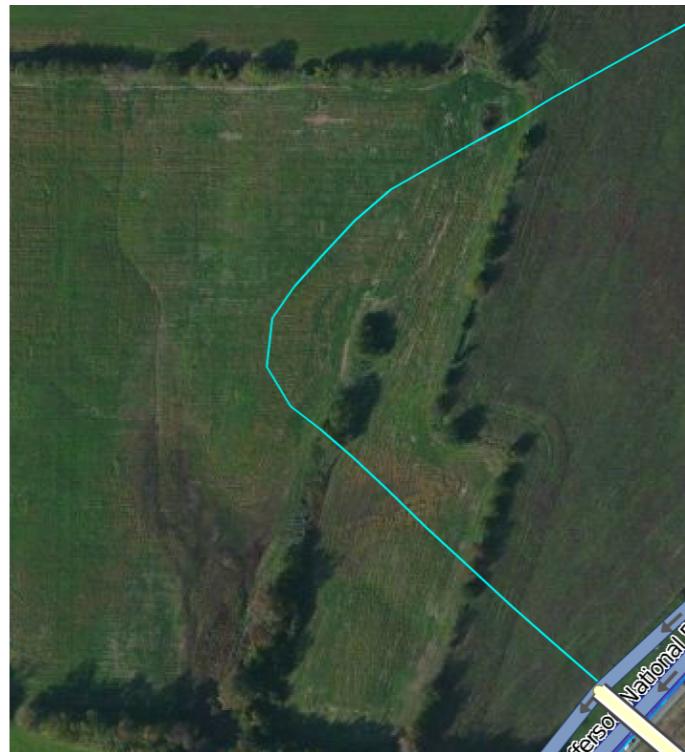
My focus is on navigation, so I'm most interested in:

- Roads/Speed Limits
- Addresses
- Buildings
- Water
- Rail
- Etc...



Spatial completeness: points and ways

- Field work
 - GPS traces
 - Photos
 - Smart phone edits
 - Notes (WalkingPapers.org)
- Air photos:
 - Bing
 - Mapbox (zoom 17)
 - Locally sourced



Tag completeness:

Does a fast food restaurant have a:

- Name?
- Complete mailing address?

addr:housenumber=22610
addr:street=New Cut Road
addr:city=Clarksburg
addr:state=MD
addr:postcode=20871

- Cuisine?
- Drive thru?
- Etc...

Tag correctness

addr:postcode=MD 21784

addr:city: "Washington", addr:state=DC (correct)

Incorrect:

washington, DC

washington, dc

Washington, DC

Washington dc

WASHINGTON DC

Washington, D.C.

The Wiki is your friend

Research how to capture/fix features you're not familiar with...

- OpenStreetMap Wiki
- Mailing lists
- help.openstreetmap.org
- forum.openstreetmap.org

A few common errors

Untagged ways

Tagging a road as one-way, but not checking the other end

One-way dead-ends

Missing intersections

Joining two roads with different attributes together and getting a new street name, such as “Main Street;First Avenue”

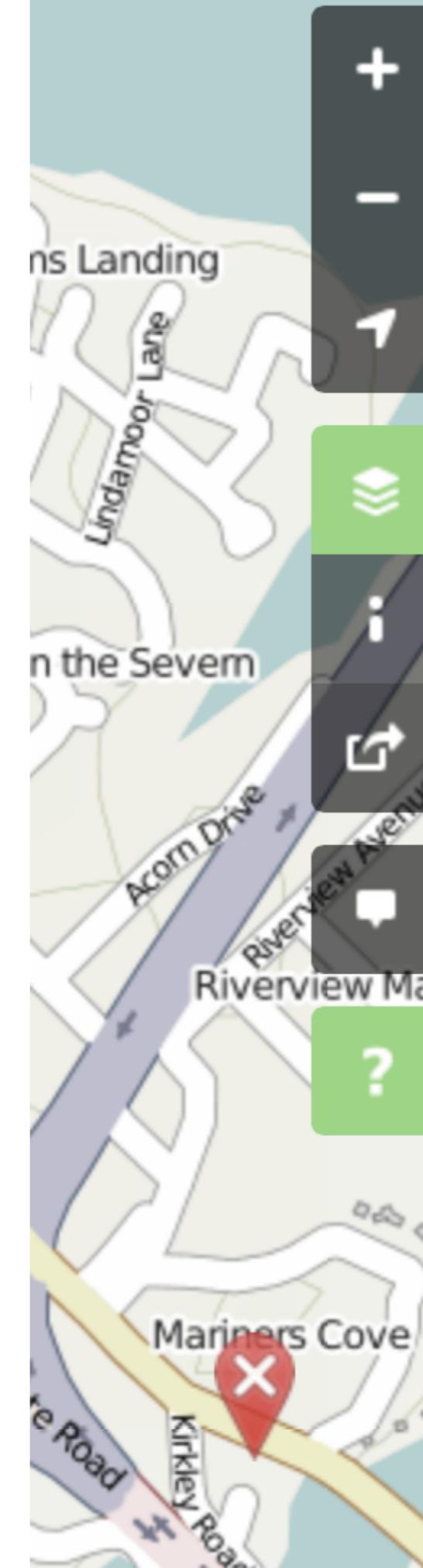
JOSM Validation

The screenshot shows the 'Validation Results' dialog in JOSM. The title bar has a checkmark icon and the text 'Validation Results'. The main area is titled 'Warnings (126)' with a warning icon. A blue rectangular highlight surrounds the first item in the list: 'incomplete object: only name (1)'. Below it is a list of other validation issues:

- incomplete object: only name (1)
- Route scheme is unspecified. Add public_transport:vers
- power=sub_station is deprecated (1)
- Crossing ways (2)
- Unspecific tag access=unknown (9)
- Unnamed ways (1)
- Way end node near other highway (3)
- landuse= on a node. Should be drawn as an area. (2)
- Other duplicated nodes – Duplicated nodes (88)
- Role verification problem (15)

Notes

- are a core feature of OSM to allow comments for mapping/ editing
- are of varying quality, as several routing apps add notes into OSM and anonymous users may add them as well
- some are ToDo tasks for the mapper



Map Layers

Standard

Cycle Map

Transport Map

MapQuest O

Humanitarian

Enable overlays for the map

Map Notes

Map Data

OpenStreetMap

Edit History Export GPS Traces User Diaries Copyright Help About RoadGeek_MD99

Search Where am I? Go

Unresolved note #74648

Description

Burleigh Manor House

Created by anonymous over 1 year ago

This note includes comments from anonymous users which should be independently verified.

Resolve Comment

Notes

Red is open
Green is resolved
Clicking on the note opens the comment

FIXME/fixme?

- Tag on a feature when a mapper knows or suspects a problem
- FIXME=yes is vague!
- Remove the FIXME when done...

Way: 233332700		
Key	Value	
FIXME	dual carriageway	×
bridge	yes	×
highway	secondary	×
name	Louetta Road	×
oneway	yes	×

View: Tagging

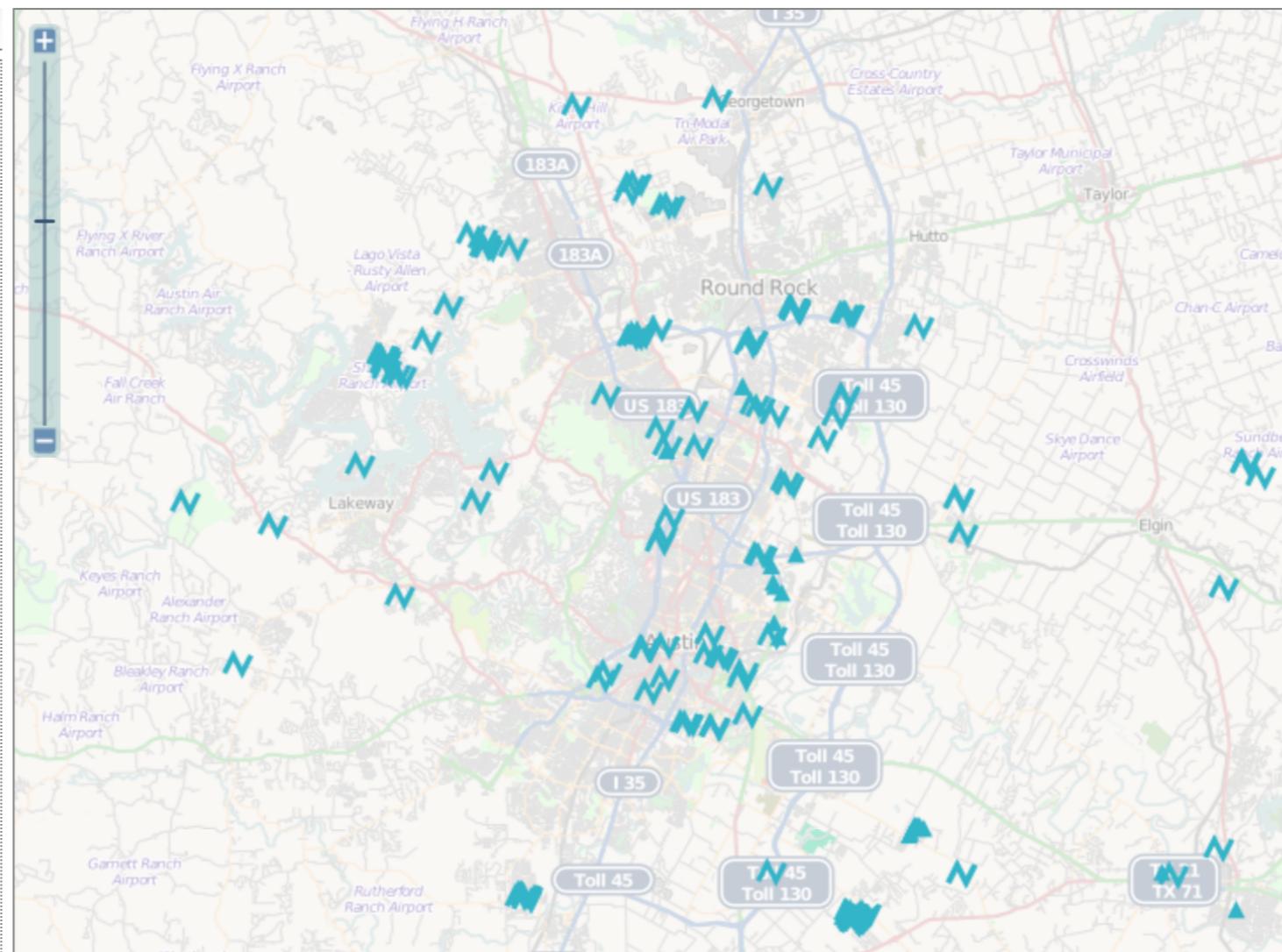
Base layer:

