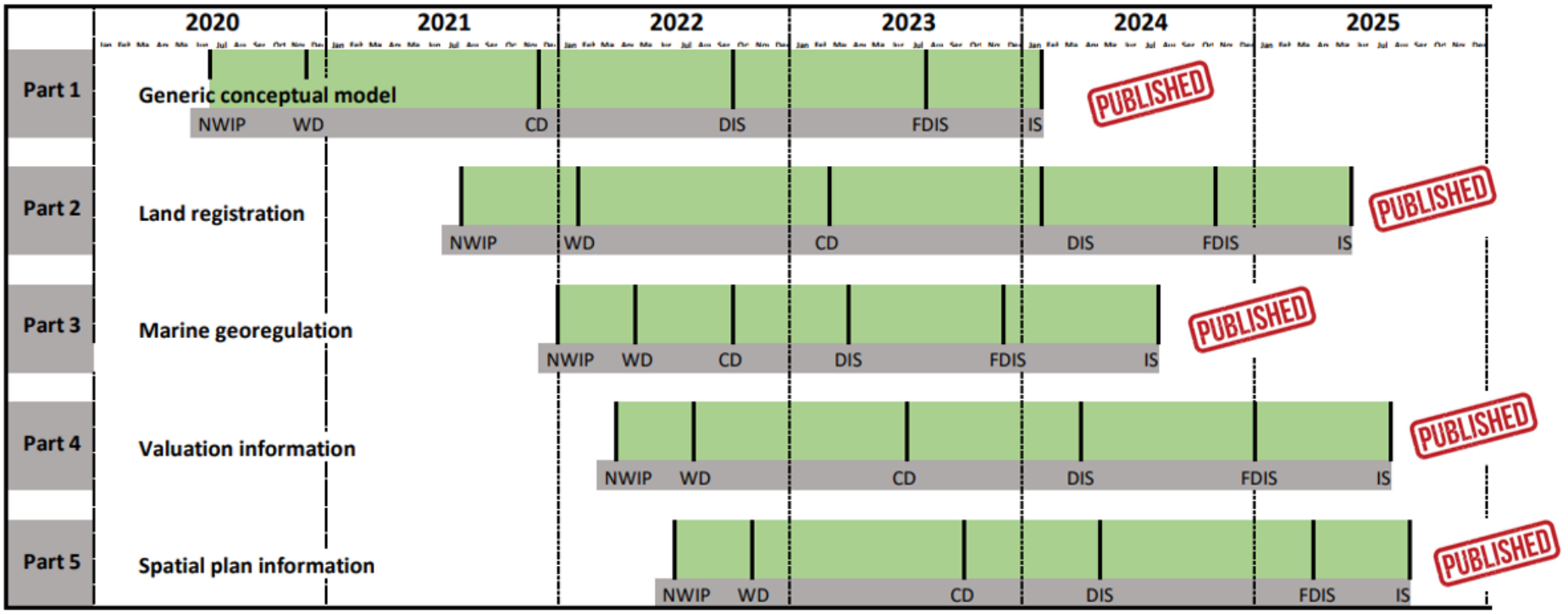
LADM Edition II Progress Report – Current Status of All Parts of LADM Edition II

(December 2025)



** The updated sections of the document are highlighted in green. The above figure has also been updated to reflect recent developments in the ISO 19152 LADM series.

Detailed LADM Progress Report

Land Administration Domain Model Edition I – An Overview of Development Stages

At the 22nd International Federation of Surveyors (FIG) Congress in Washington, DC (19–26 April 2002), it was indicated that there are significant differences between cadastral and land registration systems, as well as more general land administration systems, in different countries. In order to understand and compare these systems, a common set of concepts and terminology is required. The first seeds of the Land Administration Domain Model (LADM) were sown at that FIG Congress.

