

SABRINA project

WP1 Inspection and Safety Ratings

Road attribute conversion tool

Conversion of selected road attributes between iRAP and ECS methodology

Conversion tool TOR – technical description

This document presents a description of procedures and steps necessary to convert gathered iRAP road attributes into ECS attributes, and vice versa.

iRAP centreline to ECS centreline + minor section

According to the ECS manual, a minor section is defined as:

Minor section: *unit of data collection corresponding to a section of the route with uniform or nearly uniform characteristics in terms of route component type, traffic speed and volume, surface, width and attractivity of the area/landscape. Minor sections are typically between 200 m and 5 km long.*

With respect to the abovementioned, minor sections can be defined using a defined set of coded iRAP attributes, such as:

- **Speed limit;**
- **Facilities for bicycles;**
- **Number of lanes;**
- **Lane width.**
- **Road condition**
- **Skid resistance**

An ECS **minor section** should start whenever any of the 6 selected iRAP attributes changes its state, taking into account that a minor section length is not shorter than 200 metres.

ECS route line into iRAP centreline

In order to adapt the ECS route file for iRAP coding, prestored GPS route on the ECS portal has to be converted into the appropriate .shp file format and segmented into 10-meter sections.

Attribute conversion

At present, it has been concluded that only a limited number of road attributes is feasible for conversion between the two methodologies. Attributes which are feasible for conversion are summarised in the table in Appendix I and Appendix II.

Structure conversion

On the most basic level, the ECS data is organised in:

Daily section – 1:N – surveys –1:N– minor sections –1:N– points

At least survey and minor section data needs to be generated by the conversion.

iRAP to ECS

GPS coordinate location – rewrite the coordinate location information into corresponding .csv file cell

AADT – rewrite AADT information into corresponding .csv file cell

Speed limit – rewrite speed limit information into corresponding .csv file cell

Comment – rewrite values from iRAP aggregated export columns: Image reference, road name, section

Date – rewrite road survey date information into corresponding .csv file cell

Legal – status of the *Legal* ECS attribute can be determined using a combination of several iRAP attributes, and namely:

- Carriageway label;
- Number of lanes;
- Bicyclist peak hour flow and;
- Speed limit.

If a road segment has an iRAP code of: (Carriageway A of a divided road, Carriageway B of a divided road, Carriageway A of a motorcycle facility or Carriageway B of a motorcycle facility) **and** a (number of lanes equal or higher than 2) **and** (no bicyclist peak hour flow) **and** a (speed limit equal or higher than 110 km/h) resulting code for the *Legal* ECS attribute should be “Entry forbidden”.

Infrastructure type – status of the *infrastructure type* ECS attribute can be assessed by a combination of two iRAP attributes:

- Vehicle flow (AADT) and;
- Facilities for bicycles.
- Pedestrian Flow

In cases when a road infrastructure segment has an iRAP code of *None*; *Signed shared roadway*; or *Extra wide outside $\geq 4.2m$* in the Facilities for bicycles attribute category, combined with any AADT value different than 0 (zero), the resulting ECS Infrastructure type attribute is **Public road**.

In cases when a road infrastructure segment has an iRAP code of *Dedicated bicycle lane on roadway* in the Facilities for bicycles attribute category, combined with any AADT value different than 0 (zero), the resulting ECS Infrastructure type attribute is **Painted cycle lane**.

In cases when a road infrastructure segment has an iRAP code of *Segregated bicycle path* or *Segregated bicycle path with barrier* in the Facilities for bicycles attribute category, the resulting ECS Infrastructure type attribute is **Cycle path**.

In cases when a road infrastructure segment has an iRAP code of *Segregated bicycle path with barrier*; or *Shared use path* in the Facilities for bicycles attribute category, combined with any AADT value different than 0 (zero) or a pedestrian flow value different than 0 (zero), the resulting ECS Infrastructure type attribute is **Cycle and pedestrian path**.

At present, remaining ECS infrastructure types can not be determined with a high degree of certainty, if solely based on iRAP road attributes.

Direction – if the ECS infrastructure type has been determined as public road and Median type = one-way only, direction = one way.