Mapnik



Overlays

- Empty tag key
 - On nodes
 - On ways
- Empty tag value
 - On nodes
 - On ways
- Tag key with space
 - On nodes
 - On ways
- Misspelled key?
 - On nodes
 - On ways
- Unusual character
 - On nodes
 - On ways
- Unusual key length
 - On nodes
 - On ways
- Tagged with FIXME
 - On nodes
 - On ways
- Unwayed segments
- Ways without tags



Data from 2015-02-27 21:23 (UTC)

-97.52300, 30.32265 zoom=10 [Permalink](#)Data/Maps Copyright 2014 Geofabrik GmbH and OpenStreetMap Contributors | Map tiles: Creative Commons BY-SA 2.0 Data: ODbL 1.0 | [Contact](#)

Selection



layer: ways_without_tags

way_id: 139463469

lastchange: 2011-12-02T22:53:06Z

Data

None

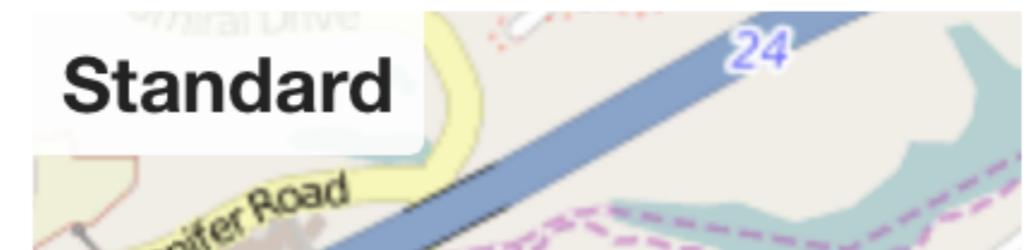
FIXMEs in OSM Inspector

Some Map Views...

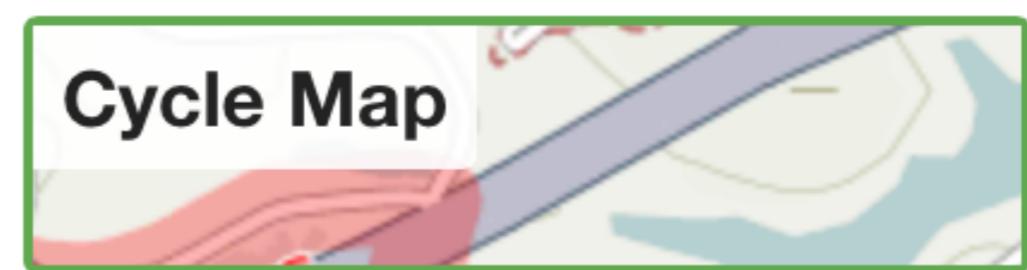


Map Layers

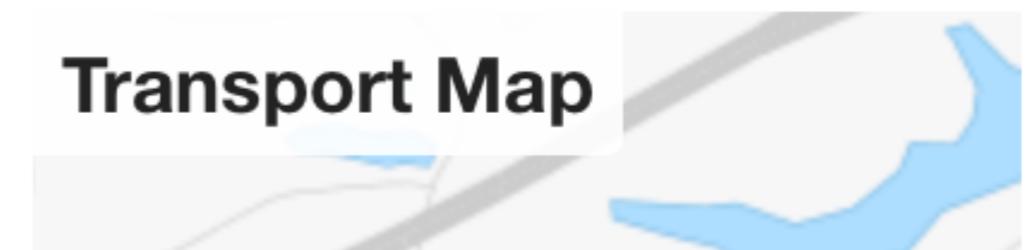
Standard



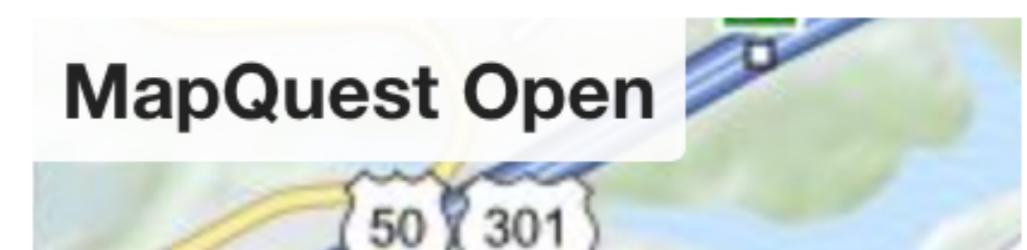
Cycle Map



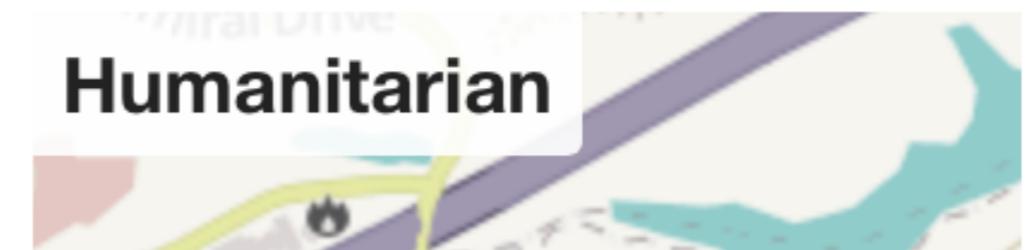
Transport Map



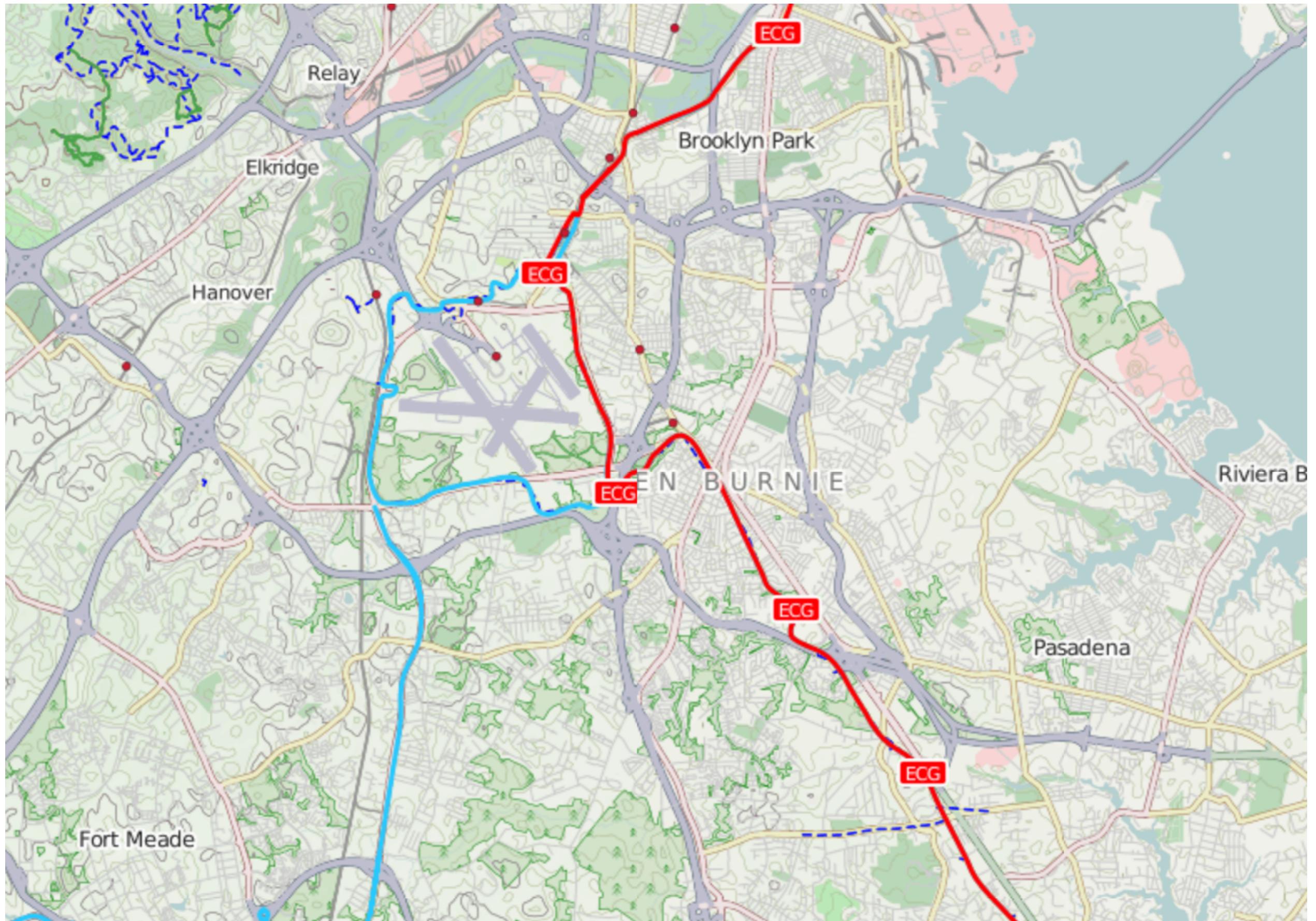
MapQuest Open



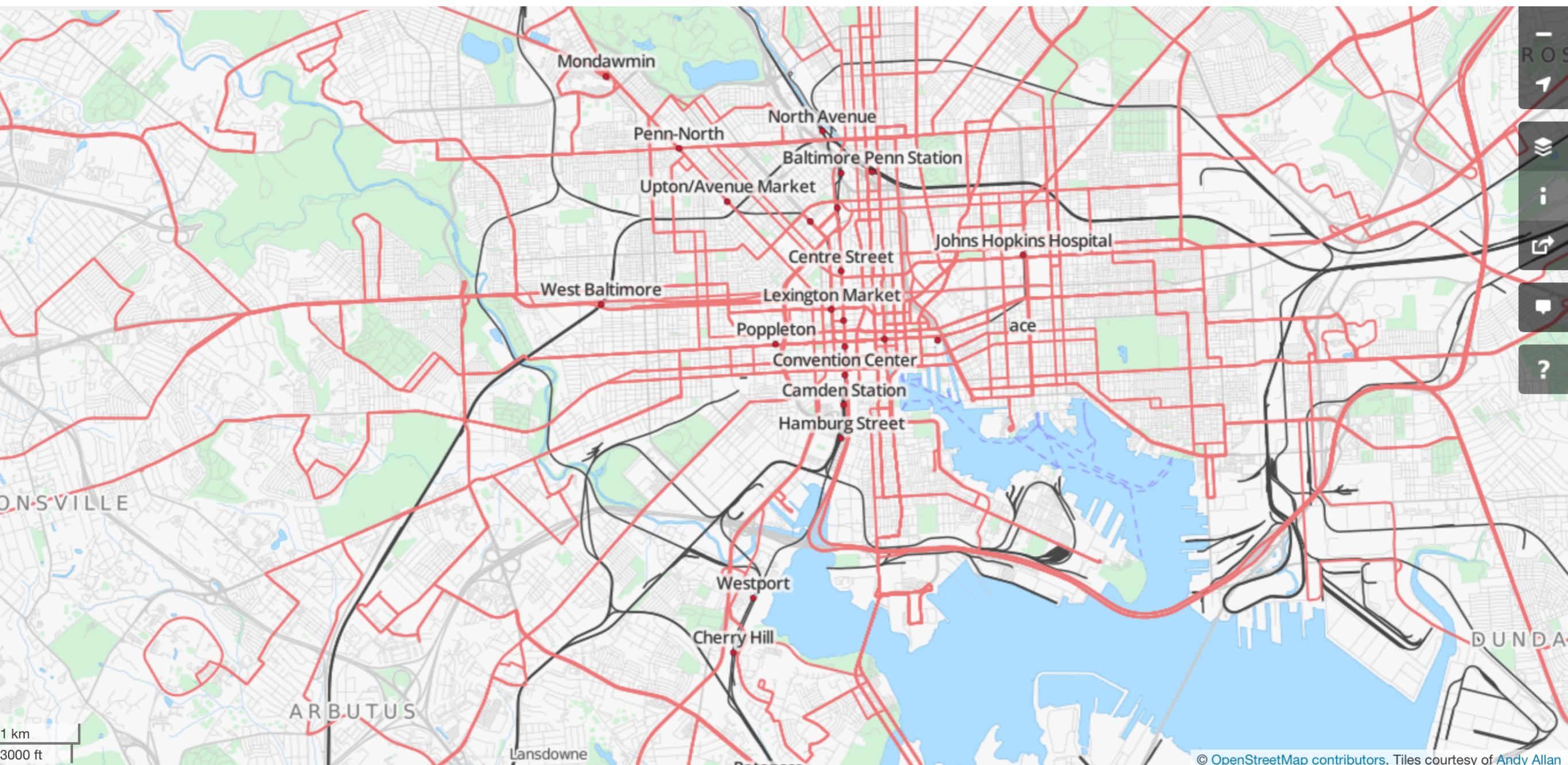
Humanitarian



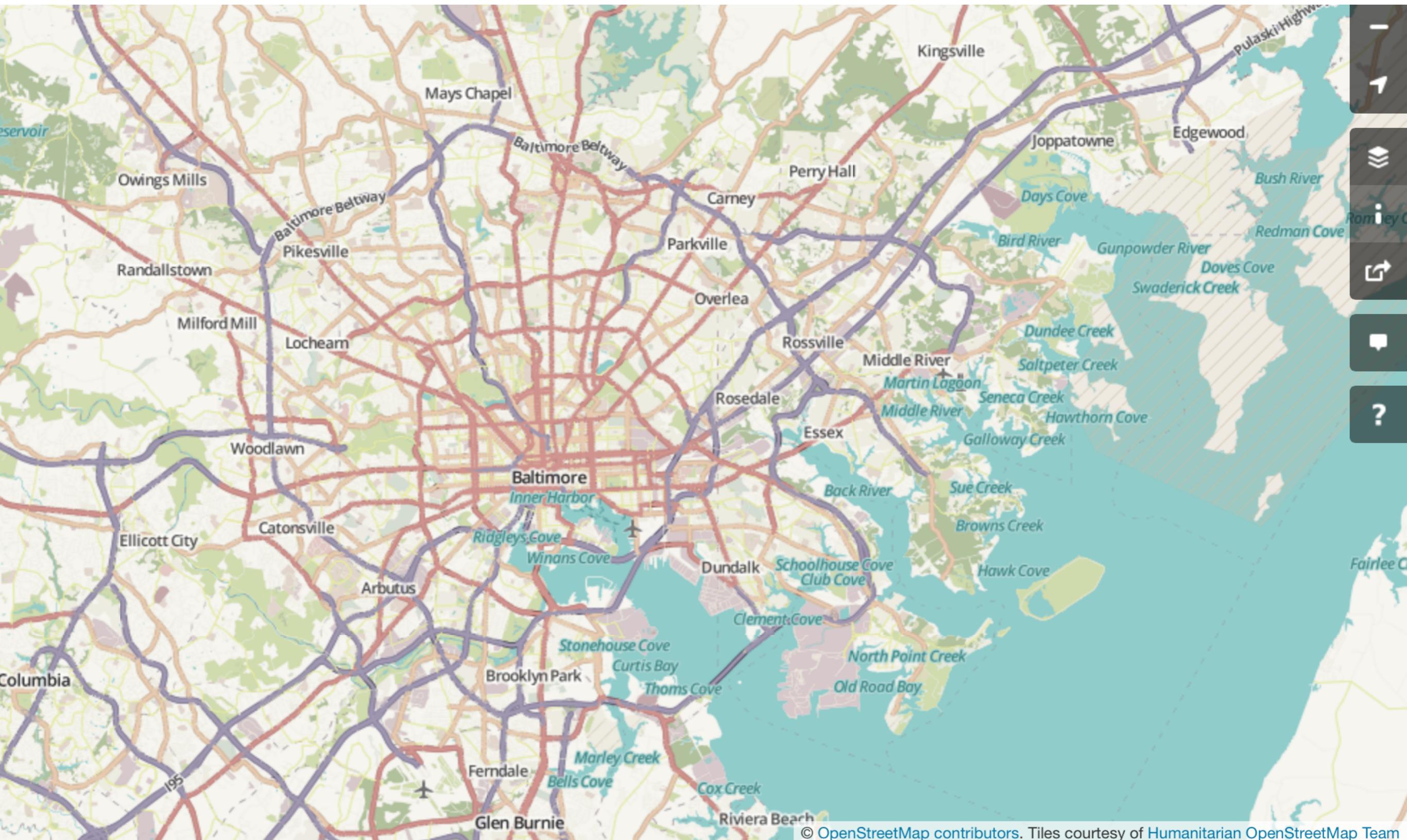
Cycle Map



Transport Map



Humanitarian



OpenRailwayMap.org

OpenRailwayMap English  Sponsored by: joker.com

Last update: 29.05.2015 19:00, more than 21 hours ago

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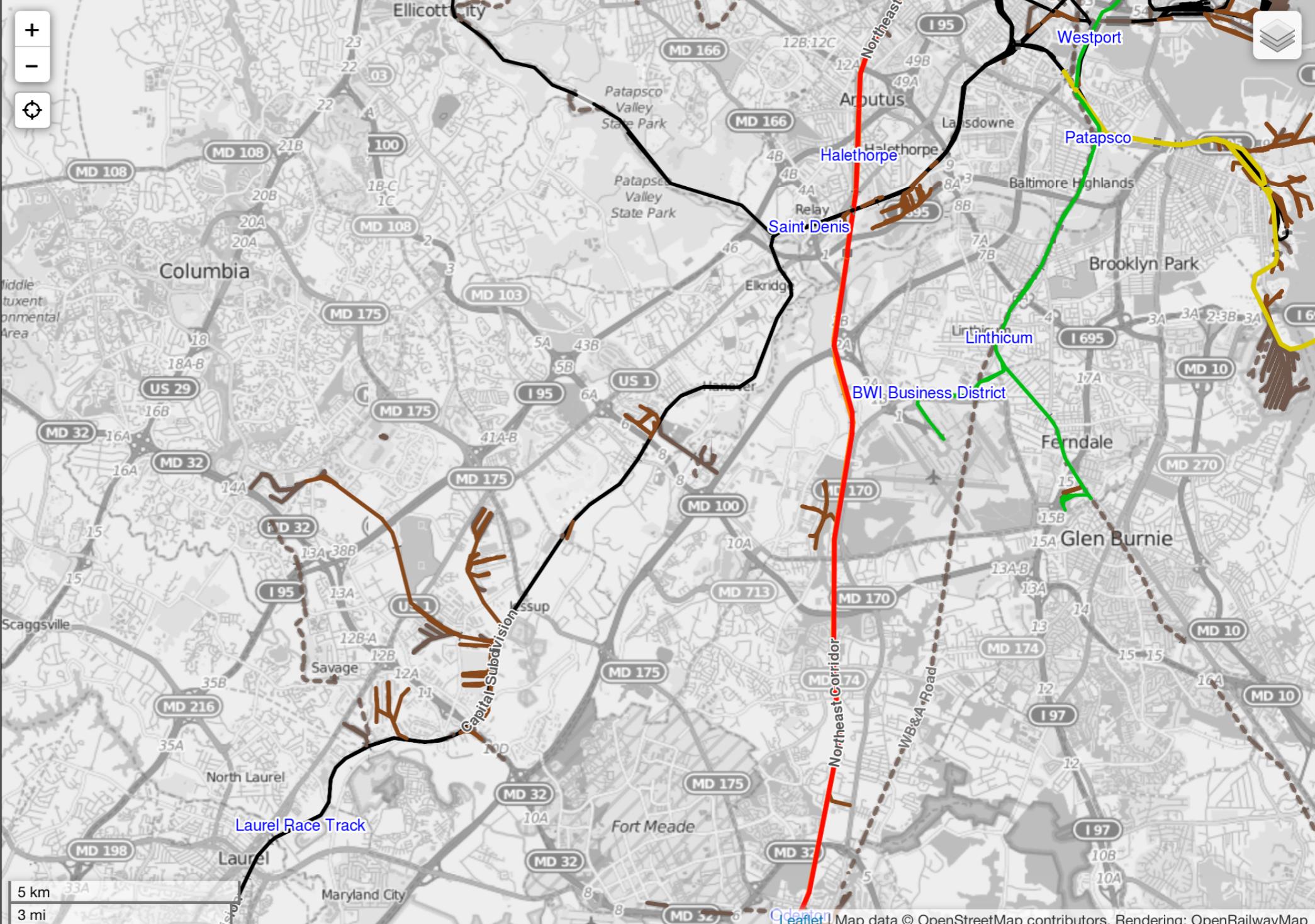
[◀](#) [X](#)

Select a map style:

- Infrastructure
- Maxspeeds
- Signalling

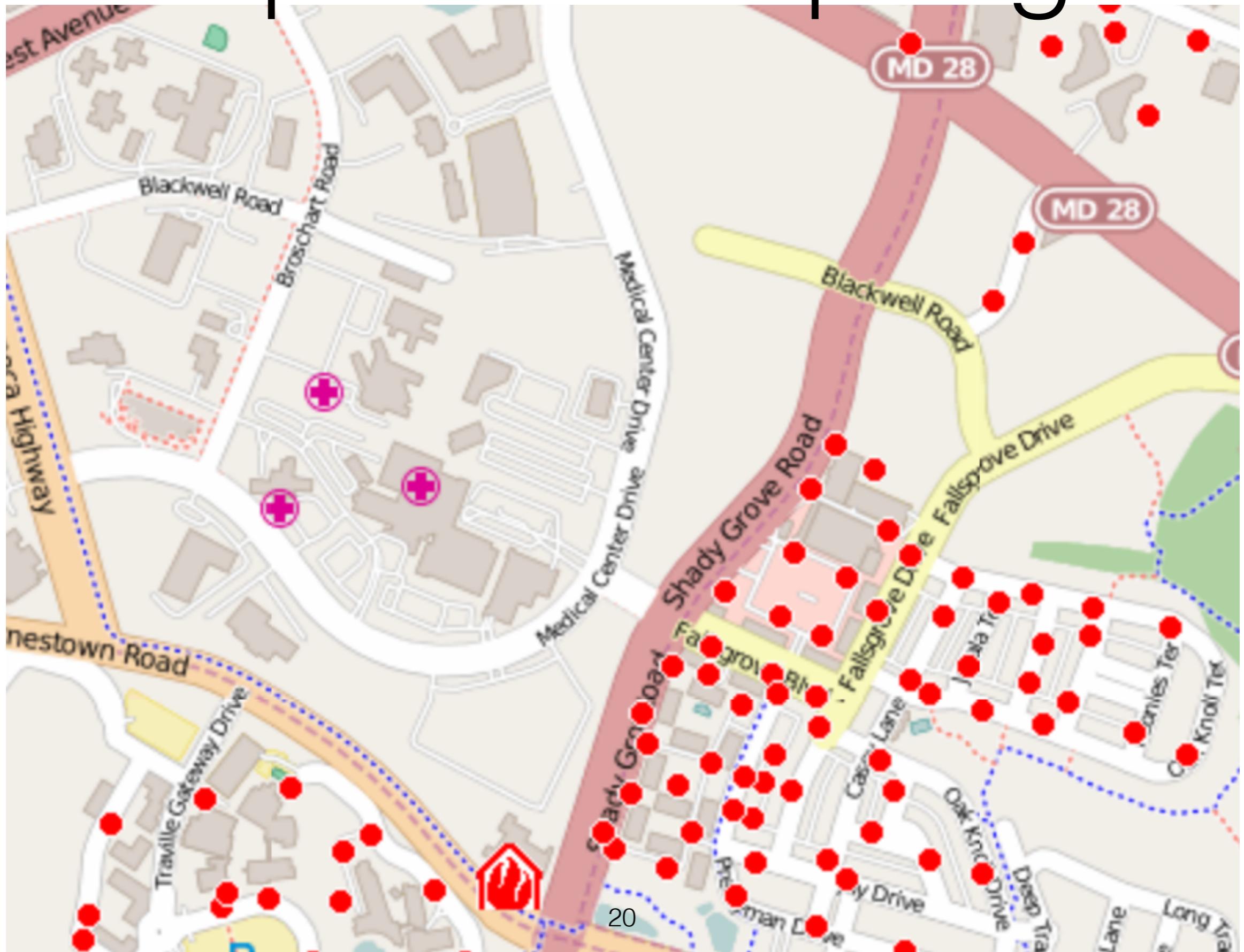
Legend:

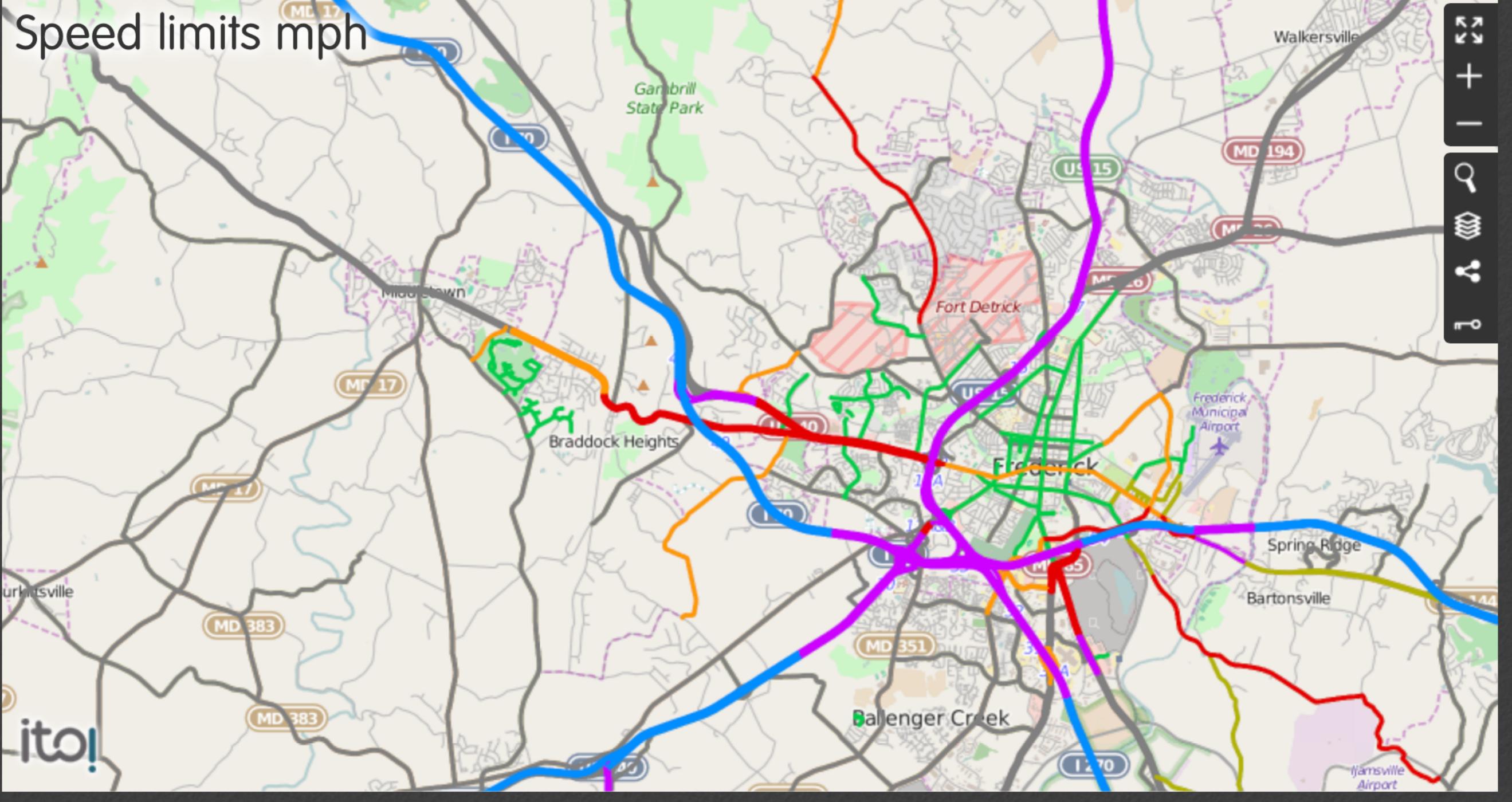
- Bridge
- Tunnel
- Line ref
- Railroad line
- Siding
- Yard track
- Spur
- Crossover track
- Branch line
- Main line
- Highspeed line
- Industrial line