The design of the LADM took place in an incremental approach with a continuous expert reviewing from 2002 till 2006 (Lemmen et al., 2012). LADM – earlier named the 'Core Cadastral Domain Model' (Van Oosterom et al., 2006) – aims to support 'an extensible basis for efficient and effective cadastral system development based on a Model Driven Architecture (MDA)' and to 'enable involved parties, both within one country and between different countries, to communicate based on the shared ontology implied by the model'. The design and development process for International Standards has been followed as a methodology for LADM design (please see next section for the details about ISO standard development and review methodologies).

The first mature version 1.0 was presented at the FIG congress, in Munich 2006 (Lemmen and Van Oosterom, 2006) and the version 1.1 was presented at the FIG Working Week 2008, in Stockholm (Hespanha et al, 2008). In February 2008, **FIG submitted the New Work Item Proposal (NP or NWIP)**, which was prepared by Professor Christiaan Lemmen and Professor Peter van Oosterom to develop an International Standard for the Land Administration Domain, to the TC 211 (Technical Committee 211 on Geographic Information/Geomatics). The proposal is accepted by the majority of the participating members of the ISO/TC 211 votes in favour. Then a working group of experts is set up by the TC for the preparation of a **working draft (WD)**. After three meetings with the ISO 19152 Project Team (in Copenhagen, Denmark, May 2008; in Delft, The Netherlands, September 2008; and in Tsukuba, Japan, December 2008), **Committee Draft (CD)** were prepared (Lemmen et al., 2009). The voting results and comments of the experts of participating countries on the CD were received in October 2009. After several meetings to process the comments, **Draft International Standard (DIS)** was prepared and submitted to TC 211 in 2011. The DIS is circulated to all ISO member bodies by the ISO Central Secretariat for voting and commenting and then it is approved for submission as a **Final Draft International Standard (FDIS)**. A positive vote has been received on the DIS in June 2011 and proceed to the FDIS stage (Lemmen, 2012).

The FDIS is circulated to all ISO member bodies by the ISO Central Secretariat for a final Yes/No vote in the beginning of 2012. Finally, LADM is available since December 2012 as a formal **International Standard (IS)**, published as ISO 19152:2012.

ISO Standard Development and Systematic Revision Processes

At the outset, each ISO deliverable is assigned to a standards development track. This track determines the timeframe of the project (18, 24, or 36 months) as it passes through the various stages to publication. Whichever track is chosen, the development process for ISO standards follows defined stages which are given here in full detail (URL).

All possible stages are mentioned here below starting from the scratch. Please see Figure 1 to see all stages at once.