Surface material – Surface material can be partially determined for ECS by reading iRAP Skid resistance attribute. Namely, **Asphalt / concrete surface** can be determined by reading “Sealed – adequate”, “Sealed – medium” and “Sealed – poor” values, **Stabilised gravel** can be determined by reading a value of “Unsealed – adequate”, and **gravel/dirt** can be determined by reading a value of “Unsealed – poor”. **Blocks/slabs/cobbles** surfaces cannot be determined. Surface type can only be determined for “on road” cycling facilities, therefore, for all surfaces, “Facilities for bicycles” iRAP csv. column must meet the condition of “None”, “Signed shared roadway”, “Extra wide outside $\geq 4.2m$ ” or “Dedicated bicycle lane on roadway”.

ECS to iRAP

GPS coordinate location – rewrite the coordinate location information into corresponding .csv file cell

AADT – rewrite AADT information into corresponding .csv file cell

Speed limit – rewrite speed limit information into corresponding .csv file cell

Skid resistance / grip – Skid resistance/grip can only be partially calculated from ECS exports. **Unsealed – adequate** can be read from “Stabilised gravel” and **Unsealed – poor** can be read from “Gravel/dirt” attributes from “I3_surface_type” column in minor section csv ECS export. The condition for this is that “I2_type” must be one of the following: Public road, Painted cycle lane, cycle street, home zone or agricultural/forestry/water management road.

Facilities for bicycles – Facilities for bicycles iRAP attribute can only be partially calculated from ECS. Namely, **Dedicated bicycle lane on roadway** can be attributed by reading “Painted Cycle Lane” from “I2_type” column in minor section csv ECS export, and **Shared use path** can be attributed by reading “Cycle and Pedestrian path” from “I2_type” column in minor section csv ECS export.



| ECS /IRAP | Roadside severity: driver-side distance | Roadside severity: driver-side object | Roadside severity: passenger-side distance | Roadside severity: passenger-side object | Shoulder rumble strips | Paved shoulder: driver-side | Paved shoulder: passenger-side | Carriageway label | Upgrade cost | Median type | Centreline rumble strips | Number of lanes | Lane width | Curvature | Quality of curve | Grade | Road condition | Skid resistance /grip | Delineation | Street lighting | Vehicle parking | Service road | Roadwork signs | Sight distance | Intersection type | Intersection channelisation | Intersection road volume | Intersection equality | Property access points | Vehicle flow (AADT) | Motorcyclist % | Pedestrian peak flow across road | Pedestrian peak hour flow along road: driver-side | Pedestrian peak hour flow along road: passenger-side | Bicyclist peak hour flow | Land use: driver-side | Land use: passenger-side | Area type | Pedestrian crossing facilities: inspected road | Pedestrian crossing quality | Pedestrian crossing facilities: intersecting road | Pedestrian crossing facilities: fencing | Sidewalk: driver-side | Sidewalk: passenger-side | Facilities for motorised two wheelers | Facilities for bicycles | School zone warning | School zone crossing supervisor | Speed limits | Differential speed limits | Speed management / traffic calming | Operating Speed (85th percentile) |
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| Minor Section | <ul style="list-style-type: none"> Legal Detour Type Direction Width_range Width_m Traffic_volume Traffic_speed Surface_type Surface_quality Area Nuisance:atvri Nuisance:social Width_sufficient Intra_class Traffic_category Route_infrastructure ECS_M_basic ECS_M_obstacles ECS_M_signs ECS_M_infrastructure key_word | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Survey points - Accomodation or food | <ul style="list-style-type: none"> Luxury Standard Budget Camping Certified Gourmet Standard Snack Certified Attraction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Survey points - Attraction | <ul style="list-style-type: none"> attraction_parking attraction_lockers repair_shop spare_parts self_service helpline charging rental Crossing Steps_difficult Steps_easy high_terrain Chicane_pole Other_obstacle Dismount_point Table Shelter Toilet Water Playground | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Survey Points - Bike Services | <ul style="list-style-type: none"> rental Crossing Steps_difficult Steps_easy high_terrain Chicane_pole Other_obstacle Dismount_point Table Shelter Toilet Water Playground | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Survey Points - Crossing and obstacle | <ul style="list-style-type: none"> rental Crossing Steps_difficult Steps_easy high_terrain Chicane_pole Other_obstacle Dismount_point Table Shelter Toilet Water Playground | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Survey Points - Rest Area | <ul style="list-style-type: none"> rental Crossing Steps_difficult Steps_easy high_terrain Chicane_pole Other_obstacle Dismount_point Table Shelter Toilet Water Playground | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Survey points_Signing | <ul style="list-style-type: none"> National_signing Content_confirmation Content_next_town Content_distance Content_attractions Content_eurovelo Defect_missing Defect_wrong Defect_not_readable | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |