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LIPS QA 2011 workshop, Tallinn 22nd November 2011

LPIS QA Training 2011

Tallinn, 22nd November 2011

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GeoCAP Action - MARS Unit - JRC Ispra

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Agenda

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1. Essential ATS elements
- Implementation Conformance Statement
- Purpose and scope of the Eligibility Profile

2. Performing the ETS correctly 1/2
- Reading the guidance
- Setting the environment, preparing data and discarding zones
- Inspecting the LUI and establishing non-conformities

3. Performing the ETS correctly 2/2
- Inspection errors identified during the screening of the 2010 ETS package relevant for 2011
- Understanding the Support articles
- Templates, Schemas and Tools
- The LPISQA portal

4. Discussion + Q&A
- Recent MS questions
- Technical issues only!

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Performing the ETS correctly 1/2

Reading the guidance

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Reading the LPIS QA in WikiCAP

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1. Inspection method

- 1.1. ATS conformance
- 1.2. Focus on the Eligibility Profile
- 1.3. Annual ETS conformance
  - 1.3.1. Methodological background
  - 1.3.2. LPIS Control Zones and reference orthoimagery
  - 1.3.3. Reference Parcel Sampling
  - 1.3.4. Inspection
  - 1.3.5. Analysis of observed data
  - 1.3.6. Acceptance decisions
- 1.4. Annual LPIS assessment report
- 1.5. Non-CwRS image upload/delivery

Formal Part
ETS instructions

2. Support

- 2.1. Downloads: schema changes
- 2.2. Tools
- 2.3. LPISQA portal manual
- 2.4. Practical guidelines and examples
  - 2.4.1. Specific examples of ETS observations
  - 2.4.2. The "Critical Defects" issue
  - 2.4.3. Impact of the orthoimage quality on the ETS
  - 2.4.4. The concept of the "5 meter buffer"
- 2.5. Frequently Asked Questions

……

Supporting part
ETS guidance

http://marswiki.jrc.ec.europa.eu/wikicap/index.php/LPISQA2011

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Reading the guidance

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ETS Annexes are the core documentation:

Annex I – Detailed description of the data quality measures and data quality elements

Annex II – Inspection procedure (activity diagram and flow of event)

Annex III – Land cover concept and Eligibility Profile

http://marswiki.jrc.ec.europa.eu/wikicap/index.php/LPISQA2011_2.b.ii

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Performing the ETS correctly 1/2

Setting the environment, preparing data and discarding zones

Required environment and operator skills

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- **Standard GIS environment**
  - Any off-the-shelf or open source software
  - Basic GIS editing functions
  - Multilayer capabilities
  - Ability to handle raster data (TIFF, IMG)
  - Topology
  - Basic geodata processing
  - Image enhancement
  - RDBMS
  - XML/GML export
    - **Workflow-tailored proprietary application is also a good option**
- **Skilled Operator**
  - Extensive knowledge in Large scale land cover mapping
  - Good knowledge in image processing and GIS
  - Very good knowledge of nation-specific agriculture practices and landscape properties!

Basic principles respected in ETS

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- **Perform land cover inventory on the area represented by the Reference Parcel**
  - Called also Land Under Inspection (LUI)
- **One Reference Parcel = one LUI**
  - except for LPIS based on cadastral parcel)
- **Always delineate from scratch**
  - no copy/paste is allowed
- **Use only LC types defined in the eligibility profile**
  - Landscape elements subject to 2009R1122 art (34)2, are part not mapped separately
- **The visual scale should be larger than 1: 5 000**
  - Preferably in the range of 1:1500 to 1: 1000
- **The area should be reported in square meters**
  - Rounded to a meter
- **Consider that for some RP a direct comparison between the areas cannot be made**
  - Area observed and Area recorded in the LPIS
- **The inspection stops when number of the RP inspected reaches the QC sample**
  - The number required for the DQ_Scope of QE 4

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Important Definitions

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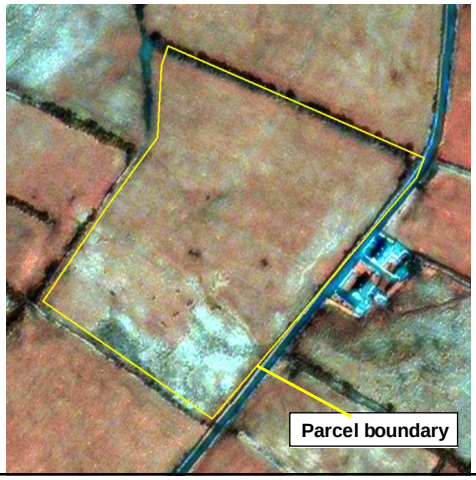
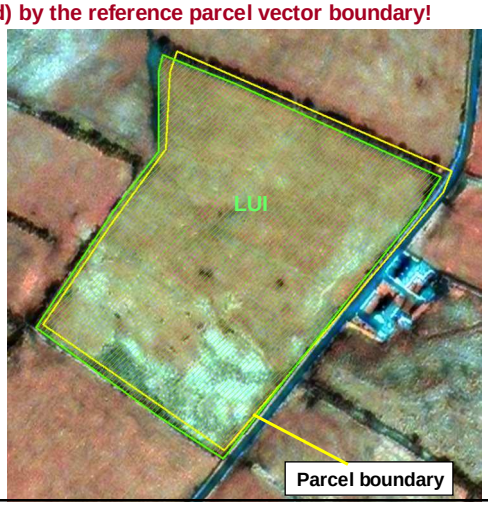
LUI – land under inspection:

- **The actual land to be inspected and mapped for each reference parcel should be the land represented by the Reference Parcel, according to its definition.**

LUI is not equal to the land enclosed (clipped) by the reference parcel vector boundary!





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II: Check the feasibility for inspection

Reference: Annex II

ANNEX II: Description of the workflow, related to the inspection of the Reference Parcel, version 5.1 (Oct 2011)

The following UML diagram show the activities, related to the inspection of the Reference Parcel:

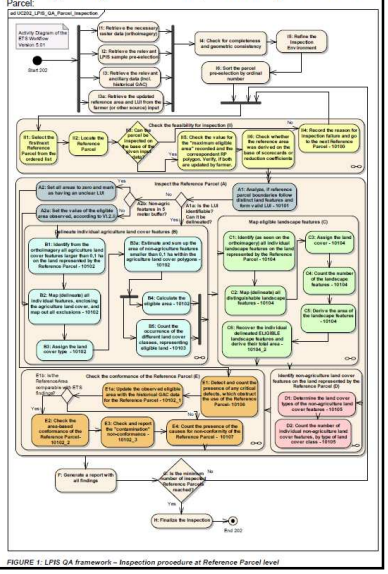

FIGURE 1: LPIS QA framework – Inspection procedure at Reference Parcel level

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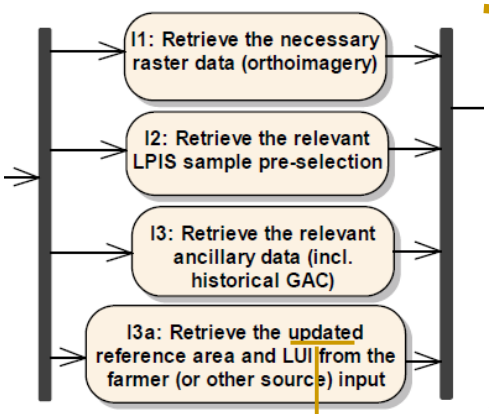
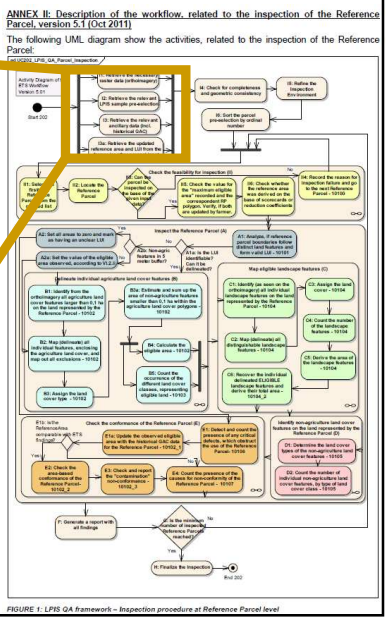
I: Data Preparation



- provided by the farmer at the moment of his application or
- obtained from any other relevant source "in tempore non suspecto".



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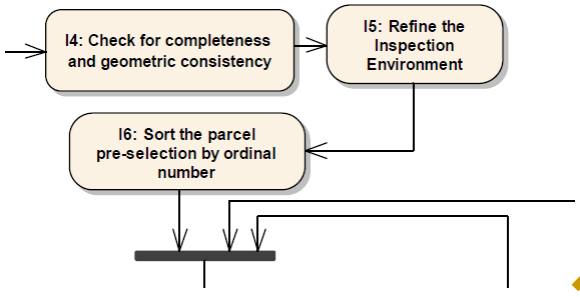
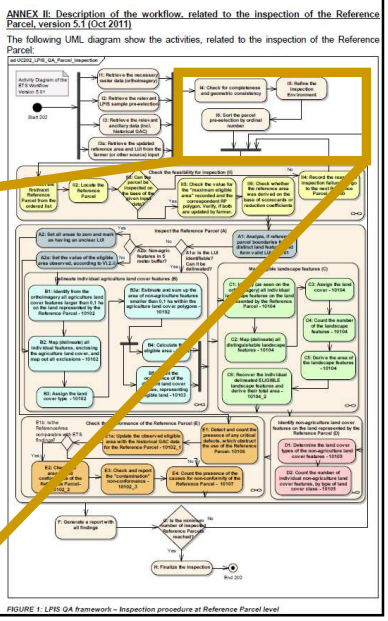
I: Preparation of the input data and setting the environment

Reference: Annex II





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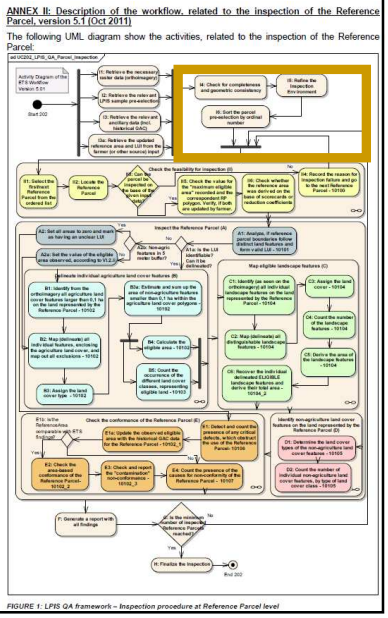
I4: Check for data completeness and geometric consistency

- Check the statement ATS and the availability of the Eligibility Profile
- Check the temporal aspect of the reference orthoimagery (is it up-to-date?)
- Check for completeness and geometric consistency of the vector and raster data



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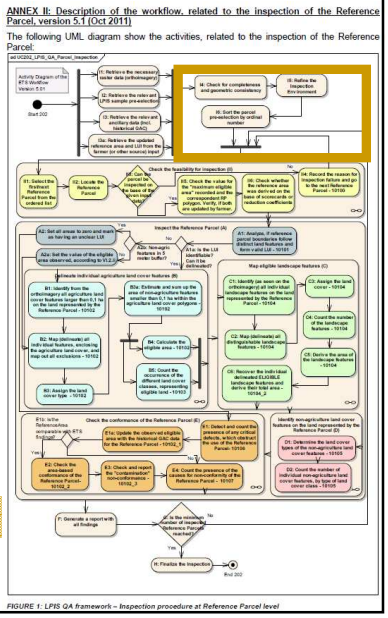
I4: Check for data completeness and geometric consistency

- Navigate through the data (LPIS vectors, orthoimages)
- Check the vector and raster datasets for the relevant metadata
- Check for completeness of the vector, raster and alphanumeric data (fields and attributes)
- Check for geometric coherence (fit) between the different spatial datasets
- Check the orthoimage properties and perform image acceptance (see Detailed Instruction 1 at the end of Annex II)

In case of unacceptable quality of the raw image

Discard the whole LPIS zone!



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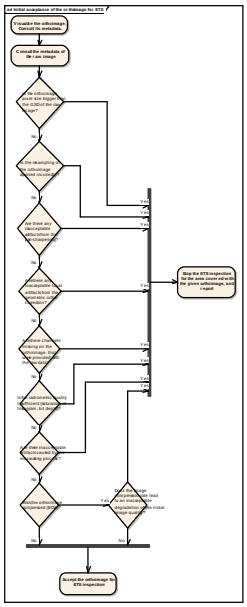
Initial acceptance of the orthoimage for ETS

- Visualize the orthoimage in question.
- Consult the metadata of the raw image and derive the image parameters.
- Check whether:
  - the orthoimage pixel size exceeds the initial GSD
  - the resampling of the orthoimage is correct
  - there are artifacts from the pan-sharpening
  - there are local artifacts from the geometric ortho-correction
  - there are channels missing on the orthoimage,
  - the radiometric quality is insufficient
  - check artifacts caused by the mosaicking process
  - the image compression rate leads to an inacceptable degradation



In case of at least one positive answer

- stop the ETS inspection for the area covered with the given orthoimage, and
- report to orthoimage producer or provider

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Orthoimagery suitable for LPIS QA

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ETS uses the same VHR orthoimagery, as for the CwRS with some further restrictions:

spatial resolution better than 1 meter

acquisition with off-nadir angles up to 30 degrees

use of the full spectral resolution of the imagery (PAN+MS recommended)

Also considered important:

Radiometric quality: histogram peak, contrast, color balance

Level of information content: Pan-sharpening, resampling

Level of geometric accuracy: max 2.5 RMSE 1-d might be too "loose" threshold

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Orthoimage technical specifications for the purpose of LPIS

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Orthoimage technical specifications for the purpose of LPIS

DQ Sub elements	Conformance Quality Level & Tolerance Limits	Notes	Expected rate of conforming items
Spatial resolution	<= 1m	Ratio of the final ortho resolution to the GSD is 1:1 for digital sensors, whereas for film cameras should be at least 1.2:1	100%
Radiometric resolution	=>8 bits/channel	11-12 bits per channel is highly recommended	100%
Spectral Resolution	Color (natural or color infrared)	Panchromatic only (satellite or aerial) data is allowed, only if there is no option for color imagery	100%
General Image Quality	Lack of defects and artifacts, which could prevent the visual interpretation of the image	Checking for existence of scratches, dust, threads, hot spots, haze, drop lines, shadows, color seams, spilling, artifacts, etc	N/A (no defects allowed)
Cloud cover	<5-10%	Per image and in total. The term "image" is used for the 'control unit' e.g. orthoimage, mosaic (map sheet)	100%
Overall clipping	<0.5% at each tail	Overall clipping of the luminosity histogram	100%
Histogram Peak	+/-15% of middle value	For 8 bit image, the middle value is 128	100%
Color balance	<2% between min and max value of triplet	Not applicable for panchromatic only	100%
Noise	Signal to Noise Ratio > 12 for each channel	SNR which is defined as the ratio of the mean DN value to the standard deviation of the DN values	100%
Contrast	The coefficient of variation of the image DN values should be in the range of 10-20%	Represented as the Standard Deviation of the DN values as a percentage of the available grey levels	100%
Geometric accuracy	RMSEx <= 2.5 m; RMSEy <= 2.5 m	RMSE is calculated on the base of at least 20 well distributed independent check points (ICP), per image	100%
Mosaicking	DN valies variation on similar area type not to exceed 10% in average (or 4% between each of the 3 channels)	.	100%
Mosaicking	Geometric mismatches along seam lines (d) <3 pixels	.	100%
Compression	Lossless (TIF, LZW-TIF) Visually lossless (JPEG2000, ECW, MrSID) at last stage (storage)	.	100%

For more information on the quality assurance and quality check, please refer to: [1]

See also: VHR spaceborne sensors, suitable for LPIS creation and update

http://marswiki.jrc.ec.europa.eu/wikicap/index.php/Orthoimage_technical_specifications_for_the_purpose_of_LPIS)

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Common problems with VHR

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- **Orthorectification with sufficient, but not optimal result**
  - **•Less accurate or wrongly positioned GCPs, coarse DEM, incomplete QC**
- **Improper pansharpening approach**
  - **•Different geometric models applied for PAN and MS, wrong algorithms used**
- **Poor radiometric quality**
  - **•Saturation at the edge of the histogram; information loss due to stretching**
- **Loss of image detail**
  - **•Wrong pansharpening, inappropriate resampling technique used, improper rescaling performed**

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Examples of bad orthoimagery