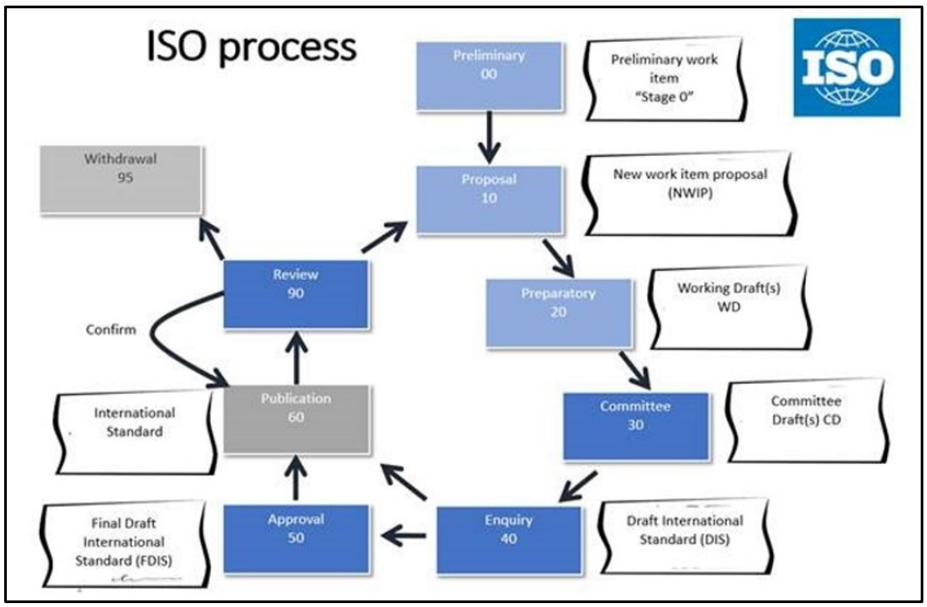


Figure 1. ISO process to develop an international standard

The first step (**Preliminary**) is to confirm that a new International Standard in the subject area is really needed. According to the ISO Global Relevance Policy (URL), global relevance can be defined as the '*Required characteristic of an International Standard that it can be used/ implemented as broadly as possible by affected industries and other stakeholders in markets around the world*'. This first step is taken with a **Preliminary Work Item (PWI)**. The TC may decide by resolution or ballot, normally after recommendation from a working group, to register a PWI. The PWI is a viable outline or draft for a future standard, not yet sufficiently mature for further stages, and for which no target dates can yet be set. A pilot study (in ISO/TC 211 often referred to as a **Stage 0 project**) is carried out to prepare the work for future stages. The project is intended to last between two plenary sessions, and the resulting Stage 0 report (also called a Summary Review report), is sent to the working group that the Stage 0 project is assigned to. It should be noted that not all new idea comes from the internal work of the TC so other ways a PWI could be created if one of the following suggest it:

- a National Body,
- the secretariat,
- a liaison organization,
- another technical committee or subcommittee,
- the technical management board or one of its advisory groups,
- the Chief Executive Officer (URL)

The second stage (**Proposal**) starts with a **New Work Item Proposal (NP or NWIP)**. A NWIP is submitted to the committee for vote using Form 4 which includes defining the scope, justification why society

needs the standard, what sustainable development goals are supported, who the stakeholders are etc. A project leader must be identified to be able to start the project. The Form 4 allows project leader to suggest the stage at which she/he would like the work to start and also the timeframe of the project (24 or 36 months). ISO/TC 211 recognizes that a committee internal 30-day review of all NWIPs, produces useful comments. The 30-day review is intended to improve draft NWIPs before the formal vote (the Proposal Stage) (please see Figure 2). The electronic balloting portal shall be used for the vote. The NP Ballot is 12 weeks. The Committee votes to decide whether the NWIP is allowed to proceed (URL 1, URL 2).

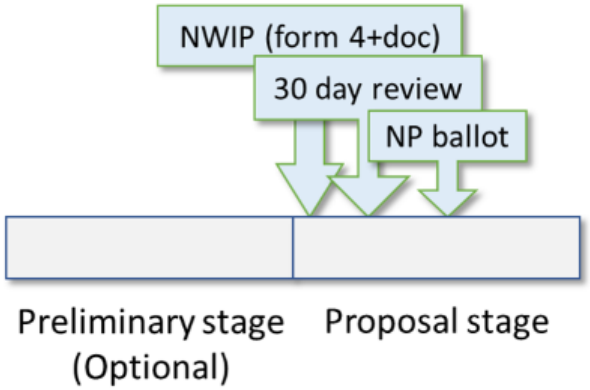


Figure 2. Proposal stage (URL)

In the next stage (**Preparatory**), a working group (WG) is usually set up to prepare the **Working Draft (WD)**. The WG is made up of experts and a Convenor (usually the Project leader). The work can be started with an approved NP. This is the core production stage where the project team gets together and by consensus, creates a draft standard. The secretariat provides the **project leader** with the result of the NP ballot vote and compilation of comments to agree on the next actions to take. If there were any comments from the NP ballot, **editors (LADM project team)** need to show how you have addressed them. The document needs to be formatted using the ISO draft template. The page on content of the standard document states the harmonization practices for the document and its resources and that is applied in ISO/TC 211, e.g. UML model, figures, dependencies and references, conformance, backward compatibility, requirement statements with identifier and so on. After a final quality assurance by the project lead together with the working group convenor, the document is ready for the next step (URL 1, URL 2).

In the fourth stage (**Committee**), **Committee Draft (CD)** document is prepared. The WD stage is the principal phase where drafting of the Standard takes place. During this phase, nominated experts will participate in collaborative meetings lead by the Project Leader (PL) and the Editor (if nominated in the NWIP). When the draft work has been completed, the document along with comment resolutions (from the NWIP ballot) is then readied for CD consultation. A CD is registered by the secretariat if criteria are met concerning document format (images etc) and that the comments from the NP ballot are resolved. To submit the document for registration and subsequent DIS ballot the word document, the resolved comments from the CD consultation and all the separate graphic files of all the figures used in the document must be submitted (URL).

In the next stage (**Enquiry stage**), **the Draft International Standard (DIS)** is submitted to ISO Central Secretariat by the Committee Manager. This is the stage where all ISO members and committee see the document, and at least some members open the draft for public comment. The DIS is circulated to all ISO members who then have 12 weeks to vote and comment on it. The DIS is approved if a two-thirds of the P-members of the TC are in favour and not more than one-quarter of the total number of

votes cast are negative. If the result of the vote is approved, but there are major comments, the PMG, secretariat, WG convenor and project leader can discuss how to proceed. This could be to remain in the DIS stage (continue to develop the document and submit it for a second DIS ballot). The DIS ballot generates comments on the document submitted from not only the entire TC but also all ISO members. Depending on the sort of changes made to resolve the comments, there are different ways to proceed: (a) If there are technical changes between the registered DIS and the updated document after the DIS ballot result, proceed to FDIS stage; (b) If there are no technical changes proceed to publication (IS) (URL 1, URL 2).

The next stage (**Approval**) is **Final Draft International Standard (FDIS)**. The FDIS stage is only needed if a technical change is made when you address the DIS ballot (Enquiry stage) comments. It should be noted that this stage is generally needed. After the DIS ballot the correct word file that was published by the ISO Central Secretariat in ISO Projects needs to be used. The FDIS is submitted to ISO/Central Secretariat (ISO/CS) by the Committee Manager. The FDIS is then circulated to all ISO member for an 8-week vote. Important is that on a FDIS ballot members are only allowed to make editorial comments. The standard is approved if a two-thirds majority of the P-members of the TC/SC is in favour and not more than one-quarter of the total number of votes cast are negative (URL 1, URL 2).

Finally, the last stage: **Publication** of **International Standard (IS)**. At this stage the secretary submits the final document for publication. Only editorial corrections are made to the final text. It is published by the ISO Central Secretariat as an International Standard. After the changes have been made a proof is put together of how the Standard will look like upon publication. The Project leader, Convenor and Secretariat are normally given two weeks to review the proof and raise any minor adjustments needed (URL 1, URL 2).

This is not the end of the story. ISO documents are all subject to **Systematic Review (SR)**. For an IS it is 5 years. It should be noted that the committee can decide to launch the SR whenever necessary, or it is automatically launched 5 years after the publication or confirmation of an IS. A national member body or the ISO/CS can also request a SR before the automatic 5-year deadline. SRs are administered electronically by ISO/CS and all ISO member bodies are invited to respond to such reviews. P-members have an obligation to respond to SR ballots. Reviews are administered by ISO and allow a 20-week review period. Many national standard bodies seek public input. The decision after the vote is often made by a simple majority. When the decision is that it is time to revise a standard, then the secretariat will be asked to send out a call for project leaders and experts on the project (URL 1, URL 2).

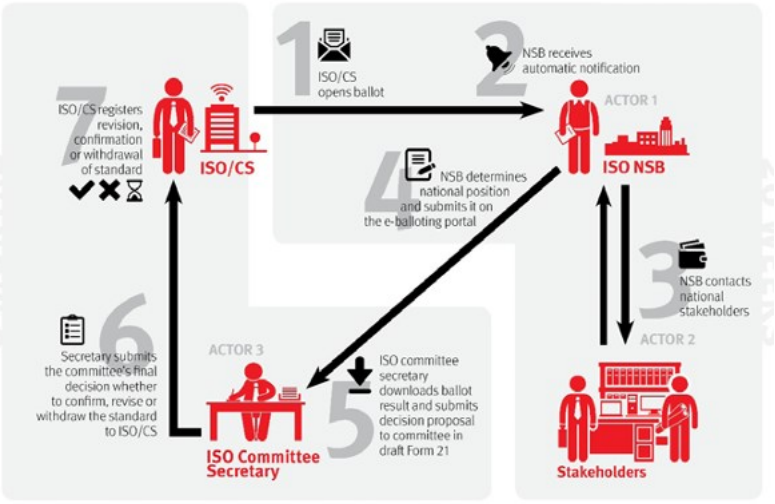


Figure 3. ISO Systematic Review process (URL)