Map data © OpenStreetMap contributors, Rendering: OpenRailwayMap

OpenFireMap.org



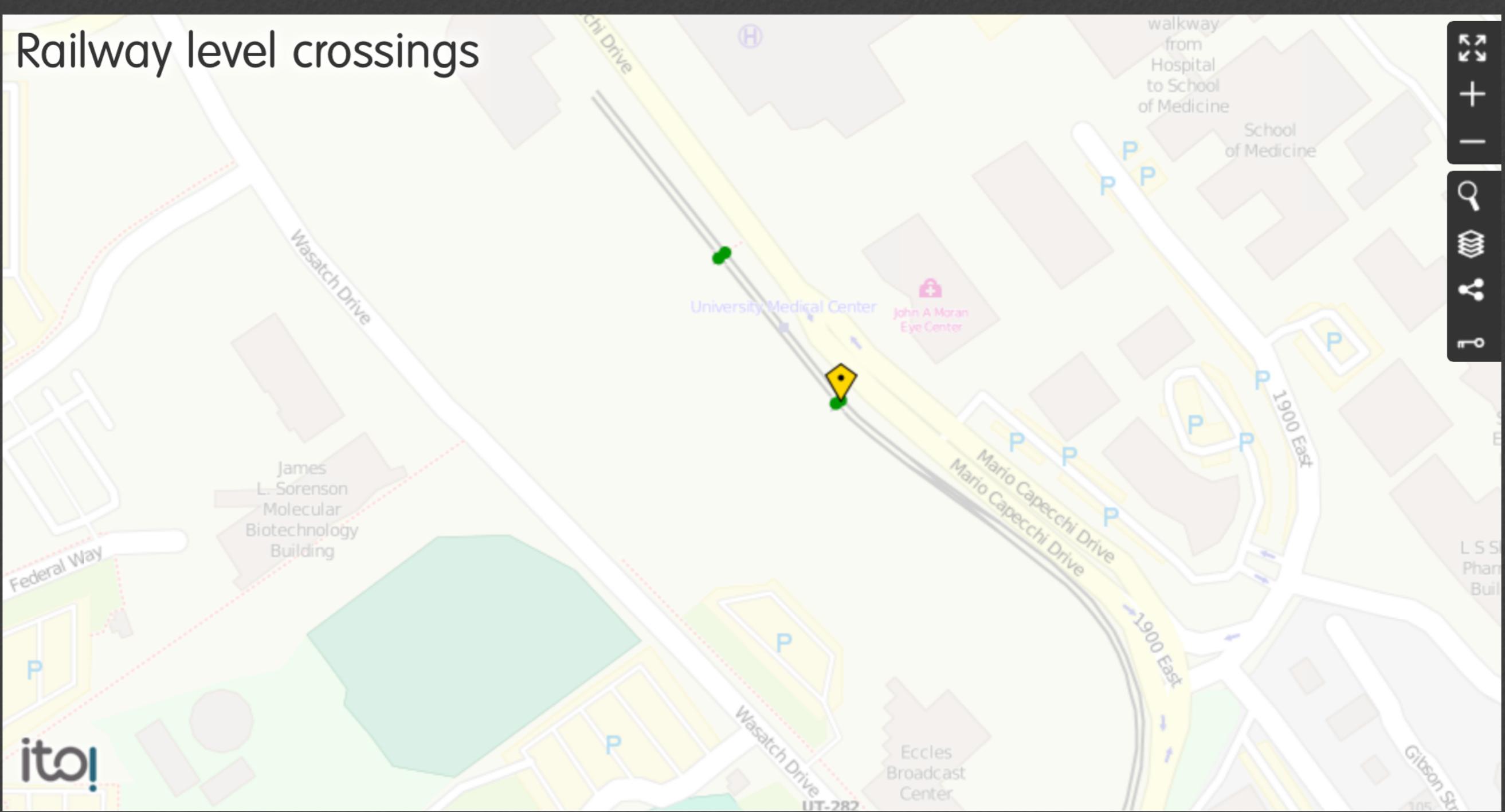


Showing road speed limits in miles per hour.

ITO World: Speed Limits

Key
None
Signals
80, 85 mph
70, 75 mph
60, 65 mph
50, 55 mph
40, 45 mph
30, 35 mph
5, 10, 15, 20, 25 mph
none of the above

ITOWorld.com: Rail Xing



Level crossings on railway lines. Small level crossings which are for pedestrians only are tagged with `railway=crossing`, and for larger crossing where motor vehicles can cross too, which are tagged with `railway=level_crossing`.

Key

- Level crossing
- Small crossing

Using QA Tools

False positives - flagged items that ***aren't*** mistakes

False negatives - mistakes that aren't flagged

Don't fix the mistake by ***deleting*** the feature!

The best QA tools have good descriptions of the errors/warnings, navigation (zoom to city), and will launch your favorite editor.

Many tools will allow you to flag the error as “fixed”.

Continuity with Change

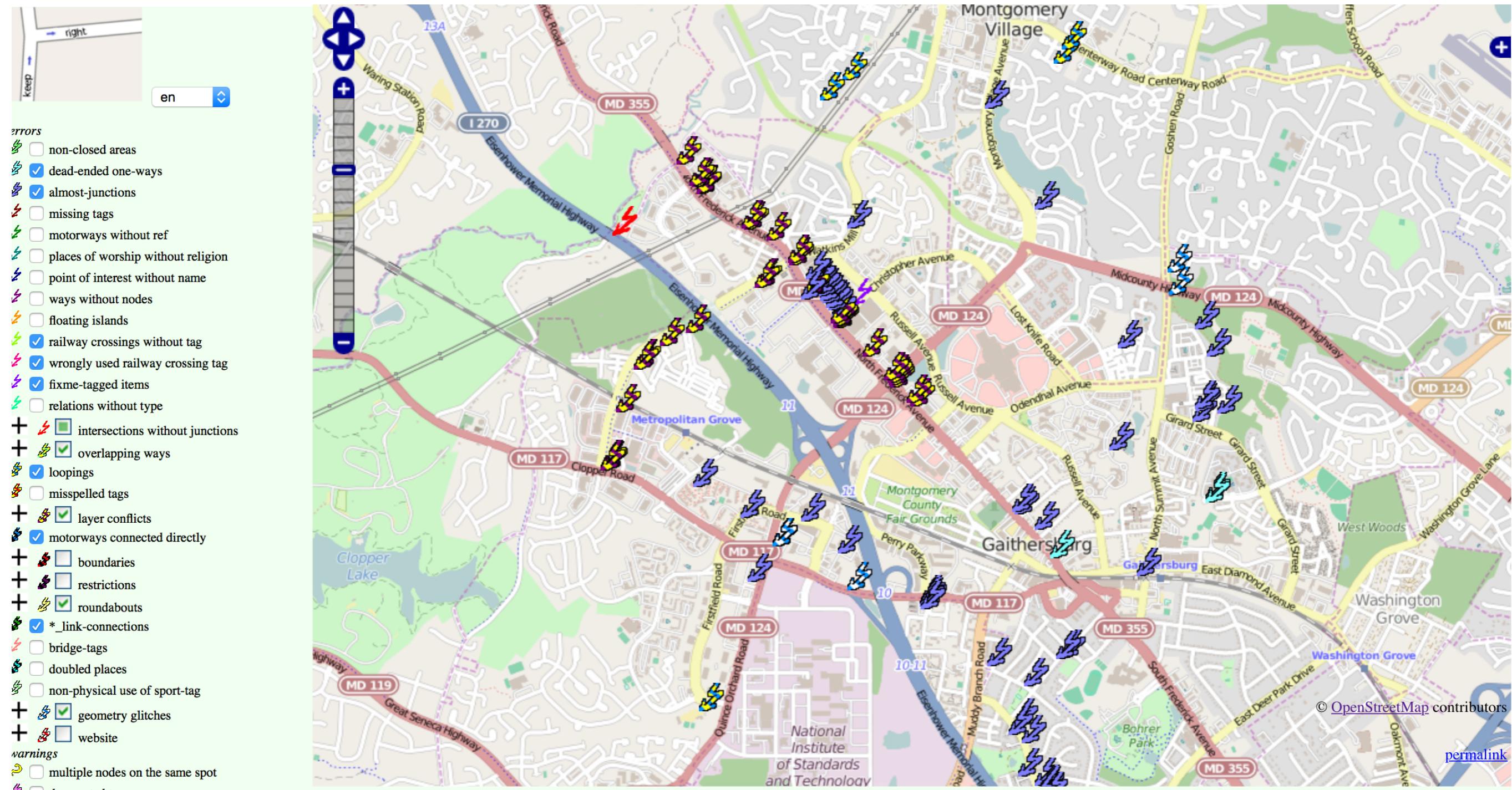


And now
for a few QA Tools...

KeepRight!

- No Zoom, but includes several starting locations
- Lat, long can be entered within the URL
- Large numbers of error types are generated
- Allows user to pick and choose which errors to display
- Untagged ways, intersections without a node, gas stations without a name, etc.
- Only 100 errors shown at a time
- The developer wants to give it away. Know PHP and want to run a server with a Planet file?

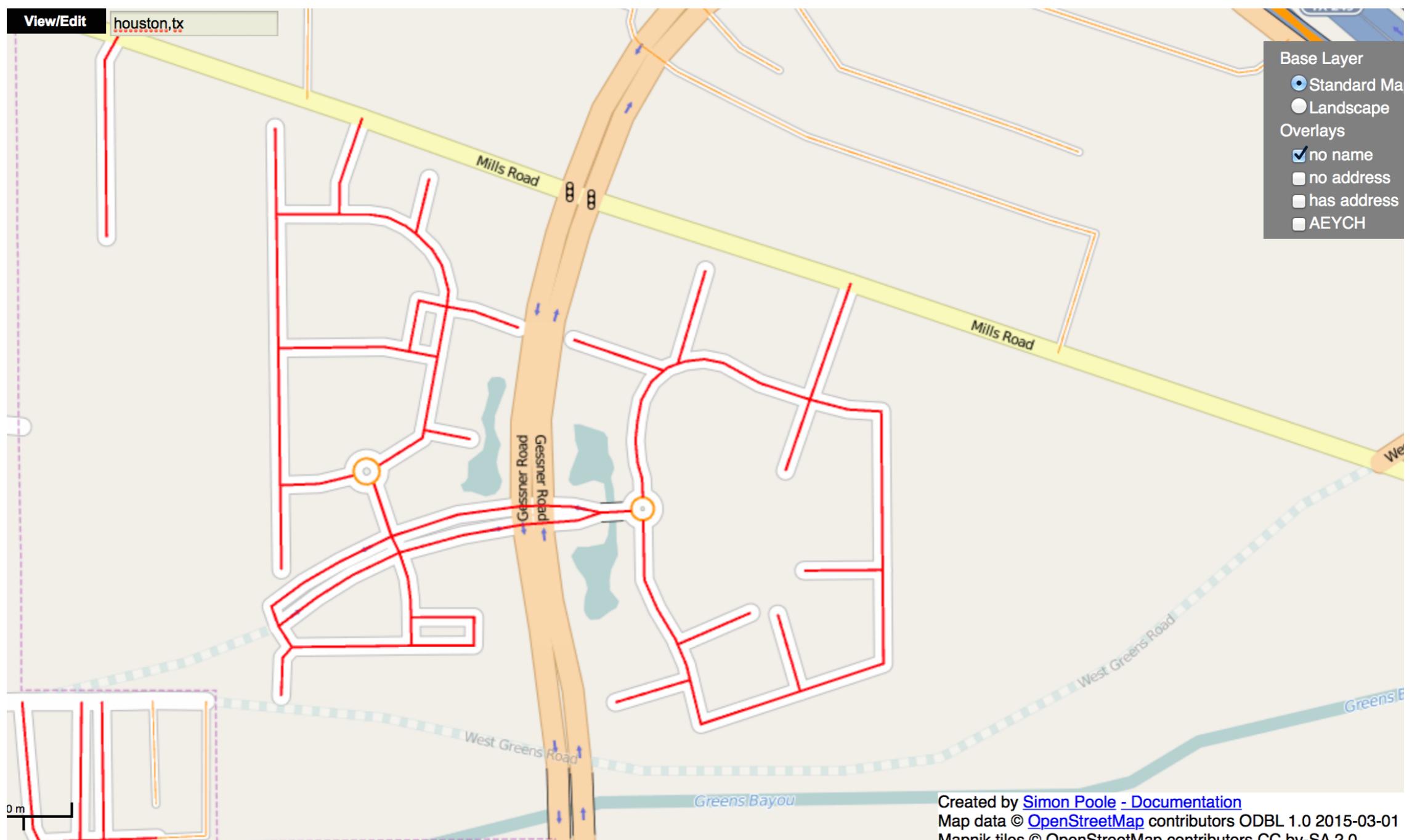
KeepRight.at



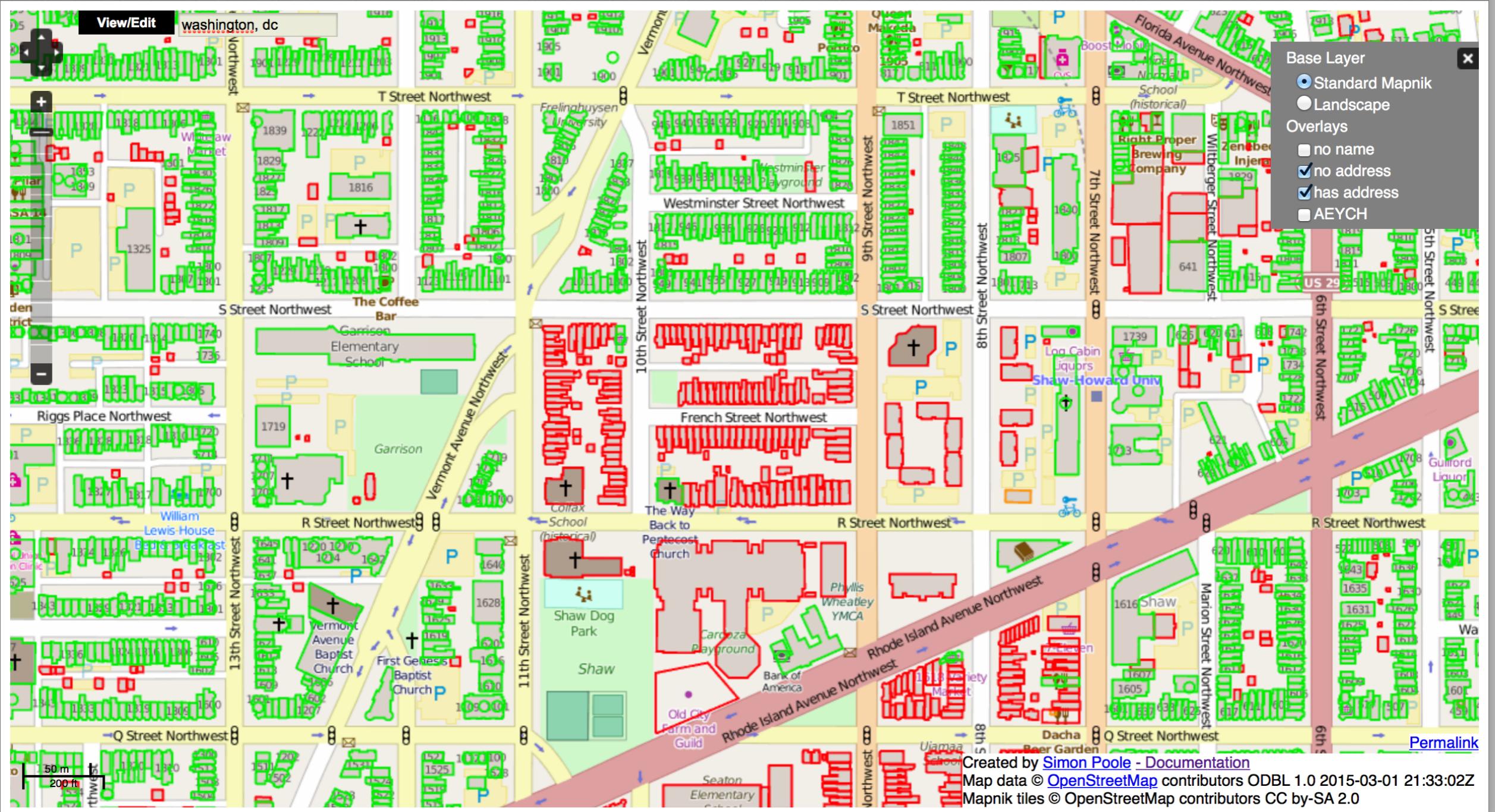
“QA Tool”

- Shows unnamed roads as red/orange on a background of OSM tiles
- Also shows addressed/unaddressed buildings
- Zoom to location
- Roughly 5 minute updates!

qa.poole.ch



Unnamed Roads in Houston, TX



Addresses on buildings: Yes and No in Washington, DC

OSM Inspector

- 15 different views of the data, including:
 - Address, Routing, Rail, Geometry, Tagging, Water, Public Transport, etc.

tools.geofabrik.de/osmi:Addresses

OSM Inspector search Help GEOFABRIK tools Switch tool... ▾

View: Addresses Base layer: Mapnik

Overlays

- Buildings
- All
- With addresses
- Postal code
- Tagged with postal_code
- Nodes with addresses
 - No addr:street tag
 - Street not found
 - Defined addresses
 - Interpolated addresses
- House number interpolation lines
 - Without errors
 - With errors
- Nearest roads
 - Connection lines
 - Connection points on roads
 - Nearest roads
- Nearest areas
 - Nearest areas

Selection

layer: street_not_found
node_id: 822365570
way_id:
ip_id:
is_ip: 0
street: Lamont Street NW
houseno: 1816
postcode:
city:
country:
fulladdr:
place:
road_id:
lastchange: 2010-07-18T01:37:00Z

Data

None

Data from 2015-02-26 21:23:01 (UTC) -77.04629, 38.93474 zoom=17 [Permalink](#)

Data/Maps Copyright 2014 Geofabrik GmbH and OpenStreetMap Contributors | Map tiles: Creative Commons BY-SA 2.0 Data: ODbL 1.0 | [Contact](#)

Orange buildings have addresses
Red dots for street names not found

Most of the red dots are addresses where the street name is abbreviated (wrong), but not the street way (centerline)!

Map Roulette

- Choose from various micro-tasks, such as poorly shaped roads, missing intersections, etc.
- Got a class of errors? Ask if they will load it.
- Code is available on GitHub for use by others.

The screenshot shows the MapRoulette interface with a world map background. Overlaid on the map are several challenge boxes, each containing a title, a brief description, and a 'Work on this challenge' button.

- Bifurcation Lane Numbers EASY**
Lane Counts at Junctions
total tasks: 11575, available: 5506
[Work on this challenge](#)
- Massachusetts Schools EASY**
total tasks: 1499, available: 1158
[Work on this challenge](#)
- Luxembourg missing highways EASY**
total tasks: 3014, available: 85
[Work on this challenge](#)
- Add missing NYC bike lanes EASY**
Help add bike lanes in NYC to OSM
[Work on this challenge](#)

OpenStreetMap MapRoulette
signed in as RoadGeek_MD99. [sign out](#)

Italian Wrong Addresses

[More help for this challenge](#)
[Select a different challenge](#)
[MapRoulette Metrics](#)

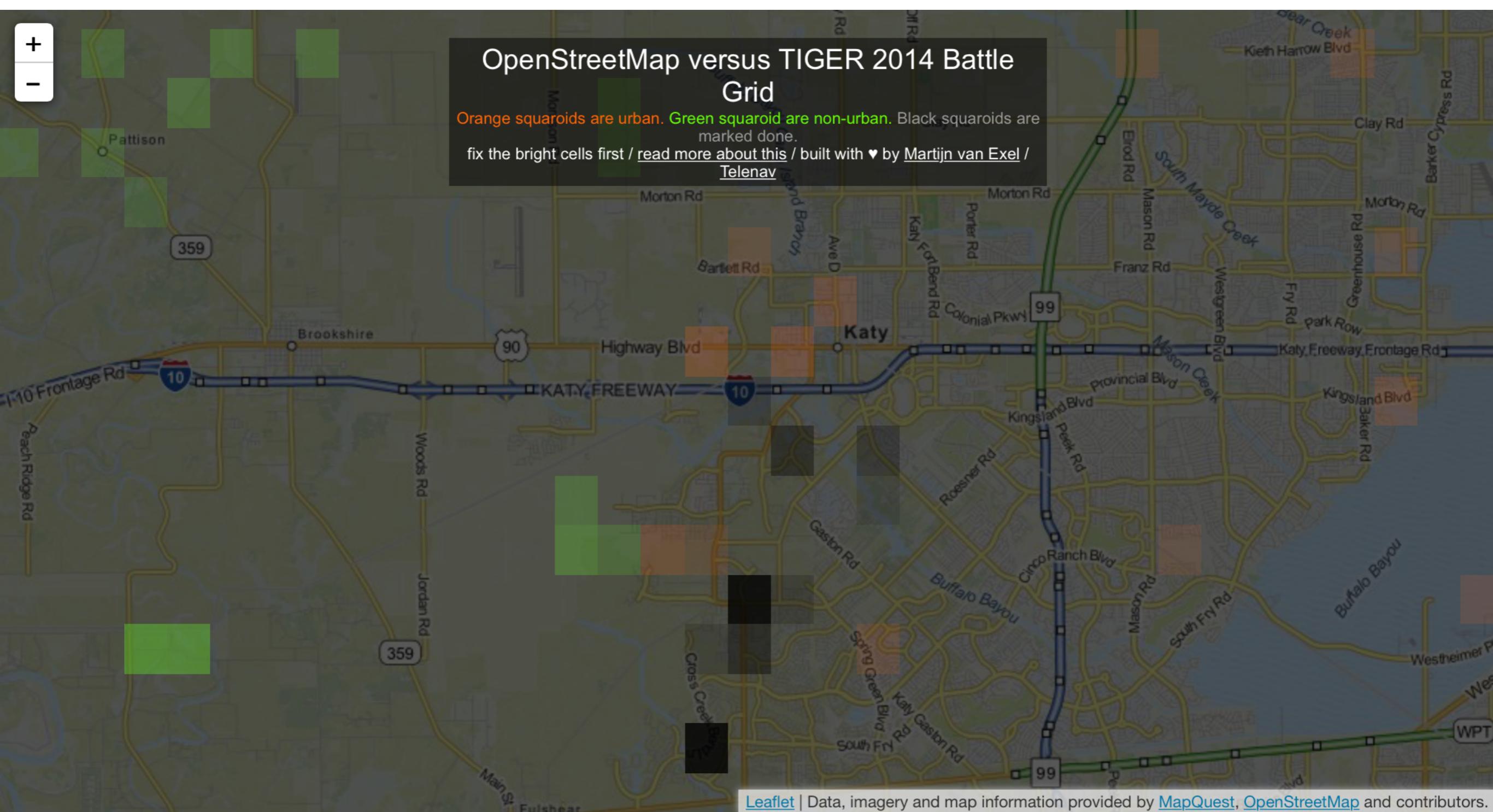
This challenge has about 32130 tasks, and we still need to fix about 7540 of them.

THIS IS NOT AN ERROR q
I'M NOT SURE / SKIP w
EDIT IN iD e
EDIT IN JOSM r

Leaflet | © OpenStreetMap contributors

Battle Grid

- Shows gaps in OpenStreetMap based on USA TIGER 2014
- Prioritized by the number of “missing” roads and urban vs. rural
- No navigation, but add lat/long to URL:
 - [http://184.73.220.107/battlegrid/
#12/29.7322/-95.8705](http://184.73.220.107/battlegrid/#12/29.7322/-95.8705)



• 184.73.220.107/battlegrid

Brighter squares need more work
Orange is urban, green is rural
Black is done

TIGER

- US Census Bureau map of the USA with roads, rail, water, administrative boundaries, and so on.
- A map for counting people, so the shape isn't very important (but it is getting better).
- Basis for massive import of USA roads in 2007
- Not suitable for routing without adding one-ways, bridges, removing nodes between bridges and surface streets, etc.

Overpass

- Powerful query engine with export functionality
- Not a QA tool, but allows for ad hoc queries
- Samples:
 - `FIXME` = ‘dual carriageway’
 - `source =~ 'go*gle'`
- Wizard

Overpass.eu

overpass turbo

Share Export Wizard Save Load Settings Help Flattr this!

Map Data

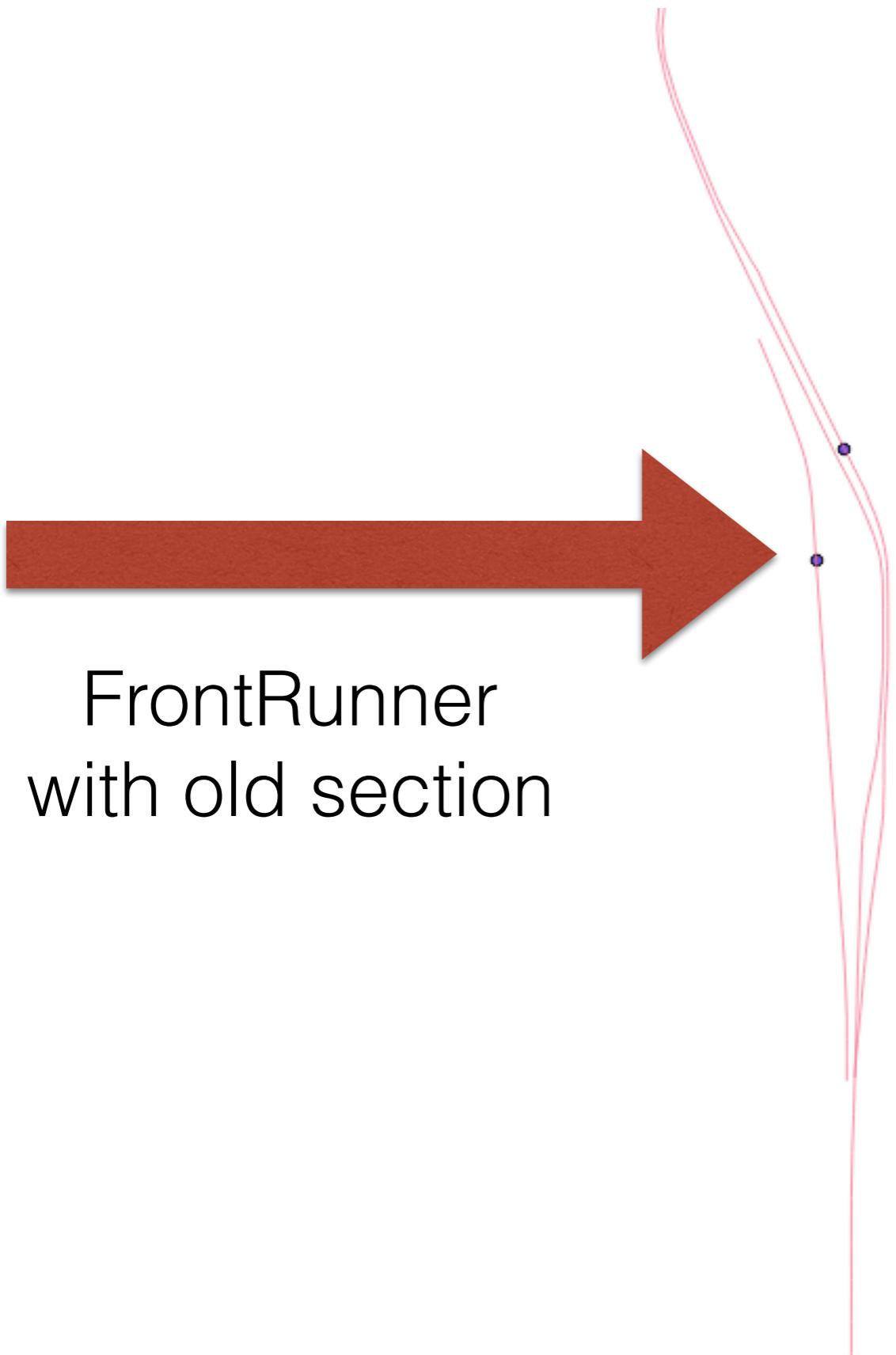
```
/*
This has been generated by the
overpass-turbo wizard.
The original search was:
"name="FrontRunner"
*/
[out:json][timeout:25];
// gather results
(
  // query part for:
  "name=FrontRunner"
  relation["name"="FrontRunner"]
)({{bbox}});
);
// print results
out body;
>;
out skel qt;
```

20 km

Loaded – nodes: 2915, ways: 142, relations: 1
Displayed – pois: 2, lines: 142, polygons: 0

Name=FrontRunner

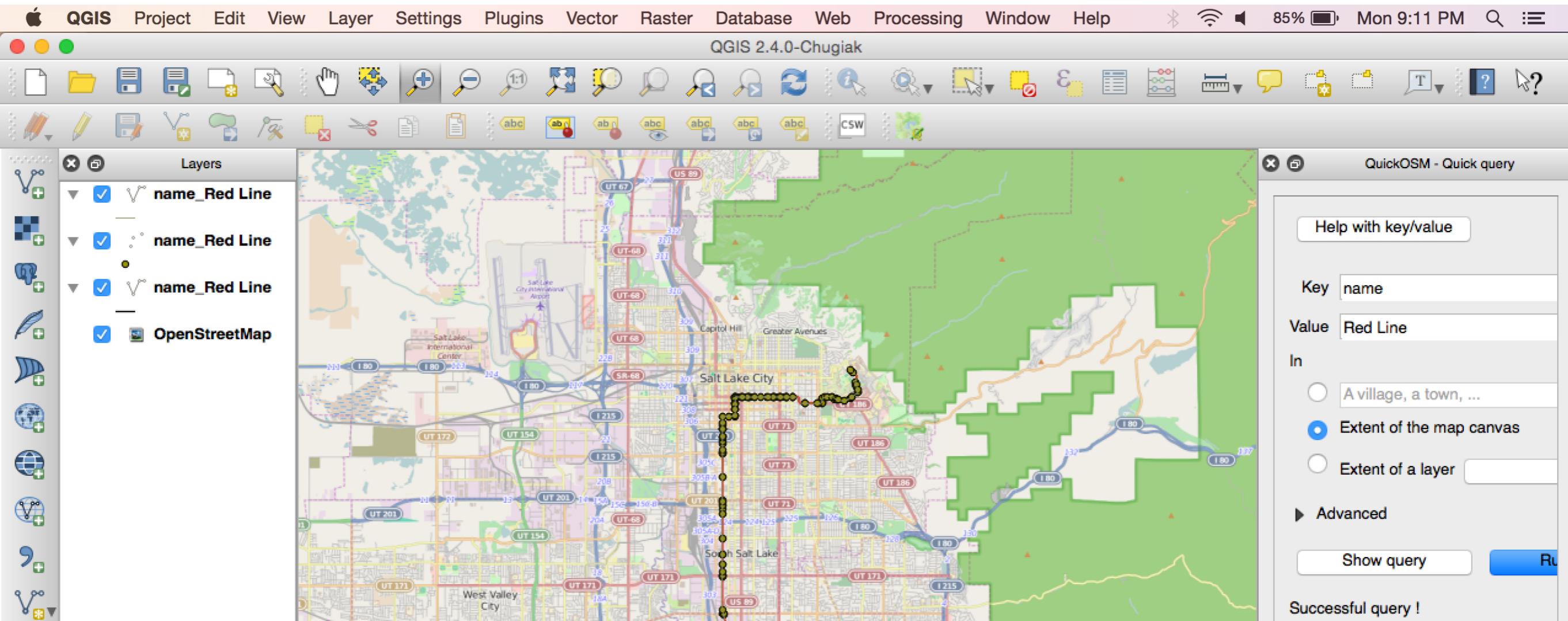
Export from Overpass as GeoJSON and read into QGIS



FrontRunner
with old section

QGIS Overpass Plugin: Quick OSM

- Open source QGIS has a plugin:
`QgisQuickOSMPlugin`
- Allows you to download data in one step for custom analysis



Missed Topics

- Many more QA tools
- Monitoring Tools (Watching the map)
- Tag Info
- Vandalism/Edit wars: Data Working Group
- And...

osmose.openstreetmap.fr/ en/map

- For more, wait for the next session...

Change language ▾ Issues by user Relation analyser Statistics Export ▾ Help ▾ Delay: 0.76d RoadGeek_MD99 (8932) ▾

Severity 1 only
Fixable Topic
Select: [all nothing invert](#)

Structure 22/22 all nothing

- overlapping building
- invalid polygon
- reverse roundabout
- orphan nodes
- sudden highway type change
- bad * link highway
- broken highway continuity
- big relation
- multipolygon
- not-connected highway/cycleway
- duplicate geometry

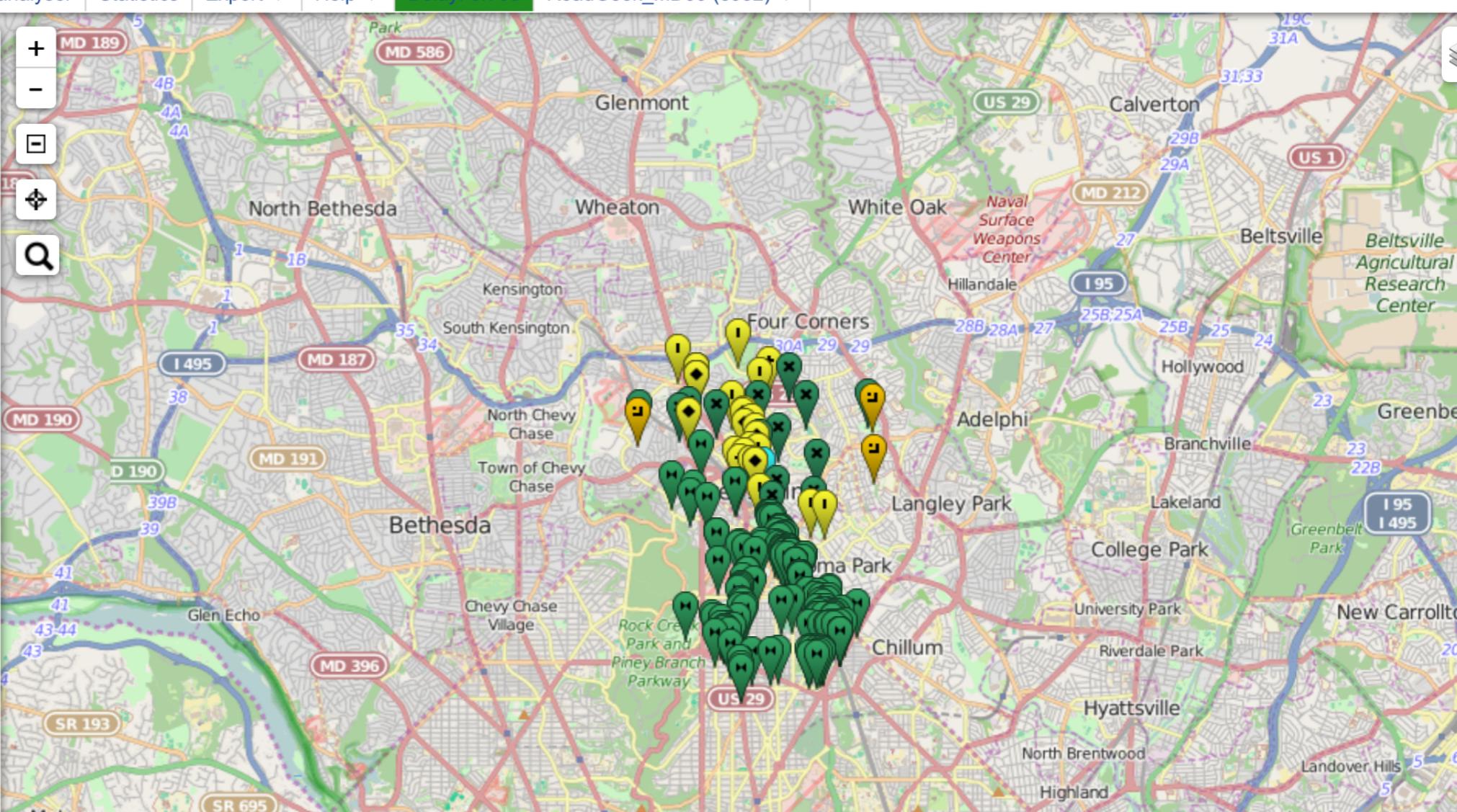
Missing tags 9/9 all nothing

- junction=roundabout
- oneway
- highway

Bad tag 24/24 all nothing

- bad source tag
- multiple tags
- incorrect tag
- bad tag key
- typo in tag

Tags to remove 10/10 all nothing



Questions?

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This talk offers a full introduction of OpenStreetMap QA tools and strategies.

I'll start with a definition of QA in OpenStreetMap and then move onto simple QA with Notes and FIXME/fixme tags. This will be followed by an overview of a few of the QA programs available for OpenStreetMap, such as: OSM Inspector, keep right!, Unnamed Streets, BattleGrid and MapRoulette. Next, I'll cover custom tiles for views of specific data sets, such as: Cycle Map, Transport, Humanitarian, OpenRailMap, OpenFireMap and the ITO World map collection. Lastly, I'll discuss Overpass query (both stand alone and from a QGIS plug in), TIGER clean up, and JOSM editor validation.