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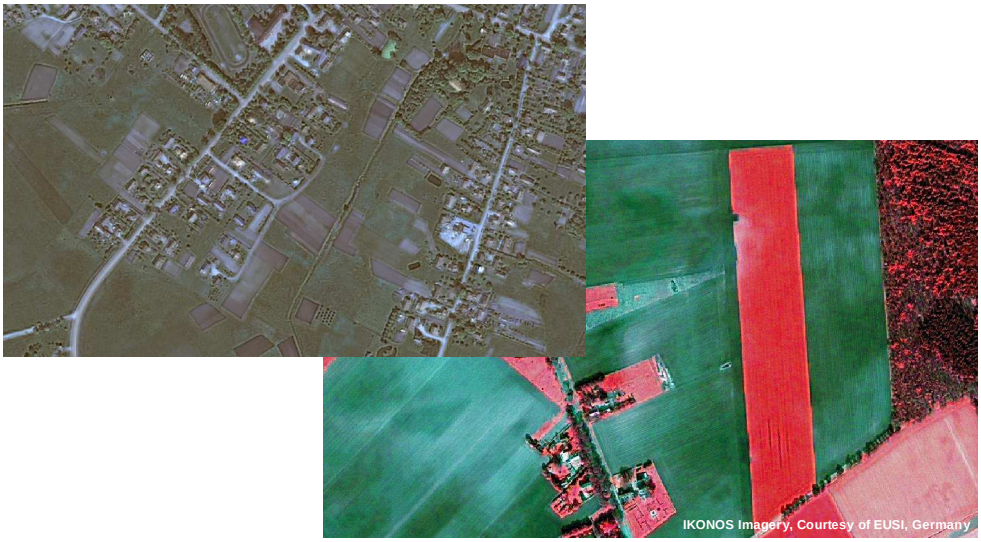

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Setting the environment

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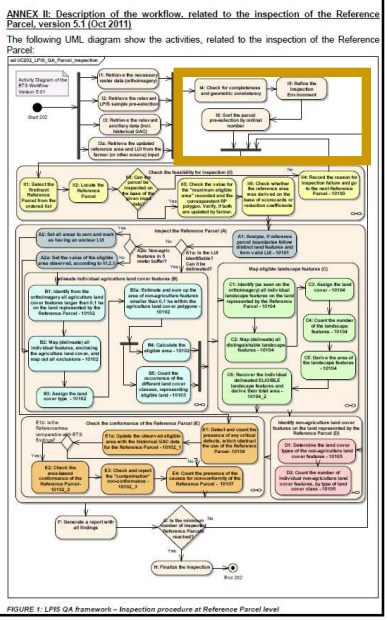
I5-I6: Refine the Inspection Environment and Sort the pre-selection

- Enhance or change, if necessary, the radiometric and spectral parameters of the orthoimage
- Set the ranges for the visual scale
- Adapt the visual appearance of the graphical data (modify colours, add labels if necessary)
- Sort the parcel pre-selection by ordinal number



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Performing the ETS correctly 1/2

Inspecting the LUI and establishing non-conformities

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Inspecting the LUI and establishing non-conformities

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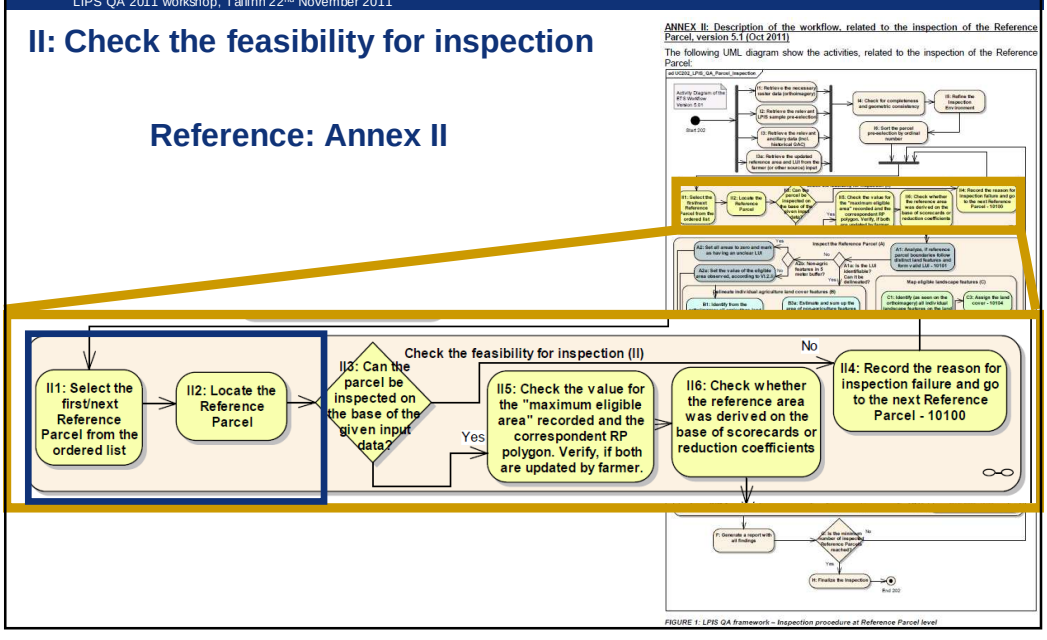
II: Check the feasibility for inspection

Reference: Annex II



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II3: Can the parcel be inspected on the base of the given input data?

For each first/next Reference Parcel (RP) from the sorted ordered list of the sample pre-selection:

- **Select the Reference Parcel from the attribute list**
- **Navigate through the data (LPIS vectors, orthoimages) using the GIS tools and interface, in order to locate the position of selected Reference Parcel.**
- **Set the appropriate visual scale**

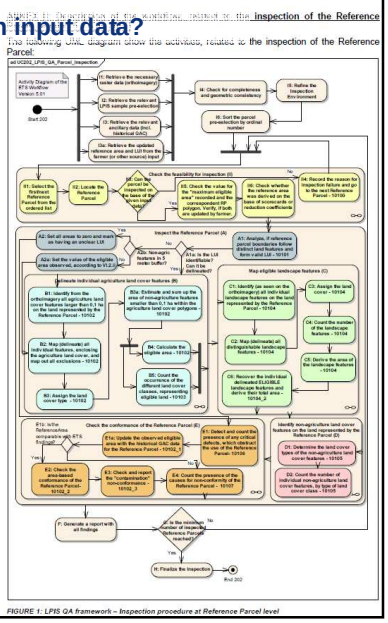

FIGURE 1: LPIS QA framework – Inspection procedure at Reference Parcel level

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II: Check the feasibility for inspection

Reference: Annex II

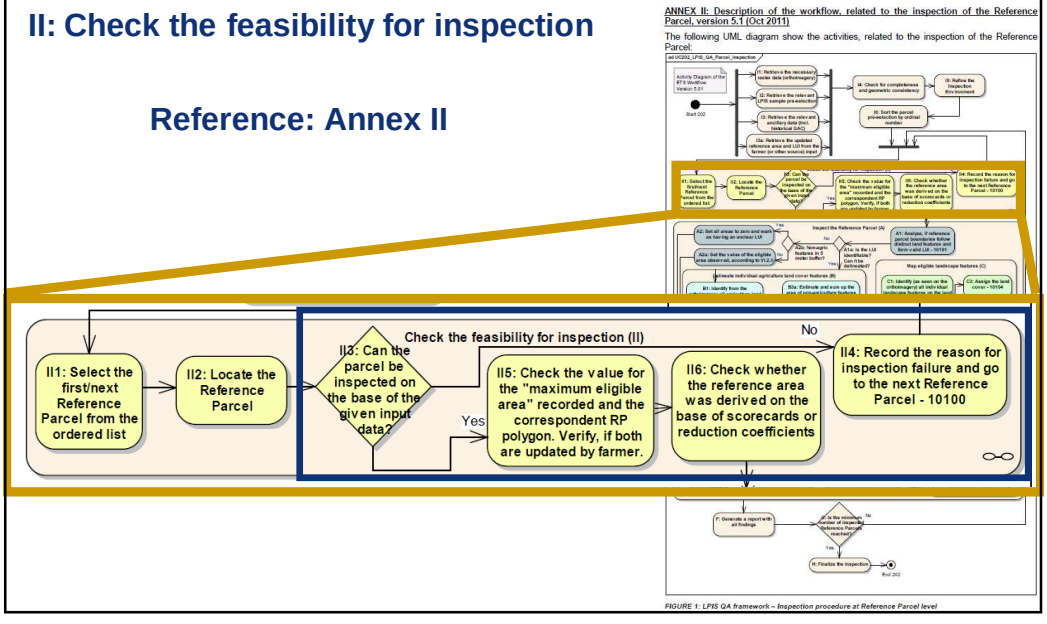

FIGURE 1: LPIS QA framework – Inspection procedure at Reference Parcel level

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Inspecting the LUI and establishing non-conformities

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II3: Can the parcel be inspected on the base of the given input data?

Analyse visually, if the LUI can be inspected based on the available input information.

Check:

- **RP ID persistency in the LPIS**
- **Geometry validity of the RP**
- **Availability of meaningful image over the entire RP**
- **Presence of cloud cover/haze on image**
- **Sufficient radiometric/geometric quality**
- **Presence of force major factors preventing the ETS**

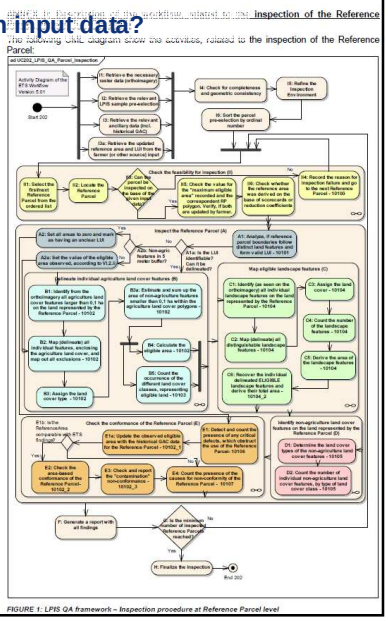

FIGURE 1: LPIS QA framework – Inspection procedure at Reference Parcel level

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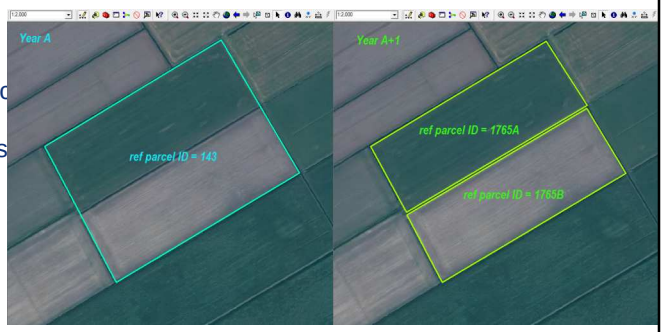
II3: Can the parcel be inspected on the base of the given input data?

Check:

- RP ID persistency in the LPIS
- Geometry validity of the RP
- Availability of meaningful image over the entire RP
- Presence of cloud cover/haze on image
- Sufficient radiometric/geometric quality
- Presence of force major factors preventing the ETS



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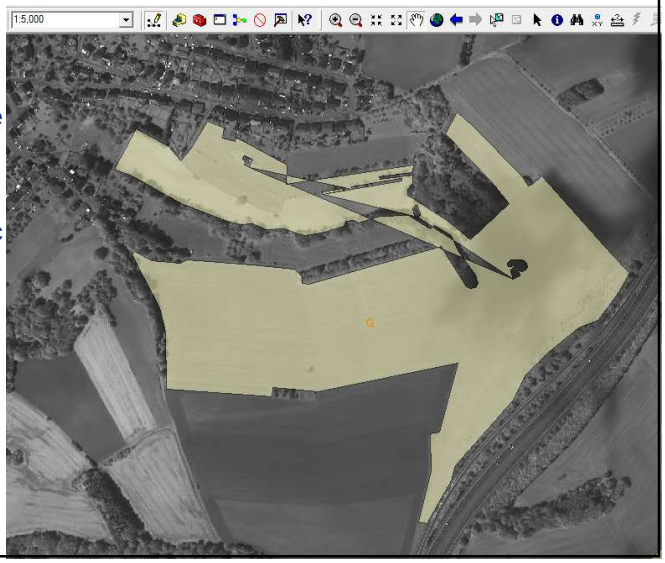
II3: Can the parcel be inspected on the base of the given input data?

Check:
- RP ID persistency in the LPIS
- Geometry validity of the RP
- Availability of meaningful image over the entire RP
- Presence of cloud cover/haze on image
- Sufficient radiometric/geometric quality
- Presence of force major factors preventing the ETS



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II2: Can the parcel be inspected on the base of the given input data?

Check:
- RP ID persistency in the LPIS
- Geometry validity of the RP
- Availability of meaningful image over the entire RP
- Presence of cloud cover/haze on image
- Sufficient radiometric/geometric quality
- Presence of force major factors preventing the ETS

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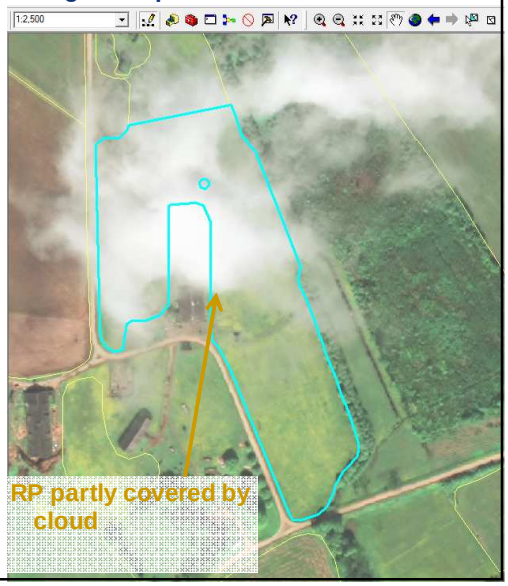
II2: Can the parcel be inspected on the base of the given input data?

Check:

- RP ID persistency in the LPIS
- Geometry validity of the RP
- Availability of meaningful image over the entire RP
- Presence of cloud cover/haze on image
- Sufficient radiometric/geometric quality
- Presence of force major factors preventing the ETS



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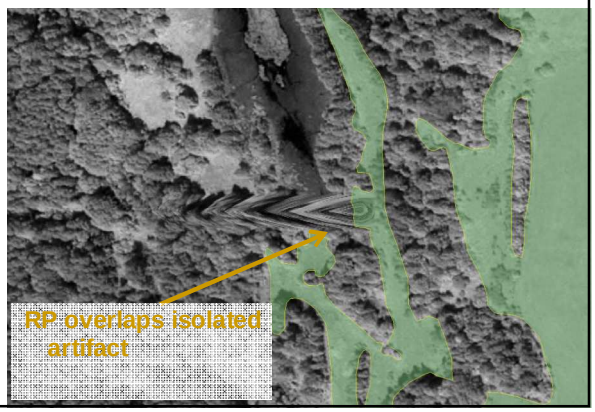
II2: Can the parcel be inspected on the base of the given input data?

Check:

- RP ID persistency in the LPIS
- Geometry validity of the RP
- Availability of meaningful image over the entire RP
- Presence of cloud cover/haze on image
- Sufficient radiometric/geometric quality
- Presence of force major factors preventing the ETS



Inspecting the LUI and establishing non-conformities

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II2: Can the parcel be inspected on the base of the given input data?

Check:
- RP ID persistency in the LPIS
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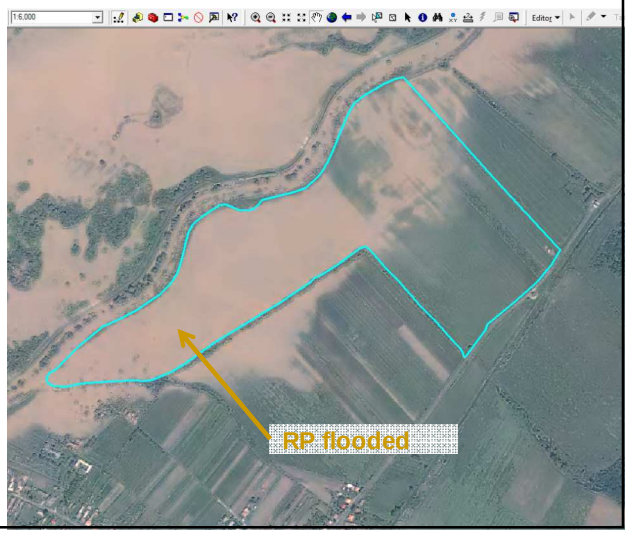
- Presence of force major factors preventing the ETS



Inspecting the LUI and establishing non-conformities

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II: Check the feasibility for inspection

1. Check:
- RP ID persistency in the LPIS
- Geometry of the RP
- Presence of the image covering fully the RP
- Presence of cloud cover/haze
- Radiometric/geometric properties
- Presence of force major

2. Assign a code to the RP:
- pre-defined code list
- Measure 10100 (Annex I, Table 0)

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II: Check the feasibility for inspection

1. Check:
- RP ID persistency in the LPIS
- Geometry of the RP
- Presence of the image covering fully the RP
- Presence of cloud cover/haze
- Radiometric/geometric properties
- Presence of force major

2. Assign a code to the RP:
- pre-defined code list
- Measure 10100 (Annex I, Table 0)

RP **affected** by any above-mentioned issue → **Flag the RP skipped**

RP **not affected** by any above-mentioned issue → **Add RP to the sample and proceed with the ETS** → **Check if both RP reference area and polygon, have been update by farmer** → **Check how the RP reference area was derived**

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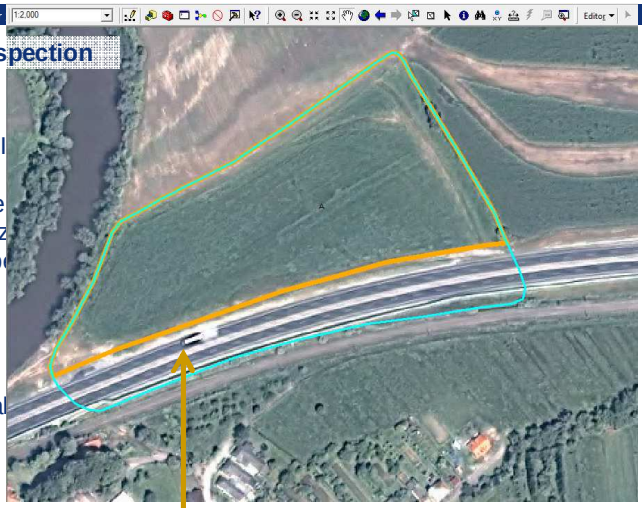

II: Check the feasibility for inspection

1. Check:
- RP ID persistency in the LPI
- Geometry of the RP
- Presence of the image cove
- Presence of cloud cover/haz
- Radiometric/geometric prop
- Presence of force major

2. Assign a code to the RP:
- pre-defined code list
- Measure 10100 (Annex I, Tal

RP **not affected** by any above-mentioned issue → **RP added to the sample and proceeded with the ETS** → **Check if both RP reference area and polygon, have been update by farmer** → **Check how the RP reference area was derived**

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Inspect the Reference Parcel (A)

Reference: Annex II

ANNEX II: Description of the workflow, related to the inspection of the Reference Parcel, version 5.1 (Oct 2011)

The following UML diagram show the activities, related to the inspection of the Reference Parcel:

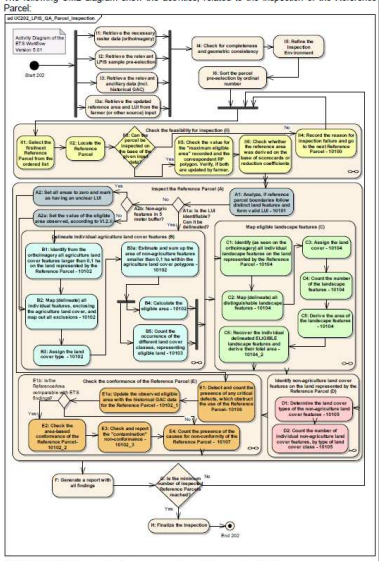

FIGURE 1: LPIS QA framework – Inspection procedure at Reference Parcel level

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Reference: Annex II

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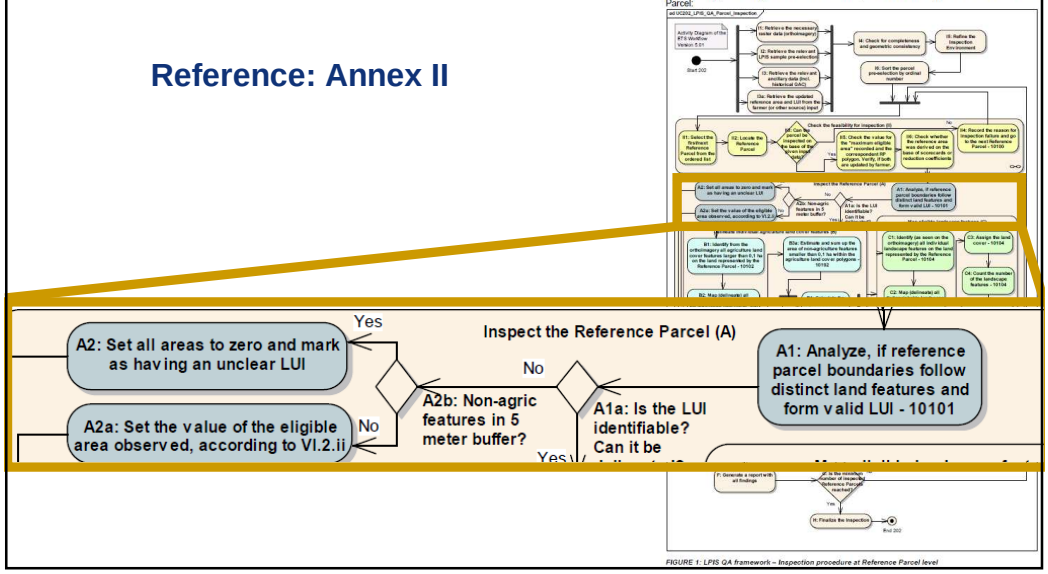

FIGURE 1: LPIS QA framework – Inspection procedure at Reference Parcel level

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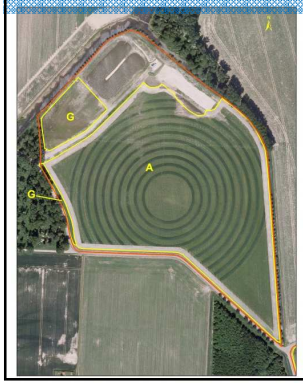
Inspect the Reference Parcel (A)

Check if RP boundaries match distinct land features or follow well identifiable limits of land cover and/or land use

A1a: Is the LUI identifiable? Can it be delineated?

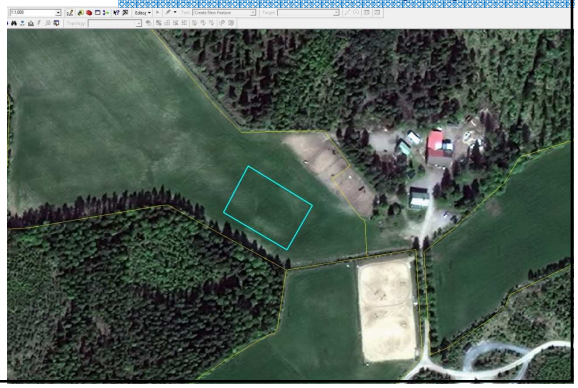
YES

Delineate individual agriculture land cover features on LUI (B)



NO

Check presence of non-agricultural features in 5m buffer (A2b)



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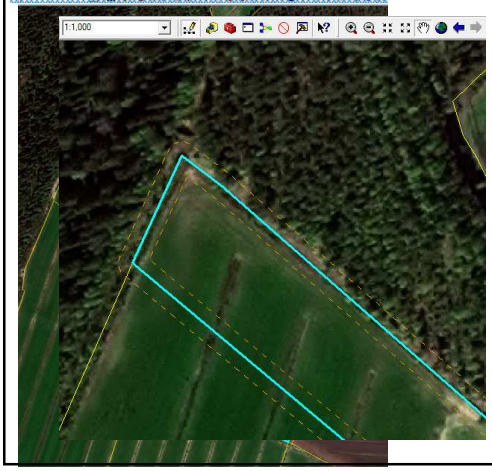
Inspect the Reference Parcel (A)

Check presence of non-agricultural features in 5m buffer (A2b)

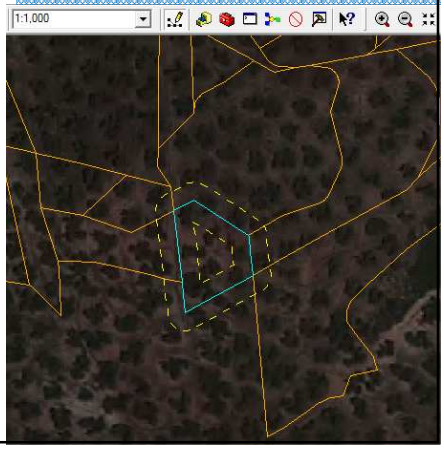
YES

Set Arec, Adec, Aobs to zero as RP is having unclear LUI



NO

consider the RP polygon equal the initial agriculture LC polygon



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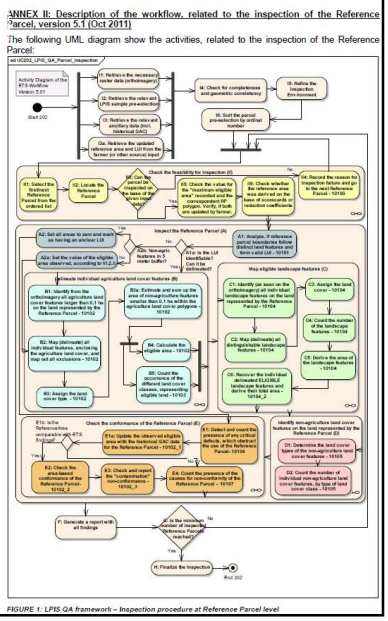
Delineate individual agriculture land cover features (B)

Reference: Annex II



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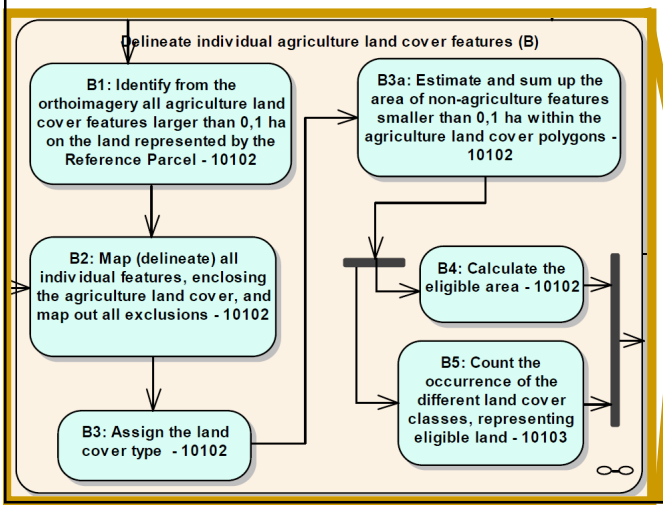
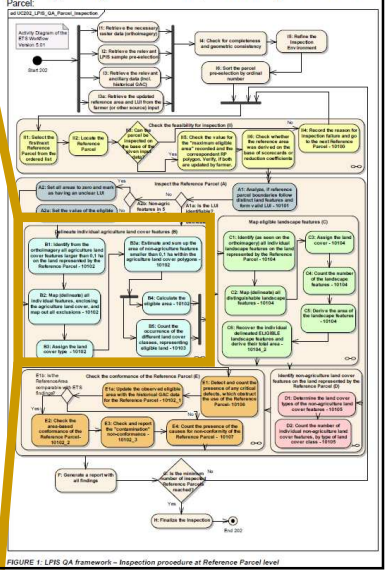
Delineate individual agriculture land cover features (B)

Reference: Annex II





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Detect and map all agriculture land cover features larger then 0.1 ha

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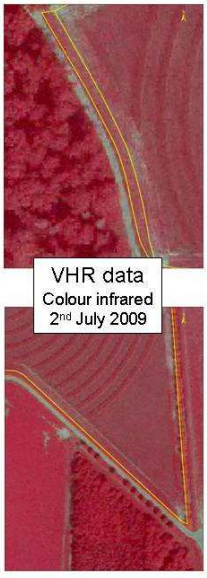
Orthophoto
Natural colour
2nd April 2009



VHR data
Colour infrared
2nd July 2009

Area not vegetated on both images, but found to be ploughed on the orthophoto

Examples of mapping agriculture land cover

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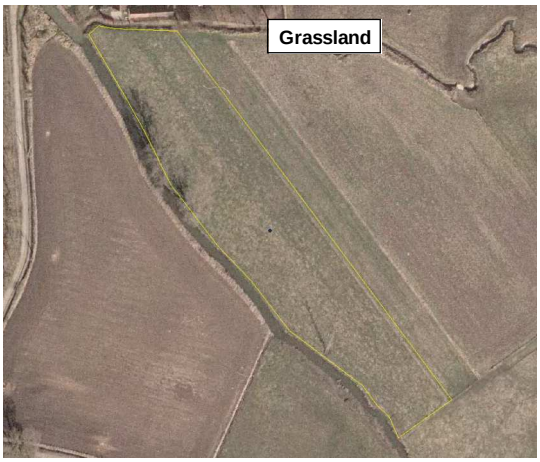

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Map out all of the non-agriculture features larger than 0.1ha found inside the agriculture land cover polygons

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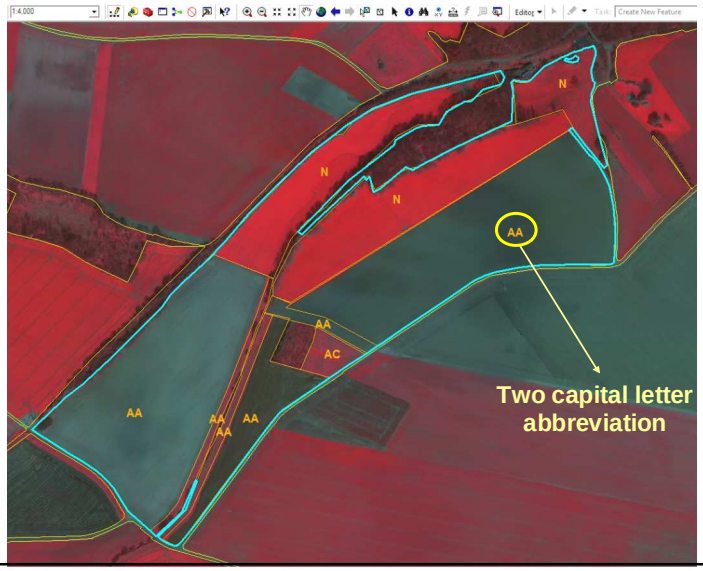
Assign the land cover type



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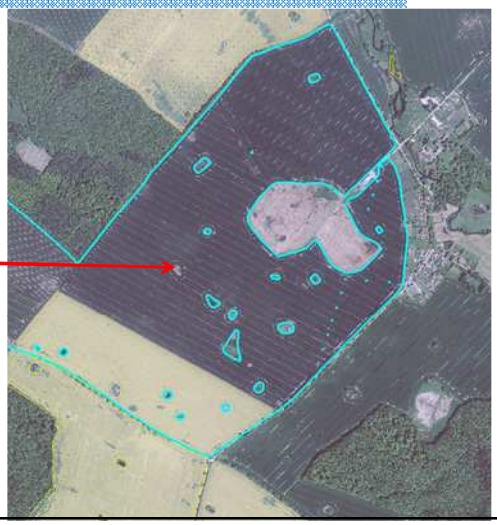
Estimate and sum up the area of the individual non-agriculture features smaller than 0.1 ha within the digitized land cover polygons, if their total area exceeds 3% of the RP reference area of the

Smaller than 0.1 ha
(no need to be mapped)



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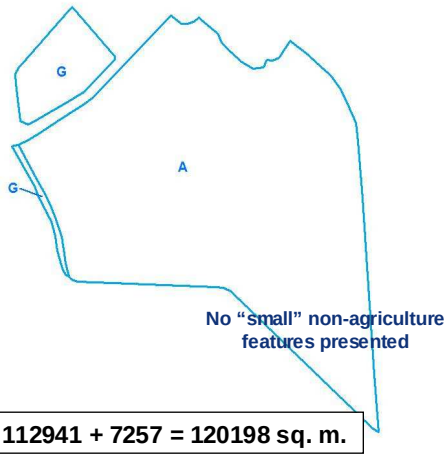
Calculate the total eligible area =
Sum of all agriculture "net" land cover features
minus Sum of "small" non-agriculture features



No "small" non-agriculture features presented

Area of A + Sum Area of G = 112941 + 7257 = 120198 sq. m.

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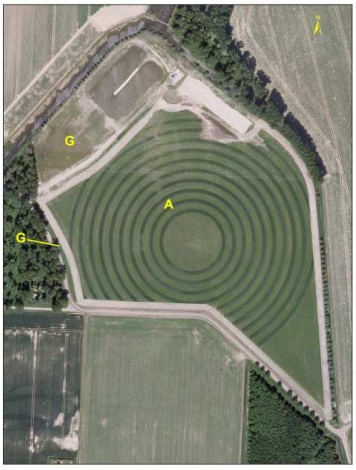
Count and report the occurrence of the agriculture land cover classes



Agriculture Land Cover Classes (Types)
Arable Land (A)
Permanent Grassland (N)

Report them once!

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Map eligible landscape features (C)

Reference: Annex II

ANNEX II: Description of the workflow, related to the inspection of the Reference Parcel, version 5.1 (Oct 2011)

The following UML diagram show the activities, related to the inspection of the Reference Parcel:

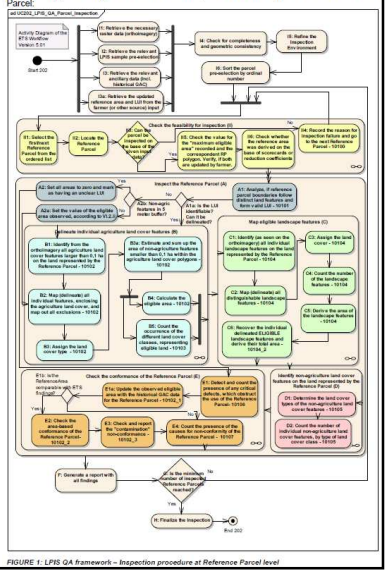

FIGURE 1: LPIS QA framework – Inspection procedure at Reference Parcel level

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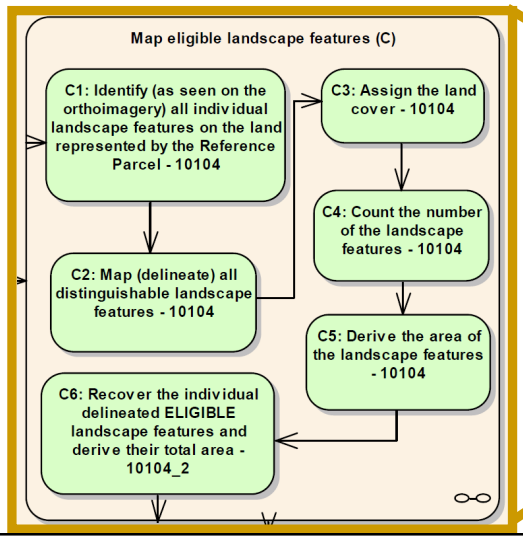
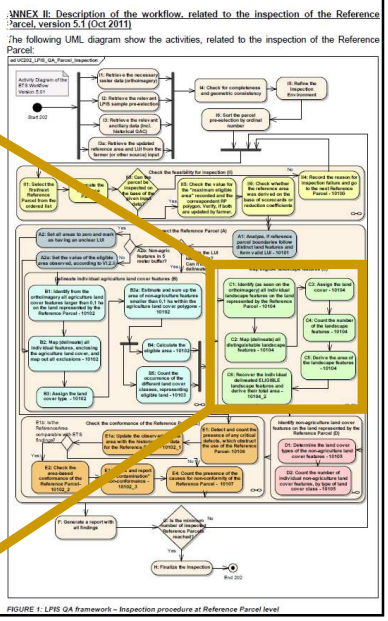
Map eligible landscape features (C)

Reference: Annex II





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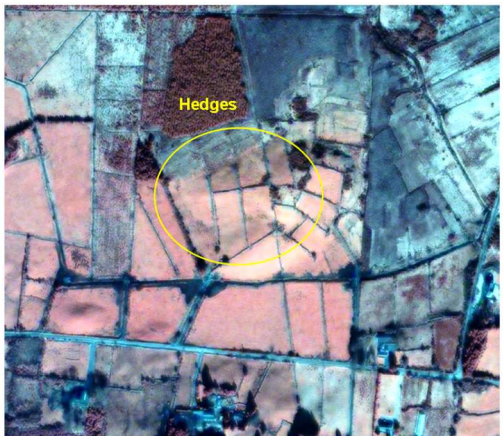
Examples of landscape features



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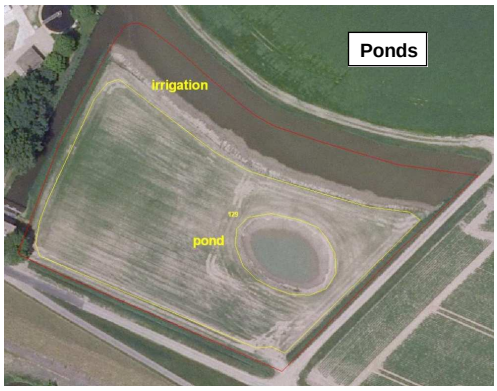
Examples of landscape features



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Detect and map all landscape features found on the LUI

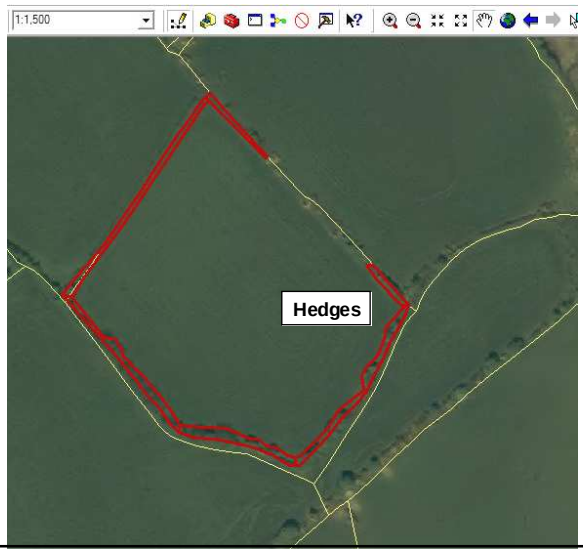
↓

Assign the LF type

↓

Report the abundance of the LF types

Type of Landscape features	Abundance
Hedges	3
Ponds	1
trees in line	1
trees in group	2



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Derive the area of the landscape features

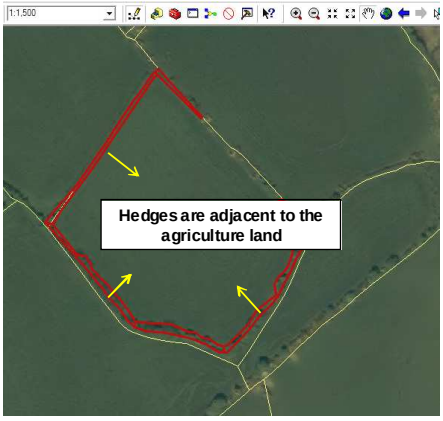
LF is **outside and not bordering** agriculture land → **Discard its area as not eligible**

LF is **inside or bordering** agriculture land

Take its area as eligible

Sum up the total eligible area of the landscape features

Eligible landscape features found on the LUI	Area (m^2)
Ponds	750
patches of trees	200
trees in line	300
Total	**1250**



Handling LF cardinality

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- **any isolated LF, not bordering agriculture land is ineligible**
- **any LF that borders or resides inside one and only one RP should be considered a full part of that RP.**
- **only a LF on the immediate border of two or more RP can be considered as a separate item for inspection (=LUI).**
  - **Eligible area could be divided between the RPs**

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Identify non-agriculture land cover features on the land represented by the Refrence parcel (D)

Reference: Annex II

ANNEX II: Description of the workflow, related to the inspection of the Reference Parcel, version 5.1 (Oct 2011)

The following UML diagram show the activities, related to the inspection of the Reference Parcel:

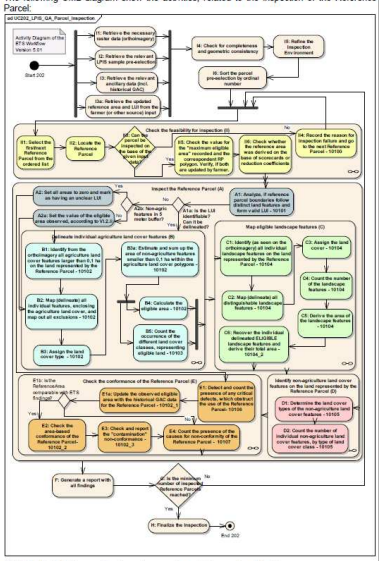

FIGURE 1: LPIS QA framework – Inspection procedure at Reference Parcel level

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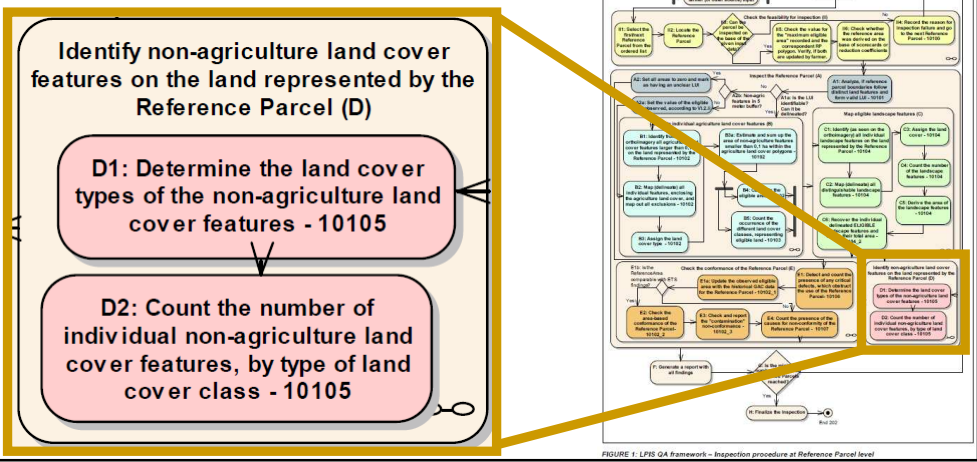
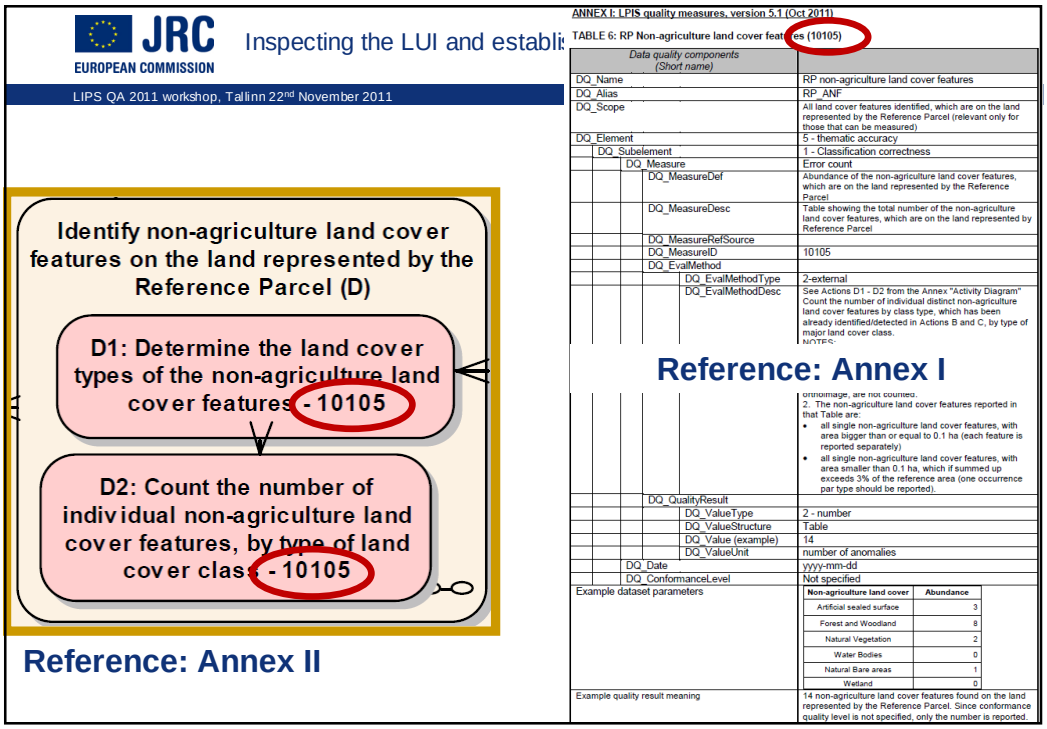


FIGURE 1: LPIS QA framework – Inspection procedure at Reference Parcel level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Identify non-agriculture land cover features on the land represented by the Reference Parcel (D)
D1: Determine the land cover types of the non-agriculture land cover features - 10105
D2: Count the number of individual non-agriculture land cover features, by type of land cover class - 10105
Reference: Annex II
ANNEX I: LPIS quality measures, version 5.1 (Oct 2011)
TABLE 6: RP Non-agriculture land cover features (10105)
Data quality components (Short name)
DQ_Name
RP non-agriculture land cover features
DQ_Alias
RP_ANF
DQ_Scope
All land cover features identified, which are on the land represented by the Reference Parcel (relevant only for those that can be measured)
DQ_Element
5 - thematic accuracy
DQ_Subelement
1 - Classification correctness
DQ_Measure
Error count
DQ_MeasureDef
Abundance of the non-agriculture land cover features, which are on the land represented by the Reference Parcel
DQ_MeasureDesc
Table showing the total number of the non-agriculture land cover features, which are on the land represented by Reference Parcel
DQ_MeasureRefSource
DQ_MeasureID
10105
DQ_EvalMethod
DQ_EvalMethodType
2-external
DQ_EvalMethodDesc
See Actions D1 - D2 from the Annex "Activity Diagram"
Count the number of individual distinct non-agriculture land cover features by class type, which has been already identified/detected in Actions B and C, by type of major land cover class.
NOTES:
Reference: Annex I
orthoimage, are not counted.
2. The non-agriculture land cover features reported in that Table are:
all single non-agriculture land cover features, with area bigger than or equal to 0.1 ha (each feature is reported separately)
all single non-agriculture land cover features, with area smaller than 0.1 ha, which if summed up exceeds 3% of the reference area (one occurrence par type should be reported).
DQ_QualityResult
DQ_ValueType
2 - number
DQ_ValueStructure
Table
DQ_Value (example)
14
DQ_ValueUnit
number of anomalies
DQ_Date
yyyy-mm-dd
DQ_ConformanceLevel
Not specified
Example dataset parameters
Non-agriculture land cover
Abundance
Artificial sealed surface
3
Forest and Woodland
8
Natural Vegetation
2
Water Bodies
0
Natural Bare areas
1
Wetland
0
Example quality result meaning
14 non-agriculture land cover features found on the land represented by the Reference Parcel. Since conformance quality level is not specified, only the number is reported.

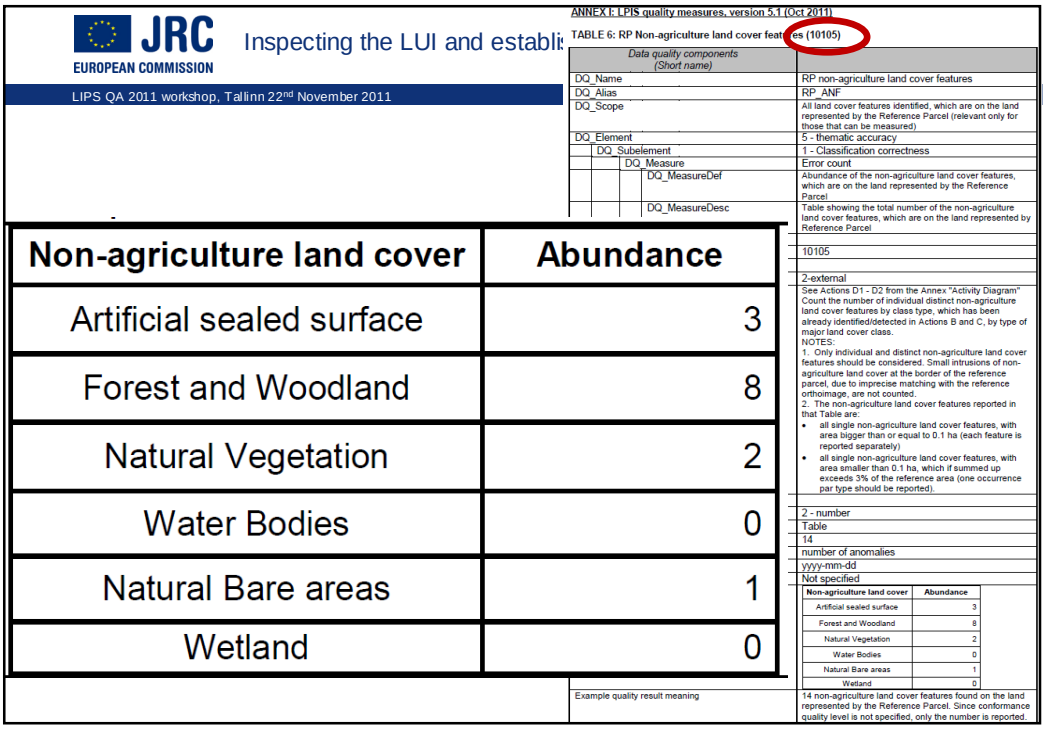
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TABLE 6: RP Non-agriculture land cover features (10105)
Data quality components (Short name)
DQ_Name
RP non-agriculture land cover features
DQ_Alias
RP_ANF
DQ_Scope
All land cover features identified, which are on the land represented by the Reference Parcel (relevant only for those that can be measured)
DQ_Element
5 - thematic accuracy
DQ_Subelement
1 - Classification correctness
DQ_Measure
Error count
DQ_MeasureDef
Abundance of the non-agriculture land cover features, which are on the land represented by the Reference Parcel
DQ_MeasureDesc
Table showing the total number of the non-agriculture land cover features, which are on the land represented by Reference Parcel
Non-agriculture land cover
Abundance
Artificial sealed surface
3
Forest and Woodland
8
Natural Vegetation
2
Water Bodies
0
Natural Bare areas
1
Wetland
0
10105
2-external
See Actions D1 - D2 from the Annex "Activity Diagram"
Count the number of individual distinct non-agriculture land cover features by class type, which has been already identified/detected in Actions B and C, by type of major land cover class.
NOTES:
1. Only individual and distinct non-agriculture land cover features should be considered. Small intrusions of non-agriculture land cover at the border of the reference parcel, due to imprecise matching with the reference orthoimage, are not counted.
2. The non-agriculture land cover features reported in that Table are:
all single non-agriculture land cover features, with area bigger than or equal to 0.1 ha (each feature is reported separately)
all single non-agriculture land cover features, with area smaller than 0.1 ha, which if summed up exceeds 3% of the reference area (one occurrence par type should be reported).
2 - number
Table
14
number of anomalies
yyyy-mm-dd
Not specified
Example quality result meaning
14 non-agriculture land cover features found on the land represented by the Reference Parcel. Since conformance quality level is not specified, only the number is reported.

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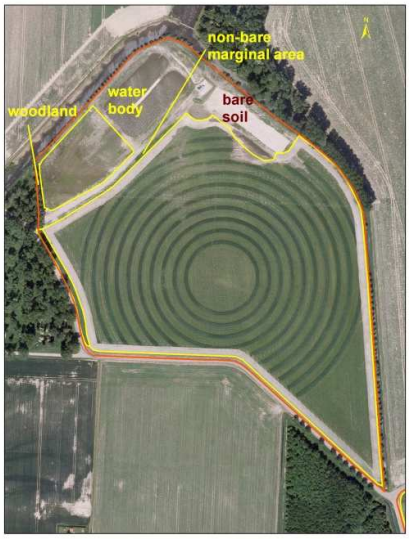

Example

Several types of non-agriculture land cover types found: forest and woodland, water body, natural bare areas, sparsely vegetated natural bare areas

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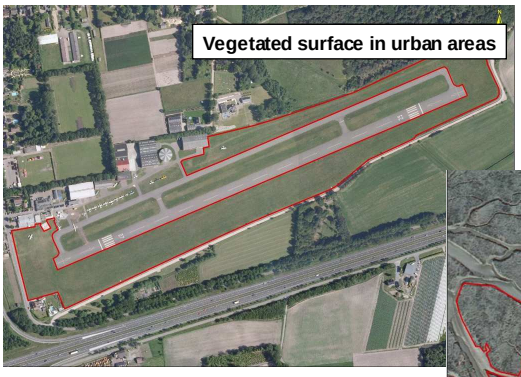
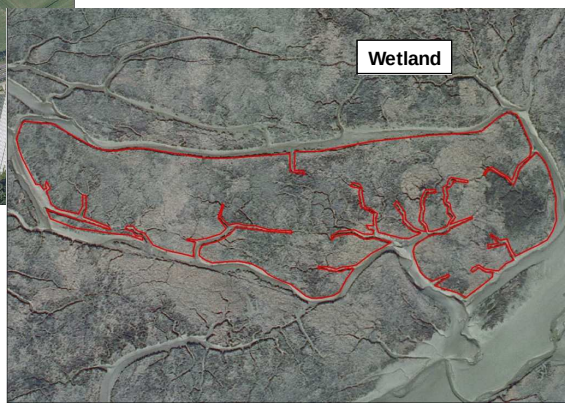


Specific Examples of non-agriculture land cover



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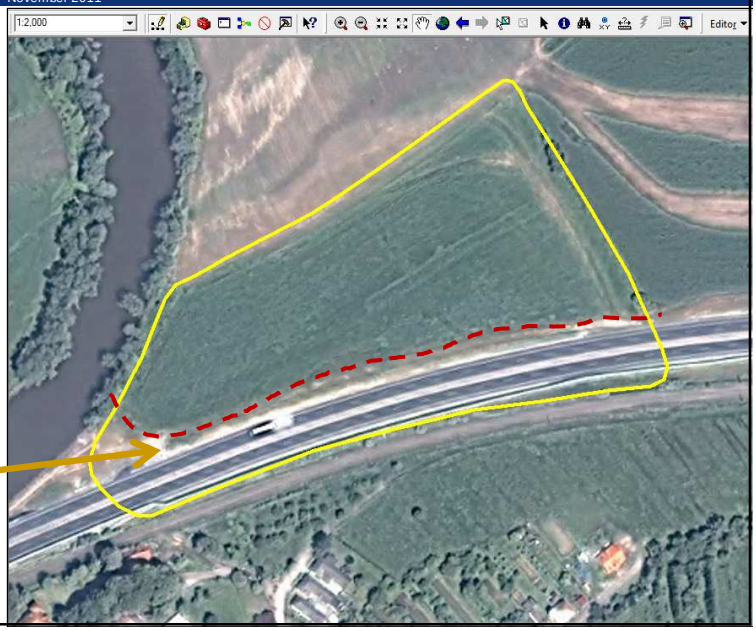
Artificial sealed surface:
road with associated non-agricultural areas
(even if covered with sparse natural vegetation)



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RFV in the ETS (on the field)

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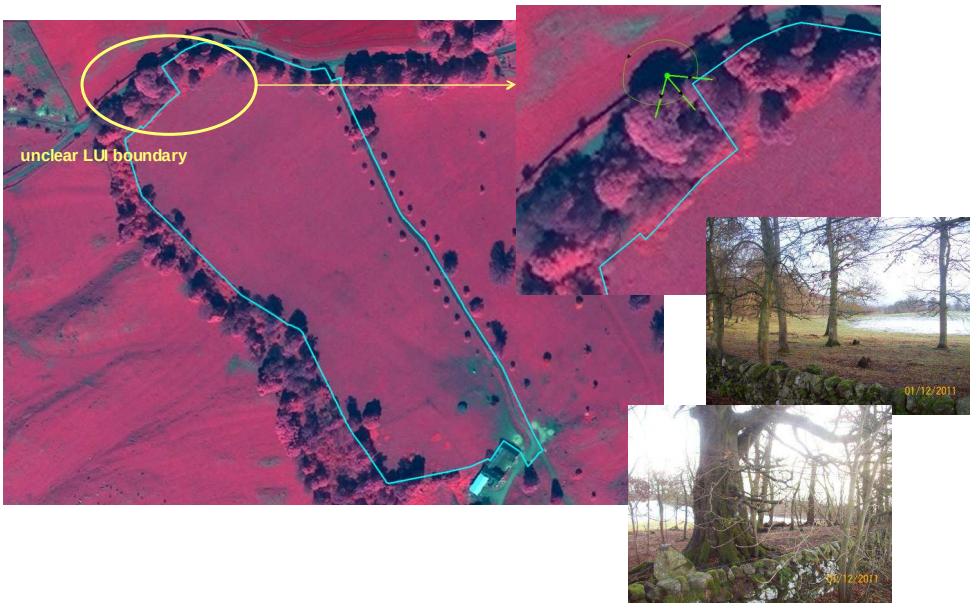

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LPIS QA and Street View

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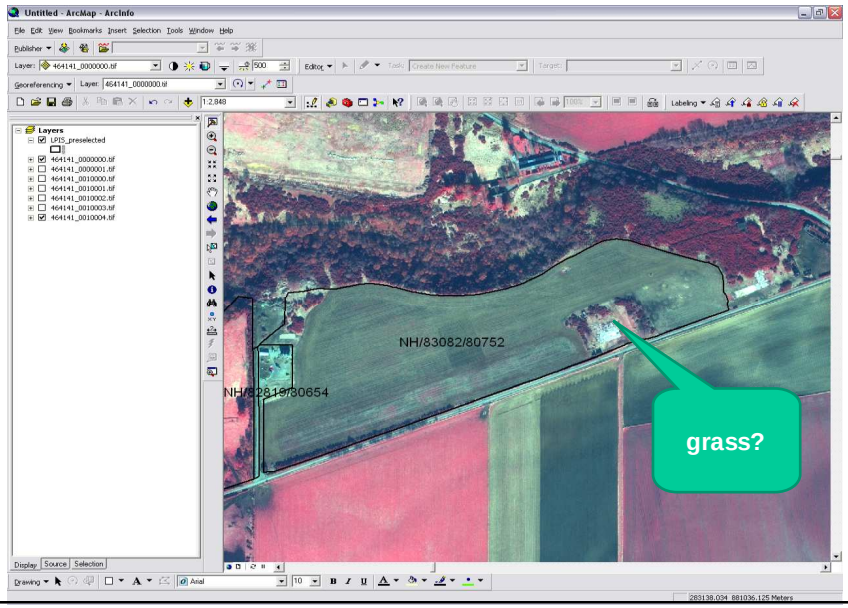

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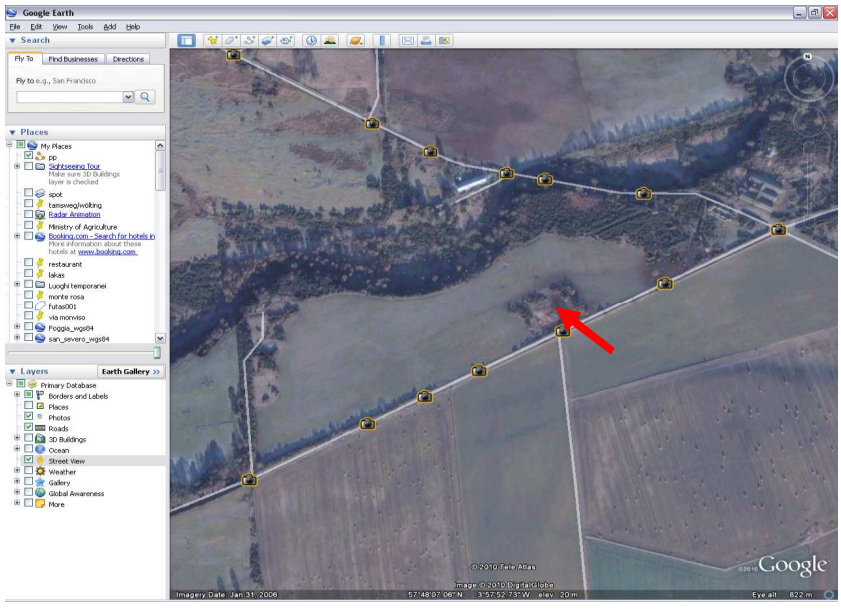

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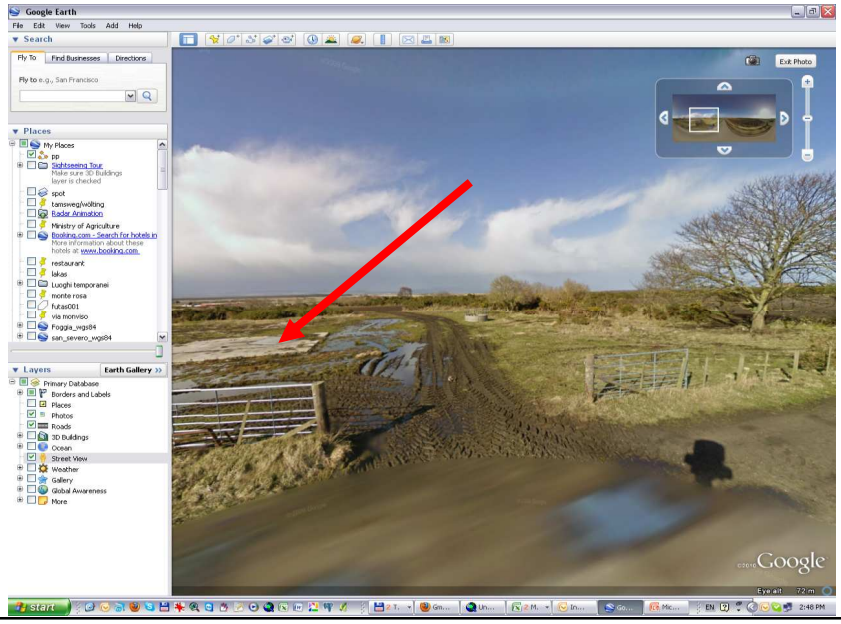

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Check the conformance of the Reference Parcel (E)

Reference: Annex II

ANNEX II: Description of the workflow, related to the inspection of the Reference Parcel, version 5.1 (Oct 2011)

The following UML diagram show the activities, related to the inspection of the Reference Parcel:

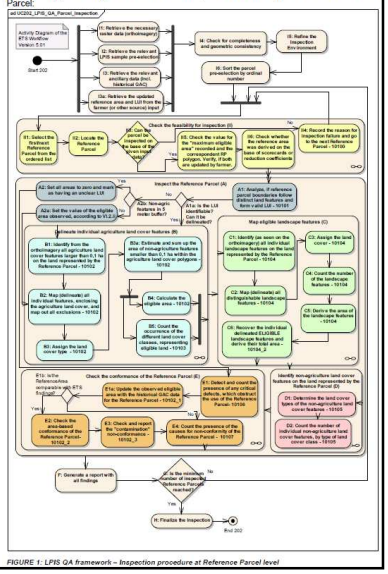

FIGURE 1: LPIS QA framework – Inspection procedure at Reference Parcel level

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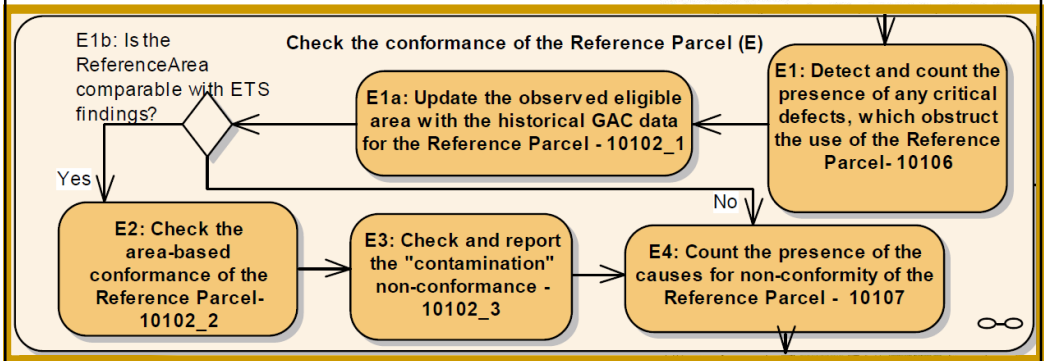
Check the conformance of the Reference Parcel (E)

ANNEX II: Description of the workflow, related to the inspection of the Reference Parcel, version 5.1 (Oct 2011)



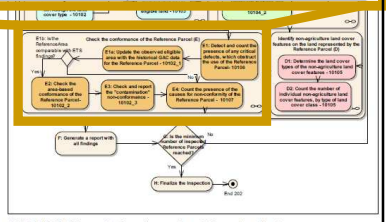


FIGURE 1: LPIS QA framework – Inspection procedure at Reference Parcel level

Reference: Annex II

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E1: Detect and count the presence of any critical defects, which obstruct the use of the Reference Parcel- 10106

ANNEX I: LPIS quality measures, version 5.1 (Oct 2011)

TABLE 7: RP Critical defects (10106)

Data quality components (Short name)	
DQ_Name	RP Conformance Critical Defects
DQ_Alias	RP_CRA
DQ_Scope	All land cover features, which are on the land represented by the Reference Parcel (relevant for all RPs that are part of the QC sample)
DQ_Element	2 – Logical consistency
DQ_Subelement	1 – Conceptual consistency
DQ_Measure	Error indicator
DQ_MeasureDef	Occurrence of local ground conditions, which evidenced for non-compliances (critical defects) that violate the conceptual schema of the dataset (LOT) under inspection and/or obstruct the use of the reference parcel (in the IACS processes where the LPIS play core part).
DQ_MeasureDesc	Table indicating the presence or absence of local ground conditions (expressed through the observed land cover and land use), which evidenced for non-compliances (critical defects) that violate the conceptual schema of the dataset (LOT) under inspection and/or obstruct the use of the reference parcel. The parcel is flagged as non-conforming, if it contains at least one critical defect.
DQ_MeasureRefSource	
DQ_MeasureID	10106
DQ_EvalMethod	
DQ_EvalMethodType	2-external
DQ_EvalMethodDesc	See Actions E1 from the Annex "Activity Diagram". Use the detailed instructions (No 1) for this inspection. 1. Check for the occurrence of a critical defect, starting from the first defect listed at the top of the table (given below) and cascade down to the bottom. 2. For each of the pre-defined critical defects from the list: a) Verify the general conditions of the LPIS conceptual schema (check the type of Reference Parcel applied) b) Identify and detect the occurrence of ALL local ground conditions listed, that evidenced for non-compliances that violate the conceptual schema of the dataset under inspection and obstruct the use of the reference parcel. Use the information provided from the ATS and the predefined list of local ground conditions. 3. Flag the parcel as non-conforming, if at least one critical defect is detected.