Systematic Review of ISO 19152:2012 LADM – Development of LADM Edition II

How systematic review process was started?

After publication of LADM as an International Standard, ISO 19152:2012, it has been widely used and implemented (please see Lemmen et al., 2020; Kalogianni et al.,2021) by various international organizations and countries. According to Kalogianni et al. (2021), at least 40 countries developed an LADM country profile. Moreover, several proposals have been made to broaden the scope of LADM, for example marine georegulation, valuation information, spatial plan information, refined survey model, semantically enriched code lists and so on.

After five years from the publication of LADM the discussions for systematic review have been started. During an UN-GGIM Meeting of the Expert Group on Land Administration and Management was held in March 2017, in Delft, The Netherlands it was concluded that a revision of the LADM Edition I is required in order to provide better tools for tenure security and better coverage of land administration, see UN-GGIM (2019). As a result of the voting (March 2018) on the systematic review of ISO 19152:2012 (ISO/TC 211 N 4812) it became clear that the majority of the ISO/TC 211 P-members expressed their wish for the revision (ISO, 2018). Considering the suggestions given by the TC 211 members and outputs of the workshops (and also inputs from LADM standard maintenance page), a NWIP was prepared and submitted to the ISO/TC 211 in April 2018 by the FIG.

Several FIG LADM Workshops have been organised to discuss the revision of LADM Edition I: One in Delft, Netherlands in March 2017 (FIG, 2017), one in Zagreb, Croatia in April 2018 (FIG, 2018), one in Kuala Lumpur, Malaysia in October 2019 (FIG, 2019), one online in June 2021 (FIG, 2021), one in Dubrovnik, Croatia in March/April 2022 (FIG, 2022), one in Gävle, Sweden in October 2023 (FIG, 2023) and the last one in Kuching, Malaysia on 24-26 September 2024 (FIG, 2024). The last LADM/3D LA workshop was held in Florianópolis, Santa Catarina, Brazil from 3 to 5 November 2025 (see https://gdmc.nl/3DCadastres/workshop2025/). The next workshop will be held in Sofia, Bulgaria on 1-2 October, 2026 (see https://conference.gate-ai.eu/ISPRS2026/).

The NWIP, as submitted in April 2018 by the FIG to the ISO/TC 211, was not accepted by ISO/TC 211. The main reason for this was that the members of ISO/TC 211 asked that the LADM be re-designed as a multipart standard. Therefore, the ISO Stage 0 project (**Preliminary stage**) started in May 2018 during the 46th Plenary Meeting Week of ISO/TC 211 Copenhagen, Denmark. There was a call for participants for the Stage 0 project on ISO 19152 LADM in September 2018. Then, during the 47th Plenary Meeting Week of the ISO/TC 211 in November 2018 in Wuhan, China, a first meeting was held, regarding the approach and contents of the LADM Edition II, followed by a second meeting in June 2019 in Maribor, Slovenia, during the 48th Plenary Meeting Week of the ISO/TC 211 (Lemmen et al., 2021).

It is worth mentioning here that the LADM revision project was supported by Kadaster, starting from 2018. A postdoctoral researcher was worked at TU Delft under the supervision of Professor Peter van Oosterom and Professor Christiaan Lemmen for the LADM revision project. Between 2018 – 2020, Dr. Anna Shnaidman and between March 2021 – August 2023, Dr. Abdullah Kara worked on this project.

In the 48th Plenary Meeting Week of ISO/TC 211, Standards Council of Canada (SCC) proposed LADM Edition II as multipart. The following structure for the multipart option (as multiple coherent packages with every part in separate standard) was agreed by the participants in that meeting:

- Part 1 – Fundamentals (later the name changed to Generic conceptual model)
- Part 2 – Land registration
- Part 3 – Marine space georegulation (later the name changed to Marine georegulation)

- Part 4 – Valuation information
- Part 5 – Spatial plan information
- Part 6 – Implementations (later the name changed to Implementation aspects)

The decision to publish LADM Edition II as multipart had a consequence that a new NWIP must be formulated for each part separately. From this point on, the current status of each part is going to be summarized.

Part 1 – Generic Conceptual Model

Part 1 is designed as a high-level umbrella standard that supports all the other parts of the LADM Edition II which is backward compatible with the LADM Edition I. It includes overview for each proposed part of LADM Edition II (Part 2, 3, 4 and 5). It introduces the fundamental notions and basic concepts of LA and only includes the characteristics of Special Classes: VersionedObject and LA_Source. The abstract class *VersionedObject* is introduced to manage and maintain versioned data. All LADM classes (directly or indirectly) inherit from *VersionedObject* except for LA_Source. The LA_Source class is introduced in order to support any kind of source. In order to version the instances of LA_Source, association relationships are specified between the VersionedObject and LA_Source. All the concepts and definitions given in the Part 1 is used as basis by the other possible parts of LADM Edition II.

ISO/PWI 19152-1 document (this document can be considered as NWIP/NP) as well as the Form 4 document have been prepared in the first half of 2020. The documents have been submitted to ISO/TC 211 by Standards Australia (SA) amongst others from the author team on behalf of the FIG. The proposed standard development track for Part 1 is 36 months. The project leader is Chris Body from SA. These documents (**ISO/TC 211 N 5394**) were launched in ISO eBallotting Portal in July 2020 (for the first two stages of ISO).

The result of voting was received in October 2020, and it was positive (19-yes, 0-no, 17-abstain; **ISO/TC 211 N 5423**). The proposal is therefore approved for inclusion in the work programme. Further, comments for Part 1 have been submitted by the ISO/TC211 members. From January 2021 to April 2021, many issues and comments have been discussed in several virtual meetings, held with a proposed group of experts. After agreeing upon the comments, they were processed and used in order to create the Committee Draft (CD) document.

Considering the comment resolution discussions, the Part 1/CD was prepared by editors (by Professor Peter van Oosterom, Professor Christiaan Lemmen and Abdullah Kara). The ballot of ISO/CD 19152-1 is launched in ISO eBalloting Portal from September 2021 to November 2021 (**ISO/TC 211 N 5630**). The result of voting has been received in November 2021, and it was positive (21-yes, 1-no, 15-abstain; **ISO/TC 211 N 5659**). Again, several comments were received. These were discussed in several virtual meetings and the Part 1/DIS was prepared by the editors.

Part 1/DIS was ready for submission in May 2022, but the project leader and the editors decided not to submit it immediately. This was because Part 1 includes annex on the overview of other parts of the LADM Edition II and the other parts were not discussed with the experts. Therefore, it was decided to wait until the received comments for Part 2, 3, 4 and 5 were resolved. This was become reality in December 2022. The ballot of ISO/DIS 19152-1 was launched in ISO eBalloting Portal in October 2022 (**ISO/TC 211 N 5822**). The result of voting has been received in March 2023, and it was positive (22-yes, 1-no, 12-abstain; **ISO/TC 211 N 5879**). Again, several comments were received. Considering the comments received Part 1/FDIS was prepared by the editors.

Part 1/FDIS was submitted to ISO, and the ballot was started in September 2023 (**ISO/TC 211 N 5940**). The result of voting has been received in November 2023, and it was positive (25-yes, 1-no, 12-abstain; **ISO/TC 211 N 5959**).

After the last revisions, **ISO 19152-1:2024 Generic conceptual model** is published as an international standard (IS) by ISO in **January 2024**, please see Figure 1 for the cover page of the published standard.

It should be noted that UML of Part 1 was also created by the project editors, and it was approved by the Harmonized Model Maintenance Group (HMMG). The UML of Part 1 (and also the current UMLs of the other parts) can be achieved through GitHub repository of HMMG (URL)

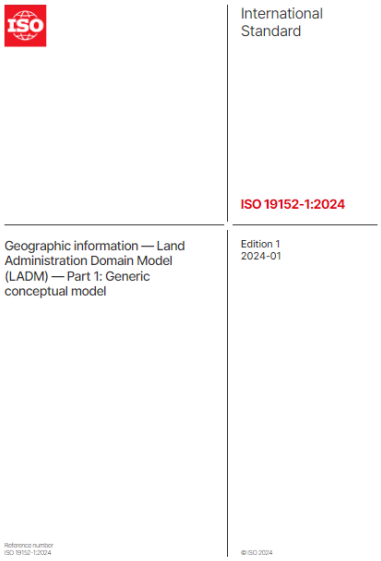


Figure 1. Cover page of the ISO 19152-1:2024 (source: https://www.iso.org/standard/81263.html)

Part 2 – Land registration

The LADM Edition I concentrated on the land registration, which is now addressed in the Part 2 of LADM Edition II with some refinements: new subclasses for LA_SpatialUnit, refined survey model (derived from OGC's LandInfra/InfraGML standard), semantically enriched and versioned code list (metamodel for refined code list using the definitions of SKOS), integration of the LADM and OGC's IndoorGML, a set of possible representations of spatial units in 2D, 3D or mixed dimension, legal spaces in buildings and refined legal profiles.

ISO/PWI 19152-2 document (NWIP/NP) as well as the Form 4 document have been prepared in the second half of 2021. The documents have been submitted to ISO/TC 211 by FIG. These documents (**ISO/TC 211 N 5607**) were launched in ISO eBallotting Portal in July 2021.

The proposed standard development track for Part 2 is 36 months. The project leader is Professor Christiaan Lemmen, and the main project editors are Professor Peter van Oosterom and Abdullah Kara. Part 2/NWIP was submitted to ISO and the ballot was started in October 2021 (**ISO/TC 211 N 5642**). The result of voting was received in January 2022, and it was positive (20-yes, 0-no, 16-abstain; **ISO/TC 211 N 5717**). The proposal is therefore approved for inclusion in the work programme. Further, comments for Part 2 have been submitted by the ISO/TC211 members. From March 2022 till November

2022, many issues and comments have been discussed in several virtual meetings, held with a proposed group of experts. After agreeing upon the comments, they will be processed and used in order to create the Committee Draft (CD) document.

The Part 2/CD was submitted in December 2022, and the ballot was started in February 2023 (**ISO/TC 211 N 5869**). The result of voting has been received in April 2023 (**ISO/TC 211 N 5889**), and the experts from 4 countries (Canada (SCC), France (AFNOR), New Zealand (NZSO) and United Kingdom BSI)) and Terminology Maintenance Group (TMG) submitted totally 89 comments to be resolved before proceeding to the next stage, namely DIS. Considering the comments received and the output of resolution meetings Part 1/FDIS was prepared by the editors.

The Part 2/DIS was submitted in December 2023. DIS voting started in April 2024. The voting result for DIS 19152-2, Geographic Information - Land Administration Domain Model (LADM) - Part 2: Land registration, was received by the editors (Professor Christian Lemmen, Professor Peter van Oosterom and Abdullah Kara) on 16 July 2024 (document number: **ISO/TC 211 N 6042 and ISO/TC 211 N 6088**). For ISO/DIS 19152-2, P members vote: 22 in favour out of 23 = 96 % (requirement >= 66.66 %) and 1 against out of 25 = 4 % (requirement <= 25 %); therefore Part 2 is accepted as DIS and a right of submission for FDIS after addressing the comments received in DIS ballot.