ANNEX I: LPIS quality measures, version 5.1 (Oct 2011)

	NOTE: Detailed instruction (No 1) on how to detect the presence of such non-compliances at the level of the reference parcel, is provided at the end of this document
DQ_QualityResult	
DQ_ValueType	1 - Boolean variable
DQ_ValueStructure	Table
DQ_Value	TRUE
DQ_ValueUnit	NA
DQ_Date	yyyy-mm-dd
DQ_ConformanceLevel	Not specified
Example dataset parameters	Critical Defect / Occurrence Total absence of eligible feature: Yes Invalid RP perimeter: No Invalid Common RP boundary: No Incomplete block: No Multi-polygon: No Multi-parcel: No
Example quality result meaning	One critical defect found. Reference Parcel is not conforming.

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E1: Detect and count the presence of any critical defects, which obstruct the use of the Reference Parcel 10106

ANNEX I: LPIS quality measures, version 5.1 (Oct 2011)

	NOTE: Detailed instruction (No … the reference parcel, is provided document
DQ_QualityResult	
DQ_ValueType	1 - Boolean variable
DQ_ValueStructure	Table
DQ_Value	TRUE
DQ_ValueUnit	NA
DQ_Date	yyyy-mm-dd
DQ_ConformanceLevel	Not specified
Example dataset parameters	Critical Defect Total absence of eligible featur Invalid RP perimeter Invalid Common RP boundary Incomplete block Multi-polygon Multi-parcel
Example quality result meaning	One critical defect found. Refere conforming.

ANNEX I: LPIS quality measures, version 5.1 (Oct 2011)

DETAILED INSTRUCTION 1: Definitions and conditions for occurrence of critical defect.

The ETS reports the types of potential critical defect given in Table A1, if the inspection observes the specified local ground conditions. The occurrence of one or more critical defects renders a reference parcel non-conforming.

Table A1

Critical Defect	Local Ground Conditions
Total absence of eligible features (or land)	Applicable only for reference parcels, holding "non zero" maximum eligible area ReferenceArea). Total lack of agriculture land cover, which might represent eligible land on the area represented by the Reference Parcel. *The total absence of eligible land indicates an evident problem.*
Invalid RP perimeter	Applicable only for reference parcels that cannot be measured and have non-agricultural elements within 5m of the LUI boundary • None of the RP perimeter "prime" vertices, which outline the shape of the LUI, correspond to the observed ground truth (as visible through the existing land cover, land use features). *These parcels are virtual and so irrelevant for land administration.*
Invalid common RP boundaries	Applicable only for physical and topographic block systems (PB, TB). • The Land use / land cover counter-indicates the presence of common stable physical boundary between the inspected reference parcel and at least two of its neighbouring reference parcels. • AND the common boundary location cannot be derived from surrounding land cover / land use elements. *These parcels represent sub-parcels of larger units.*
Incomplete block	Applicable only for (production) block systems (AP/FB/TB//PB) • The Land use / land cover counter-indicates the presence of a true stable physical boundary of the block • AND the LPIS does not hold a neighbouring non-zero MEA parcel where the farmer can declare that land clearly in his use. • AND this unaccounted land use indicates that more than 10 percent or 2000m2 (whichever is LARGER) of the block area value is missing from the LPIS. • AND the LPIS QA inspection cannot produce external evidence that the land tenure of this unaccounted part of the block is held by a farmer who is not receiving any aid for the assessment year. *These parcels prevent the neighbouring, potentially eligible land, land from being declared.* *NOTE:* The presence of a neighbouring reference parcel is not restricted to parcels within the scope of the current assessment year.
Multi-polygon	Applicable only for (production) block systems (AP/FB/TB//PB) A multi-polygon is a situation where one block (i.e. one RP identifier for is actually composed of two or more disjoint polygons. *The issue with multi-polygon is that it does not allow unambiguous location of the agricultural activity, even if managed by the same farmer.* **NOTE:** Internal or adjacent polygons representing sub-divisions in a single production block are not multi-polygon defects.
Multi-parcel	Applicable only for (production) block systems (AP/FB/TB//PB) The inspected reference parcels is an amalgamate of 10 (ten) or more clearly distinct parcels (i.e. units of agriculture land which according to the internal rules should have been processed separately). *The issue with multi-parcel is that it spreads or "blurs" the information over several land units, adversely affecting land identification and land use accuracy.*

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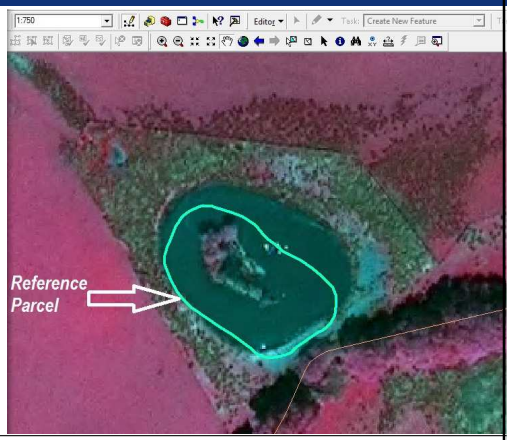
Critical Defect
Total absence of eligible feature
Invalid RP perimeter
Invalid Common RP boundary
Incomplete block
Multi-polygon
Multi-parcel



Critical Defect	Local Ground Conditions
Total absence of eligible features (or land)	Applicable only for reference parcels, holding "non zero" maximum eligible area ReferenceArea). Total lack of agriculture land cover, which might represent eligible land on the area represented by the Reference Parcel. *The total absence of eligible land indicates an evident problem.*

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Critical Defect
Total absence of eligible feature
Invalid RP perimeter
Invalid Common RP boundary
Incomplete block
Multi-polygon
Multi-parcel

Critical Defect	Local Ground Conditions
Total absence of eligible features (or land)	Applicable only for reference parcels, holding "non zero" maximum eligible area ReferenceArea). Total lack of agriculture land cover, which might represent eligible land on the area represented by the Reference Parcel. *The total absence of eligible land indicates an evident problem.*

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Critical Defect
Total absence of eligible feature
Invalid RP perimeter
Invalid Common RP boundary
Incomplete block
Multi-polygon
Multi-parcel

Critical Defect	Local Ground Conditions
Total absence of eligible features (or land)	Applicable only for reference pa Total lack of agriculture land co Reference Parcel. *The total absence of eligible land indicates an evident problem.*

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Critical Defect
Total absence of eligible feature
Invalid RP perimeter
Invalid Common RP boundary
Incomplete block
Multi-polygon
Multi-parcel

Invalid RP perimeter	Applicable only for reference parcels that cannot be measured and have non-agricultural elements within 5m of the LUI boundary • None of the RP perimeter "prime" vertices, which outline the shape of the LUI, correspond to the observed ground truth (as visible through the existing land cover, land use features). *These parcels are virtual and so irrelevant for land administration.*

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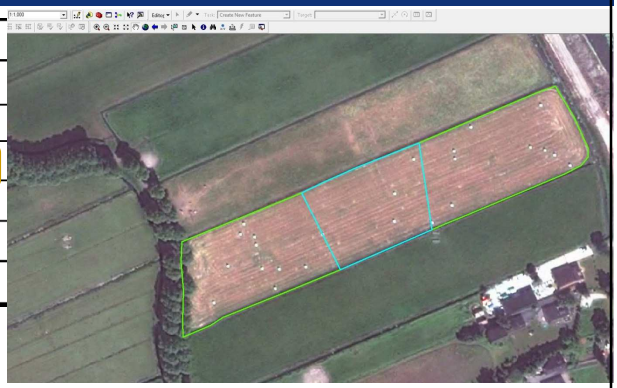
Critical Defect
Total absence of eligible feature
Invalid RP perimeter
Invalid Common RP boundary
Incomplete block
Multi-polygon
Multi-parcel



Invalid common RP boundaries	Applicable only for physical and topographic block systems (PB, TB), • The Land use / land cover counter-indicates the presence of common stable physical boundary between the inspected reference parcel and at least two of its neighbouring reference parcels. • AND the common boundary location cannot be derived from surrounding land cover / land use elements. *These parcels represent sub-parcels of larger units.*

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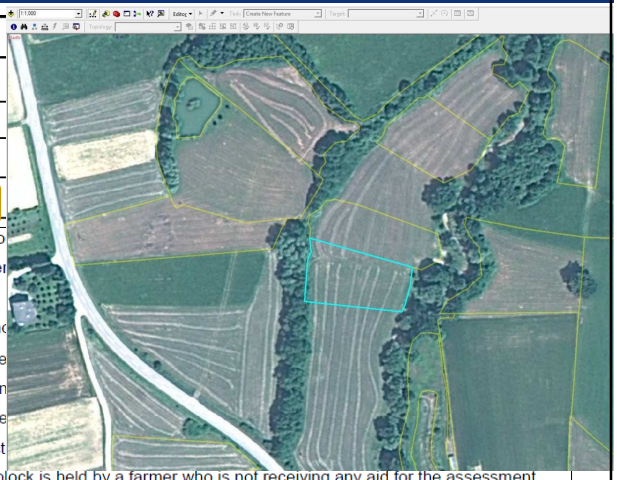
Critical Defect
Total absence of eligible feature
Invalid RP perimeter
Invalid Common RP boundary
Incomplete block



Incomplete block	Applicable only for (production) blo • The Land use / land cover block • AND the LPIS does not ho that land clearly in his use • AND this unaccounted lan LARGER) of the block are • AND the LPIS QA inspect unaccounted part of the block is held by a farmer who is not receiving any aid for the assessment year. *These parcels prevent the neighbouring, potentially eligible land, land from being declared.* ***NOTE:*** The presence of a neighbouring reference parcel is **not** restricted to parcels within the scope of the current assessment year.

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Critical Defect
Total absence of eligible feature
Invalid RP perimeter
Invalid Common RP boundary
Incomplete block

Incomplete block	Applicable only for (production) blo • The Land use / land cove block • AND the LPIS does not h that land clearly in his use • AND this unaccounted lan LARGER) of the block are • AND the LPIS QA inspec unaccounted part of the b year. *These parcels prevent the neighbo* ***NOTE:*** The presence of a neighbouring reference parcel is **not** restricted to parcels within the scope of the current assessment year.

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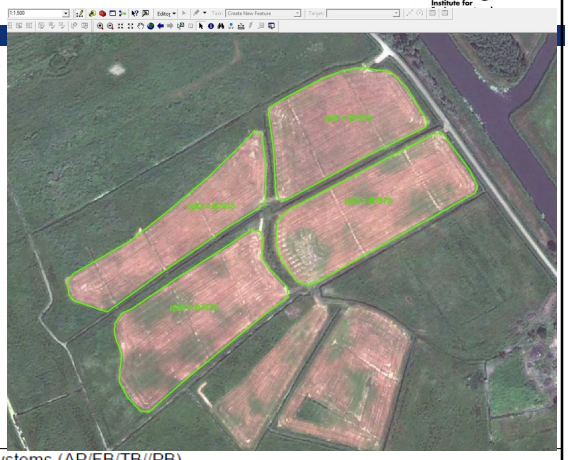
Critical Defect
Total absence of eligible feature
Invalid RP perimeter
Invalid Common RP boundary
Incomplete block
Multi-polygon
Multi-parcel



Multi-polygon	Applicable only for (production) block systems (AP/FB/TB//PB) A multi-polygon is a situation where one block (i.e. one RP identifier for is actually composed of two or more disjoint polygons. *The issue with multi-polygon is that it does not allow unambiguous location of the agricultural activity, even if managed by the same farmer.* **NOTE:** Internal or adjacent polygons representing sub-divisions in a single production block are not multi-polygon defects.

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Critical Defect
Total absence of eligible feature
Invalid RP perimeter
Invalid Common RP boundary
Incomplete block
Multi-polygon
Multi-parcel

Multi-parcel	Applicable only for (production) block systems (AP/FB/TB//PB) The inspected reference parcels is an amalgamate of 10 (ten) or more clearly distinct parcels (i.e. units of agriculture land which according to the internal rules should have been processed separately). *The issue with multi-parcel is that it spreads or "blurs" the information over several land units, adversely effecting land identification and land use accuracy.*

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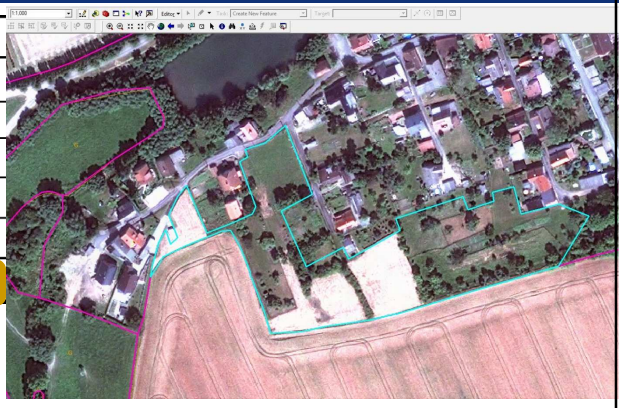
Critical Defect
Total absence of eligible feature
Invalid RP perimeter
Invalid Common RP boundary
Incomplete block
Multi-polygon
Multi-parcel



Multi-parcel	Applicable only for (production) block systems (AP/FB/TB//PB) The inspected reference parcels is an amalgamate of 10 (ten) or more clearly distinct parcels (i.e. units of agriculture land which according to the internal rules should have been processed separately). *The issue with multi-parcel is that it spreads or "blurs" the information over several land units, adversely effecting land identification and land use accuracy.*

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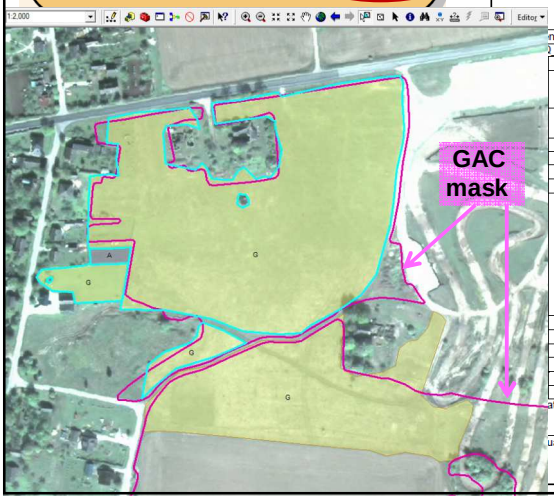
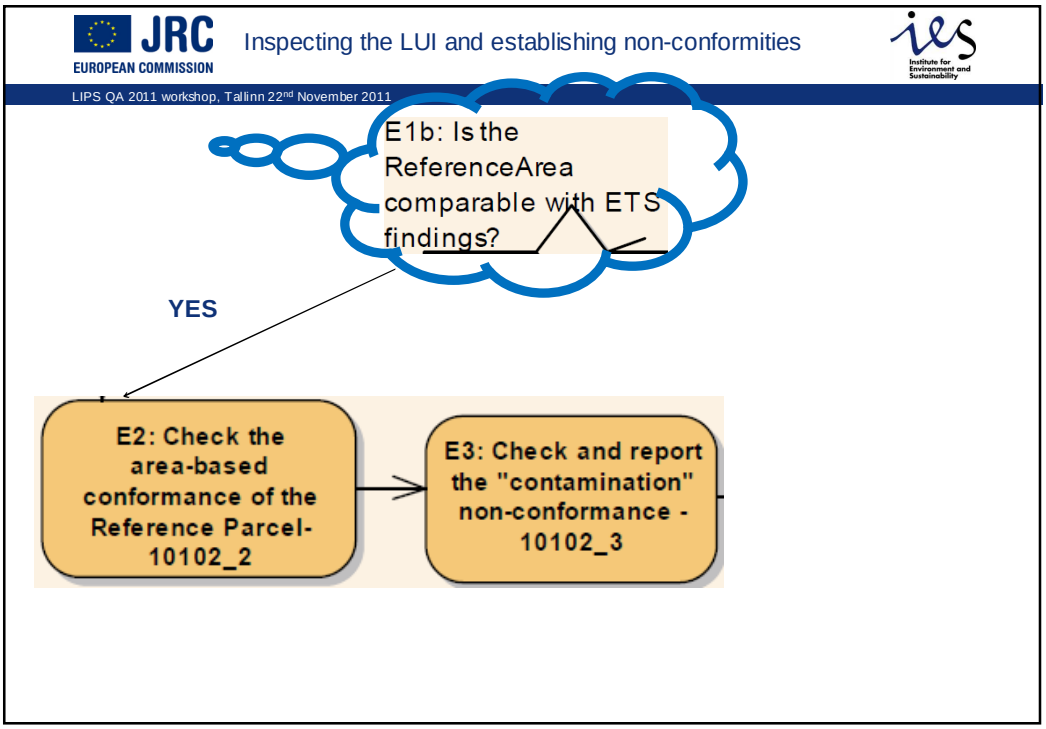
E1a: Update the observed eligible area with the historical GAC data for the Reference Parcel - 10102_1



ANNEX I: LPIS quality measures, version 5.1 (Oct 2011)

TABLE 7.2: RP GAC area (10102_1)

Data quality components (Short name)		
DQ_Name		RP Historical GAC area
DQ_Alias		RP_MEA_GAC
DQ_Scope		All single land cover features, which are on the land represented by the Reference Parcel (relevant for all RPs that that can be measured and also have historical GAC limitations presented on their LUIs)
nt		5 - thematic accuracy
Subelement		1 - Classification correctness
DQ_Measure		Correct GAC area value
	DQ_MeasureDef	Observed eligible area on the land represented by the Reference Parcel , which is in good agriculture condition (GAC) on 30 of June 2003
	DQ_MeasureDesc	Observed eligible area for the Reference Parcels, clipped with the historical GAC mask
	DQ_MeasureRefSource	
	DQ_MeasureID	10102_1
	DQ_EvalMethod	
	DQ_EvalMethodType	2-external
	DQ_EvalMethodDesc	See Actions E1a from the Annex "Activity Diagram". Spatially intersect all single agriculture land cover features and eligible landscape features on the land represented by the Reference Parcel, which were individually mapped in measure 10102, with the vector data representing the land in GAC on 30 of June 2003 (Historical GAC mask). Consult the results from the ATS (Module A_122), in order to retrieve the information and data on GAC. Calculate the eligible area from the clipped polygon area, using the information from the eligibility profile. Report the total observed eligible area for the Reference Parcel.
	DQ_QualityResult	
	DQ_ValueType	2 - number
	DQ_Value (example)	18000
	DQ_ValueUnit	square meters
DQ_Date		yyyy-mm-dd
DQ_ConformanceLevel		Not specified
ataset parameters		18000 square meters of eligible land found on the area represented by the Reference Parcel are within the historical GAC mask.
uality result meaning		18000 square meters of eligible land found on the area represented by the Reference Parcel, were actually in good agriculture conditions on 30 of June 2003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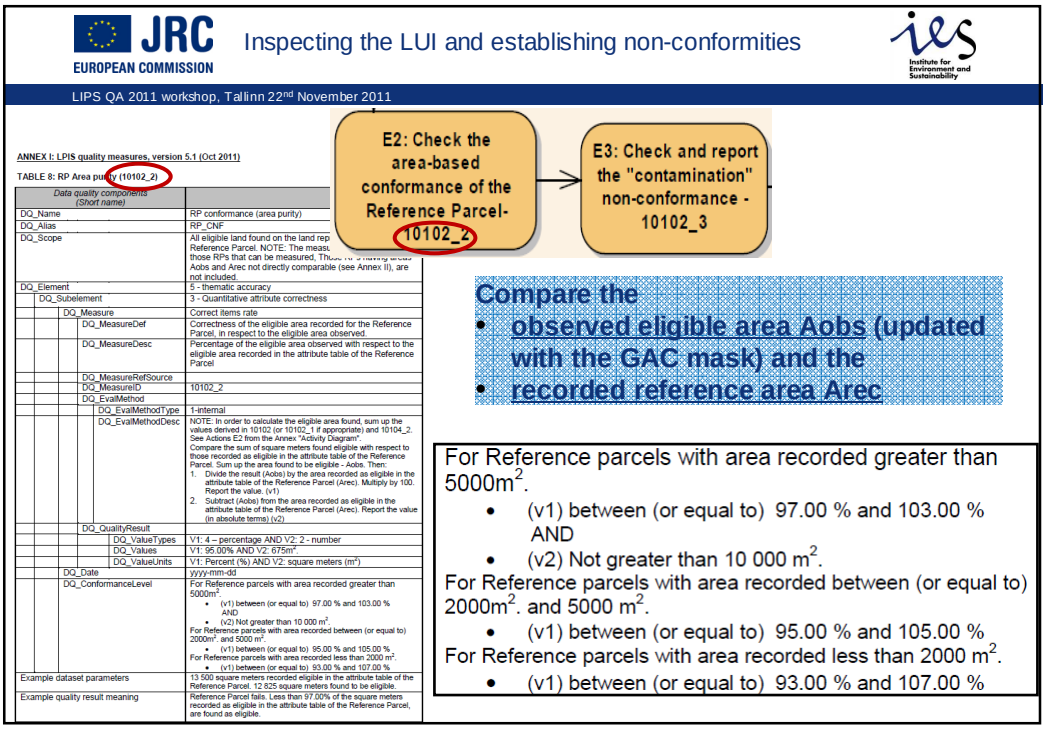
E1b: Is the ReferenceArea comparable with ETS findings?
YES
E2: Check the area-based conformance of the Reference Parcel- 10102_2
E3: Check and report the "contamination" non-conformance - 10102_3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E2: Check the area-based conformance of the Reference Parcel- 10102_2
E3: Check and report the "contamination" non-conformance - 10102_3
ANNEX I: LPIS quality measures, version 5.1 (Oct 2011)
TABLE 8: RP Area purity (10102_2)
Data quality components (Short name)
DQ_Name: RP conformance (area purity)
DQ_Alias: RP_CNF
DQ_Scope: All eligible land found on the land rep Reference Parcel. NOTE: The meas those RPs that can be measured, Thos Aobs and Arec not directly comparable (see Annex II), are not included.
DQ_Element: 5 - thematic accuracy
DQ_Subelement: 3 - Quantitative attribute correctness
DQ_Measure: Correct items rate
DQ_MeasureDef: Correctness of the eligible area recorded for the Reference Parcel, in respect to the eligible area observed.
DQ_MeasureDesc: Percentage of the eligible area observed with respect to the eligible area recorded in the attribute table of the Reference Parcel
DQ_MeasureRefSource:
DQ_MeasureID: 10102_2
DQ_EvalMethod:
DQ_EvalMethodType: 1-internal
DQ_EvalMethodDesc: NOTE: In order to calculate the eligible area found, sum up the values derived in 10102 (or 10102_1 if appropriate) and 10104_2. See Actions E2 from the Annex "Activity Diagram".
Compare the sum of square meters found eligible with respect to those recorded as eligible in the attribute table of the Reference Parcel. Sum up the area found to be eligible - Aobs. Then:
1. Divide the result (Aobs) by the area recorded as eligible in the attribute table of the Reference Parcel (Arec). Multiply by 100. Report the value. (v1)
2. Subtract (Aobs) from the area recorded as eligible in the attribute table of the Reference Parcel (Arec). Report the value (in absolute terms) (v2)
DQ_QualityResult:
DQ_ValueTypes: V1: 4 – percentage AND V2: 2 - number
DQ_Values: V1: 95.00% AND V2: 675m².
DQ_ValueUnits: V1: Percent (%) AND V2: square meters (m²)
DQ_Date: yyyy-mm-dd
DQ_ConformanceLevel: For Reference parcels with area recorded greater than 5000m².
• (v1) between (or equal to) 97.00 % and 103.00 % AND
• (v2) Not greater than 10 000 m².
For Reference parcels with area recorded between (or equal to) 2000m². and 5000 m².
• (v1) between (or equal to) 95.00 % and 105.00 %.
For Reference parcels with area recorded less than 2000 m².
• (v1) between (or equal to) 93.00 % and 107.00 %
Example dataset parameters: 13 500 square meters recorded eligible in the attribute table of the Reference Parcel. 12 825 square meters found to be eligible.
Example quality result meaning: Reference Parcel fails. Less than 97.00% of the square meters recorded as eligible in the attribute table of the Reference Parcel, are found as eligible.
Compare the
• observed eligible area Aobs (updated with the GAC mask) and the
• recorded reference area Arec
For Reference parcels with area recorded greater than 5000m².
• (v1) between (or equal to) 97.00 % and 103.00 % AND
• (v2) Not greater than 10 000 m².
For Reference parcels with area recorded between (or equal to) 2000m². and 5000 m².
• (v1) between (or equal to) 95.00 % and 105.00 %
For Reference parcels with area recorded less than 2000 m².
• (v1) between (or equal to) 93.00 % and 107.00 %

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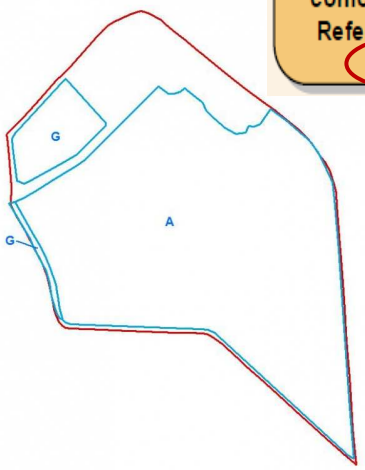
E2: Check the area-based conformance of the Reference Parcel- 10102_2

E3: Check and report the "contamination" non-conformance - 10102_3



Area Observed = 94513 sq.m.;
Area Recorded = 120198sq.m.;
Area Observed/ Area Recorded = 0.79;
21% of ineligible land found;

Reference Parcel is non-conformant, as it contains more than 3% ineligible land

referenceArea=21939


```
<cap:referenceParcel rpID=xyz123>
    <cap:RP_MEA>21293</cap:RP_MEA>
    <cap:RP_ELC>
      <cap:agricultureLandCoverClass codeSpace="urn:ec:lpisqa:2010 name="G" occurence="true"/>
    </cap:RP_ELC>
    <cap:RP_ALF>
      <cap:landscapeFeature abundance="1" codeSpace="urn:ec:lpisqa: name="HK"/>
    </cap:RP_ALF>
    <cap:RP_ELF>424</cap:RP_ELF>
    <cap:RP_ANF>
      <cap:artificialSealedSurface abundance="0"/>
      <cap:forestAndWoodland abundance="0"/>
      <cap:naturalVegetation abundance="0"/>
      <cap:waterBodies abundance="0"/>
      <cap:naturalBareAreas abundance="0"/>
      <cap:wetland abundance="0"/>
    </cap:RP_ANF>
    <cap:RP_CRA>
      <cap:inabilityToIdentifyLuiBoundaries occurence="false"/>
      <cap:discontinuity occurence="false"/>
      <cap:totalAbsenceOfEligibleFeatures occurence="false"/>
      <cap:multiParcel occurence="false"/>
      <cap:multiPolygonReferenceParcel occurence="false"/>
    </cap:RP_CRA>
    <cap:RP_CRF/>
    <cap:RP_CNF>
      <cap:observedToRecordedAreaPercentage>99.0</cap:observedToRecordedAreaPercentage>
      <cap:observedRecordedAreaDifference>222</cap:observedRecordedAreaDifference>
    </cap:RP_CNF>
    <cap:RP_CNT/>
    <cap:RP_CEA>
      <cap:changesOfTheUnderlyingLandWereNotApplied occurence="false"/>
      <cap:revisionsOfTheRegulationsWereNotApplied occurence="false"/>
      <cap:incompleteProcessing occurence="false"/>
      <cap:erroneousProcessing occurence="false"/>
      <cap:incompatibleLpisDesign occurence="false"/>
      <cap:observedEligibleAreaIsNotInGacOn20030630 occurence="false"/>
    </cap:RP_CEA>
</cap:referenceParcel>
```


```
Arec = 21939
Aobs = 21293 + 424 = 21717
(v1) = Aobs / Arec = (21717 / 21939) * 100 = 98.99%
(v2) = Arec - Aobs = 21939 - 21717 = 222
```

For Reference parcels with area recorded greater than 5000m^2.

- (v1) between (or equal to) 97.00 % and 103.00 % AND
- (v2) Not greater than 10 000 m^2.

For Reference parcels with area recorded between (or equal to) 2000m^2. and 5000 m^2.

- (v1) between (or equal to) 95.00 % and 105.00 %

For Reference parcels with area recorded less than 2000 m^2.

- (v1) between (or equal to) 93.00 % and 107.00 %

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E2: Check the area-based conformance of the Reference Parcel- 10102_2

→

E3: Check and report the "contamination" non-conformance - 10102_3

ANNEX I: LPIS quality measures, ver

TABLE 8: RP Area purity (10102_2)

Data quality components (Short name)	
DQ_Name	
DQ_Alias	
DQ_Scope	
DQ_Element	5 - thematic accuracy
DQ_Subelement	3 - Quantitative attribute correctness
DQ_Measure	Correct items rate
DQ_MeasureDef	Correctness of the eligible area recorded for the Reference Parcel, in respect to the eligible area observed.
DQ_MeasureDesc	Percentage of the eligible area observed with respect to the eligible area recorded in the attribute table of the Reference Parcel
DQ_MeasureRefSource	
DQ_MeasureID	10102_2
DQ_EvalMethod	
DQ_EvalMethodType	1-internal
DQ_EvalMethodDesc	NOTE: In order to calculate the eligible area found, sum up the values derived in 10102 (or 10102_1 if appropriate) and 10104_2. See Actions E2 from the Annex "Activity Diagram". Compare the sum of square meters found eligible with respect to those recorded as eligible in the attribute table of the Reference Parcel. Sum up the area found to be eligible - Aobs. Then: 1. Divide the result (Aobs) by the area recorded as eligible in the attribute table of the Reference Parcel (Arec). Multiply by 100. Report the value. (v1) 2. Subtract (Aobs) from the area recorded as eligible in the attribute table of the Reference Parcel (Arec). Report the value (in absolute terms) (v2).
DQ_QualityResult	
DQ_ValueTypes	V1: 4 – percentage AND V2: 2 - number
DQ_Values	V1: 95.00% AND V2: 675m².
DQ_ValueUnits	V1: Percent (%) AND V2: square meters (m²)
DQ_Date	yyyy-mm-dd
DQ_ConformanceLevel	For Reference parcels with area recorded greater than 5000m²: • (v1) between (or equal to) 97.00 % and 103.00 % AND • (v2) Not greater than 10 000 m². For Reference parcels with area recorded between (or equal to) 2000m² and 5000 m²: • (v1) between (or equal to) 95.00 % and 105.00 %. For Reference parcels with area recorded less than 2000 m²: • (v1) between (or equal to) 93.00 % and 107.00 %.
Example dataset parameters	13 500 square meters recorded eligible in the attribute table of the Reference Parcel. 12 825 square meters found to be eligible.
Example quality result meaning	Reference Parcel fails. Less than 97.00% of the square meters recorded as eligible in the attribute table of the Reference Parcel, are found as eligible.

ANNEX I: LPIS quality measures, version 5.1 (Oct 2011)

TABLE 8.2: RP "contaminated" Reference Parcels (10102_3)

Data quality components (Short name)	
DQ_Name	RP Conformance ("Contaminated" reference parcel)
DQ_Alias	RP_CNT
DQ_Scope	All land cover features, which are on the land represented by the Reference Parcel. NOTE: The measure is applicable only for those RPs found to be conformant in respect to quality measure 10102_2.
DQ_Element	1 - Completeness
DQ_Subelement	1 - Commission
DQ_Measure	Error indicator
DQ_MeasureDef	Occurrence of non-agriculture land cover features on the land represented by the Reference Parcel (if the parcel is found to be conformant in respect to 10102_2), which violate the relevant general and local ETS conditions for each of the pre-defined waivers.
DQ_MeasureDesc	Table indicating the presence (occurrence) of non-agriculture land cover features by type (as is defined by measure 10105), on the LUI and the conformance status of the Reference Parcel in respect to that "contamination". The parcel is flagged as non-conforming, if at least one occurrence of ineligible feature remains "unwaivered". (see Detailed Instruction 2).
DQ_MeasureRefSource	
DQ_MeasureID	10102_3
DQ_EvalMethod	
DQ_EvalMethodType	1-internal
DQ_EvalMethodDesc	1.See Actions E3 from the Annex "Activity Diagram" If the Reference Parcel is found to be conformant in respect to 10102_2, take the value for the abundance of non-agriculture land cover features per land cover type, from the reporting table of quality measure 10105. Flag the "Reference parcel as "contaminated" if for any of the given types, the value is other than 0. Use the information provided from the ATS and the predefined list of acceptable waivers, (given in Detailed instruction 2) to vindicate the presence of such observed anomalies for that reference parcel. 2. Report the presence of an applicable waiver (if any). 3. Flag the parcel as non-conforming, if at least one occurrence of ineligible feature remains "unwaivered".
DQ_QualityResult	
DQ_ValueType	1 - Boolean variable
DQ_ValueStructure	Table
DQ_Value	TRUE
DQ_ValueUnit	NA
DQ_Date	yyyy-mm-dd
DQ_ConformanceLevel	Absence of "unwaivered" occurrence of ineligible feature.

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E2: Check the area-based conformance of the Reference Parcel- 10102_2

→

E3: Check and report the "contamination" non-conformance - 10102_3

Non-agriculture land cover	Contamination	Waivered	Waiver
Artificial sealed surface	Yes	Yes	C
Forest and Woodland	Yes	Yes	C
Natural Vegetation	Yes	Yes	C
Water Bodies	No		
Natural Bare areas	Yes	Yes	C
Wetland	No		

Data quality components (Short name)	
DQ_Name	RP Conformance ("Contaminated" reference parcel)
DQ_Alias	RP_CNT
DQ_Scope	All land cover features, which are on the land represented by the Reference Parcel. NOTE: The measure is applicable only for those RPs found to be conformant in respect to quality measure 10102_2.
DQ_Element	1 - Completeness
DQ_Subelement	1 - Commission
DQ_Measure	Error indicator
DQ_MeasureDef	Occurrence of non-agriculture land cover features on the land represented by the Reference Parcel (if the parcel is found to be conformant in respect to 10102_2), which violate the relevant general and local ETS conditions for each of the pre-defined waivers.
DQ_MeasureDesc	Table indicating the presence (occurrence) of non-agriculture land cover features by type (as is defined by measure 10105), on the LUI and the conformance status of the Reference Parcel in respect to that "contamination". The parcel is flagged as non-conforming, if at least one occurrence of ineligible feature remains "unwaivered". (see Detailed Instruction 2).
DQ_MeasureRefSource	
DQ_MeasureID	10102_3
DQ_EvalMethod	
DQ_EvalMethodType	1-internal
DQ_EvalMethodDesc	1.See Actions E3 from the Annex "Activity Diagram" If the Reference Parcel is found to be conformant in respect to 10102_2, take the value for the abundance of non-agriculture land cover features per land cover type, from the reporting table of quality measure 10105. Flag the "Reference parcel as "contaminated" if for any of the given types, the value is other than 0. Use the information provided from the ATS and the predefined list of acceptable waivers, (given in Detailed instruction 2) to vindicate the presence of such observed anomalies for that reference parcel. 2. Report the presence of an applicable waiver (if any). 3. Flag the parcel as non-conforming, if at least one occurrence of ineligible feature remains "unwaivered".
DQ_QualityResult	
DQ_ValueType	1 - Boolean variable
DQ_ValueStructure	Table
DQ_Value	TRUE
DQ_ValueUnit	NA
DQ_Date	yyyy-mm-dd
DQ_ConformanceLevel	Absence of "unwaivered" occurrence of ineligible feature.

ANNEX I: LPIS quality measures, version 5.1 (Oct 2011)

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DETAILED INSTRUCTION 2: Application of waivers, which can vindicate a reference parcel contaminated by ineligible features.

The Commission issues the following waivers and Member States may choose to activate these waivers to vindicate an observed contamination of the LUI by one or more ineligible features.

For each occurrence

- **Check if the observation violates the relevant general and local ETS condition for each of the three waivers**
- **Indicate which waiver vindicates the observed contamination, where applicable,**
- **Flag the parcel as non-conforming, if at least one occurrence of ineligible feature remains "unwaivered".**

➢ Waiver C essentially requires documentation indicating that the contamination inside the LUI was known and dealt with appropriately.

Table B

Waiver	General condition	Local conditions to be verified during ETS inspection
A	-	Check that (Arec – Aobs) <= 100m2. Aobs is derived in 10102 (or 10102_1 if appropriate).
C	Verify that a separate GIS layer represents (in)eligible land cover	Verify, if the contamination is fully located within the separate GIS layer for non-eligible areas, or if it is fully located outside the separate GIS layer for eligible areas.
D	Verify that a separate GIS layer represents the historical GAC mask (SAPS only)	Check that the contamination is fully located outside the eligible partition of the separate GAC mask

quality measures, version 5.1 (Oct 2011)

"contaminated" Reference Parcels (10102_3)

quality components (Short name)	
	RP Conformance ("Contaminated" reference parcel)
	RP_CNT
	All land cover features, which are on the land represented by the Reference Parcel. NOTE: The measure is applicable only for those RPs found to be conformant in respect to quality measure 10102_2.
	1 - Completeness
ement	1 - Commission
Measure	Error indicator
DQ_MeasureDef	Occurrence of non-agriculture land cover features on the land represented by the Reference Parcel (if the parcel is found to be conformant in respect to 10102_2), which violate the relevant general and local ETS conditions for each of the pre-defined waivers.
DQ_MeasureDesc	Table indicating the presence (occurrence) of non-agriculture land cover features by type (as is defined by measure 10105), on the LUI and the conformance status of the Reference Parcel in respect to that "contamination". The parcel is flagged as non-conforming, if at least one occurrence of ineligible feature remains "unwaivered". (see Detailed Instruction 2).
DQ_MeasureRefSource	
DQ_MeasureID	10102_3
DQ_EvalMethod	
DQ_EvalMethodType	1-internal
DQ_EvalMethodDesc	1.See Actions E3 from the Annex "Activity Diagram" If the Reference Parcel is found to be conformant in respect to 10102_2, take the value for the abundance of non-agriculture land cover features per land cover type, from the reporting table of quality measure 10105. Flag the "Reference parcel as "contaminated" if for any of the given types, the value is other than 0. Use the information provided from the ATS and the predefined list of acceptable waivers, (given in Detailed instruction 2) to vindicate the presence of such observed anomalies for that reference parcel. 2. Report the presence of an applicable waiver (if any). 3. Flag the parcel as non-conforming, if at least one occurrence of ineligible feature remains "unwaivered".
DQ_QualityResult	
DQ_ValueType	1 - Boolean variable
DQ_ValueStructure	Table
DQ_Value	TRUE
DQ_ValueUnit	NA
Date	yyyy-mm-dd
ConformanceLevel	Absence of "unwaivered" occurrence of ineligible feature.

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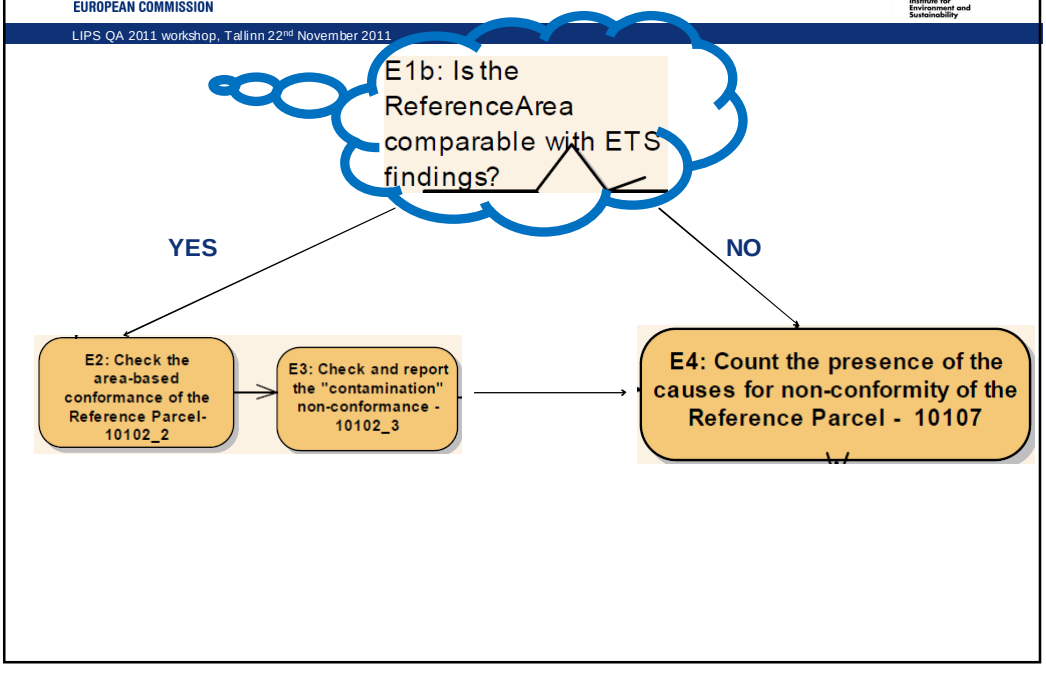

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E4: Count the presence of the causes for non-conformity of the Reference Parcel - 10107

Causes for occurrence of non-conformity in the Reference Parcels	Occurrence
Changes of the underlying land were not applied	Yes
Revisions of the Regulations were not applied	No
Incomplete processing	No
Erroneous processing	No
Incompatible LPIS design	No
Observed eligible area is not in GAC on 30 of June 2003	No

ANNEX I: LPIS quality measures, version 5.1 (Oct 2011)

TABLE 9: RP cause of non-conformity (10107)

Data quality components (Short name)	
DQ_Name	Categorization of the non-conforming reference parcels (derived from 10106, 10102_2 and 10102_3), in the LPIS
DQ_Alias	RP_CEA
DQ_Scope	Each non-conforming Reference Parcels, which take part of the QC sample, as identified in measures 10106, 10102_2 and 10102_3
DQ_Element	1 - Completeness
DQ_Subelement	1 - Commission
DQ_Measure	
DQ_MeasureDef	Categorization of the non-conforming Reference Parcel, based on the potential cause for the non-conformity
DQ_MeasureDesc	Table, which verifies the occurrence of the initially pre-defined causes for the presence of the detected problem in the observed non-conforming Reference Parcel. At least one cause should be selected.
DQ_MeasureStru	Table
DQ_MeasureRefSource	
DQ_MeasureID	10107
DQ_EvalMethod	
DQ_EvalMethodType	2-external
DQ_EvalMethodDesc	See Actions E4 from the Annex "Activity Diagram". Assign to each non-conforming Reference Parcel, one or more given pre-defined causes, starting from the first cause listed at the top and going sequentially to the last one at the bottom. Consult the LPIS data Model and the results from the ATS, wherever is needed. A Detailed Instruction (No 3) on the categorization of the non-conformant parcels is given at the end of this document.
DQ_QualityResult	
DQ_ValueType	6 - table
DQ_Value (example)	Causes for occurrence of non-conformity in the Reference Parcels / Occurrence: Changes of the underlying land were not applied – Yes; Revisions of the Regulations were not applied – No; Incomplete processing – No; Erroneous processing – No; Incompatible LPIS design – No; Observed eligible area is not in GAC on 30 of June 2003 – No
DQ_ValueUnit	Number
DQ_Date	yyyy-mm-dd
DQ_ConformanceLevel	Not specified
Example dataset parameters	See DQ_Value
Example quality result meaning	The Reference Parcel has 1 cause for the presence of the non-conformity – land changes are not applied. Since conformance quality level is not specified, only the values are reported.

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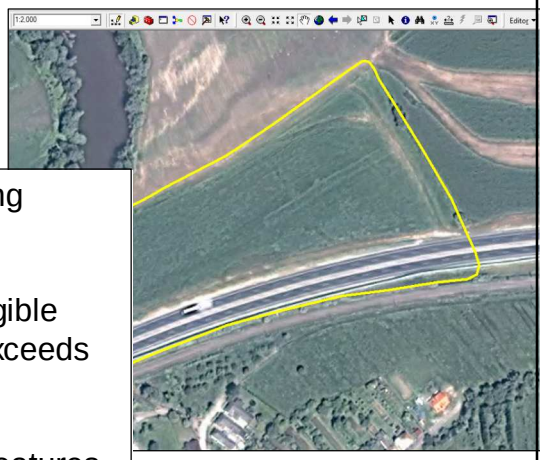
E4: Count the presence of the causes for non-conformity of the Reference Parcel - 10107



Check if at least one of the following statements are true for the RP:

- it holds a critical defect
- the difference between the eligible area observed and recorded exceeds the threshold
- its LUI contains unwaivered contaminations with ineligible features

→ **If Yes, RP is non-conforming**

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E4: Count the presence of the causes for non-conformity of the Reference Parcel - 10107

Causes for occurrence of non-conformity in the Reference Parcels	Occurrence
Changes of the underlying land were not applied	
Revisions of the Regulations were not applied	
Incomplete processing	
Erroneous processing	
Incompatible LPIS design	
Observed eligible area is not in GAC on 30 of June 2003	

ANNEX I: LPIS quality measures, version 5.1 (Oct 2011)

DETAILED INSTRUCTION 3: Categorization of the non-conforming reference parcels

In order to decide, if a particular cause can explain the observed non-conformity, the operator should perform a minimum set of actions, specific for each cause. They are listed below (for each cause separately). This list of actions is considered exhaustive. Continue to cascade down until the correct cause is determined:

1. For system under SAPS with historical GAC only: the observed eligible area was not in GAC on 30 of June 2003.
   - Check the availability of historical GAC mask (by consulting the Sub-Modules A_122 "representation of historical eligibility" of the ATS)
2. Changes of the underlying land were not applied
   - Check the date of validity of the reference parcel (by consulting the value effectiveDate in the LPIS for that parcel - see also Sub-Module A_131 of the ATS)
   - Check any archive reference data (orthoimagery, topomaps, cadastral plans,..)

   Typical examples are a newly constructed road or building that is still being considered agricultural land or a recent conversion into agricultural land that has not been taken into account.
3. Revisions of the Regulations were not applied
   - Check the rules on eligibility applied for the given LPIS lot (by consulting the eligibility profile and the reporting on Module A_12 "Eligibility and land cover types" of the ATS)

   Typical examples are an underestimate of the maximum eligible area because the abolishment of separate schemes (olives, vineyards, decouplement,...) or a creation of new schemes (retention of landscape features) have not been introduced in LPIS.
4. Incomplete processing
   - Check the availability of separate datasets or layers, which store small exclusions or landscape features (by consulting the Sub-Modules A_123 and A_124 of the ATS)
   - Check archive reference data (orthoimagery, topomaps, cadastral plans,..)

   Typical examples are that a separate sub-parcel or eligibility layer, although foreseen in the LPIS design, has not been produced for the full LUI or that a validation procedure, although required by the LPIS creation specifications, has not been performed (a particular example is where a military mask prevented photo interpretation in the past and the parcel was "cut off" at the mask).
5. Erroneous processing
   - Check the validity date of the reference parcel (by consulting the value effectiveDate in the LPIS for that parcel - see also Sub-Module A_131 of the ATS)
   - Check archive reference data (orthoimagery, topomaps, cadastral plans,..)

   Typical examples are that the operator has used inappropriate (e.g. outdated) source material or there has been a manifest deviation from the documented instructions.
6. Incompatible LPIS design
   - Check the definition of the Reference Parcel (by consulting Module A_11 of the ATS)
   - Consult historical data

   This is the situation that has not been foreseen in the specifications and cannot be explained by any of the above causes.

   Typical example could be a reference parcel of AP type, detected during the ETS as being a multi-polygon.

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Generate a report, Finalize the Inspection (F, G, H)

Reference: Annex II

ANNEX II: Description of the workflow, related to the inspection of the Reference Parcel, version 5.1 (Oct 2011)

The following UML diagram show the activities, related to the inspection of the Reference Parcel:

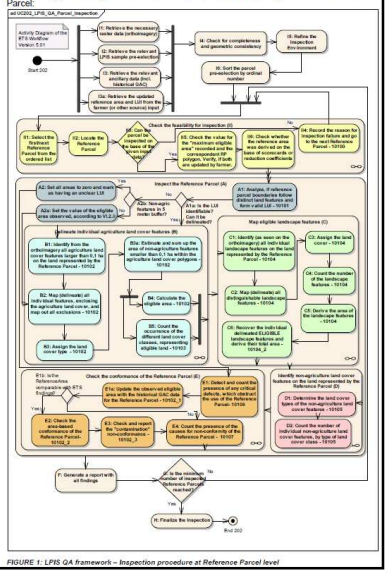

FIGURE 1: LPIS QA framework – Inspection procedure at Reference Parcel level

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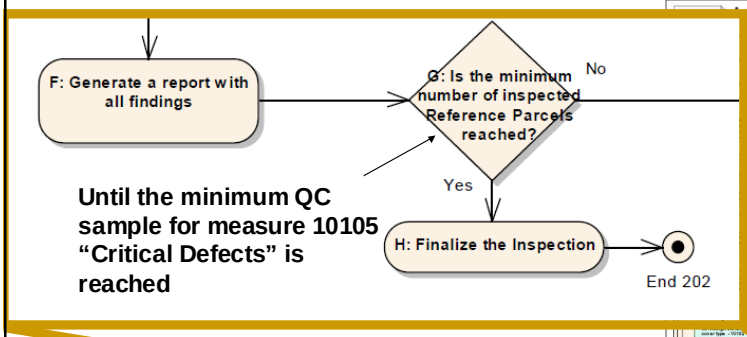
Generate a report, Finalize the Inspection (F, G, H)



Until the minimum QC sample for measure 10105 "Critical Defects" is reached

Reference: Annex II

ANNEX II: Description of the workflow, related to the inspection of the Reference Parcel, version 5.1 (Oct 2011)

The following UML diagram show the activities, related to the inspection of the Reference Parcel:

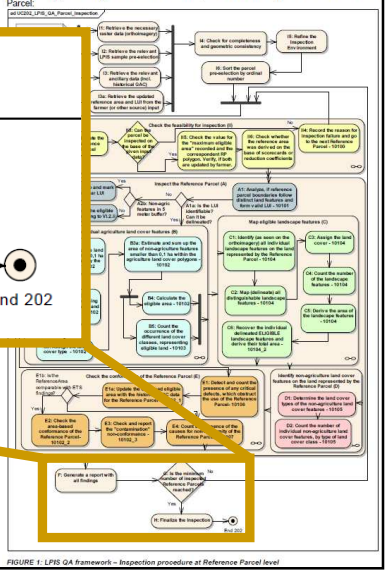


FIGURE 1: LPIS QA framework – Inspection procedure at Reference Parcel level