A total of 269 comments were received on the DIS ballot. Of these, 204 are editorial comments, 28 are technical comments and 37 are general comments. The editors organized four online meetings in September to discuss the received comments and agreed to accept 242 comments, and these accepted comments were first processed in Part 2 by Abdullah Kara with the help of Professor Christian Lemmen and Professor Peter van Oosterom. These accepted editorial comments include redrawing all figures of Part 2 (around 100 figures) in order to provide an editable figure to ISO/TC 211.

Remaining comments: 21 are "accepted in principle" and 6 are marked as "to be discussed with the project team". This means that a total of 27 comments should be discussed with the project team in a project team meeting. In order to discuss the not fully agreed comments (namely the comments marked as "accepted in principle" and "to be discussed with the project team"), three online project team meetings were organised on 7 October 2024, 8 October 2024 and 10 October 2024 to discuss the remaining 27 comments with the project team. After agreeing on all other comments, the agreed solutions were processed by Abdullah Kara with the help of Professor Christian Lemmen and Professor Peter van Oosterom. Taking into account the changes in the document, the UML model of part 2 is updated by Abdullah Kara. The updated UML model is submitted to the Harmonised Model Maintenance Group (HMMG) of ISO/TC 211 and the new model is approved. Following HMMG approval, ISO 19152-2 has been submitted to ISO/TC 211 for the FDIS stage on 17 October 2024.

The Part 2/FDIS was submitted in December 2024. FDIS voting started on 10 February 2025 and ends on 7 April 2025 (**ISO/TC 211 N 6089**). The voting result for FDIS 19152-2, Geographic Information - Land Administration Domain Model (LADM) - Part 2: Land registration, was received by the editors (Professor Christian Lemmen, Professor Peter van Oosterom and Abdullah Kara) on 11 April 2025 (document number: **ISO/TC 211 N 6138**). For ISO/FDIS 19152-2, P members vote: 26 in favour out of 26 = 96 % (requirement >= 66.66 %) and 1 against out of 29 = 4 % (requirement <= 25 %); therefore Part 2 is accepted as FDIS.

At the FDIS stage, changes required for committee agreement are not possible, since no meetings are held at this stage. In other words, only editorial changes proposed by experts from participating organisations are permitted at this stage. Conversely, the LADM editors (Professors Christian Lemmen, Peter van Oosterom and Abdullah Kara) cannot edit Part 2 at the FDIS stage. The documents can only be edited by ISO editors in the FDIS stage. However, LADM editors can add editorial comments to the

comments list if they wish to suggest changes. It should be noted that the document containing the comments received and the responses to these comments cannot be shared with third parties, as these documents are identified as ISO property.

At the FDIS stage of Part 2, 82 comments were included in the final list of comments, comprising 37 from experts of participating members (i.e. from the UK, Japan, China and Canada) and 45 from LADM editors. The ISO editor checked all the comments submitted and decided which were editorial and which were not. In some cases, the ISO editor required the agreement of the LADM editor in order to apply proposed changes. In the case of Part 2 of the LADM, the ISO editor asked the LADM editors for their opinion on 17 comments. The LADM editors (Professors Christian Lemmen, Peter van Oosterom and Abdullah Kara) organised an online meeting at the end of April to discuss these comments. The observations of LADM editors were shared with the ISO editor again at the end of April.

Of the 37 comments submitted by experts from participating members, 20 were not accepted by the ISO editor as they required committee agreement. The remaining 17 comments were discussed at the online meeting arranged by the LADM editors. All 45 comments submitted by the LADM editors were accepted by the ISO editor and applied to the FDIS document of Part 2.

The changes in FDIS stage includes but not limited to: (a) adding a URI for all the references in the bibliography, (b) revising the description of group party as “A group party consists of zero or more [0..*] parties, but also of other group parties (i.e. a group party of group parties)” and add a note to the group party definition “NOTE 2 Party with defined membership is a group party. Alternatively, members can be non-defined.”, (c) revising the description of sketch-based maps given in annex c as “a "sketch-based" spatial unit is used when a sketch (a quick drawing of a group of spatial units) is available, e.g. sketch maps, historic maps or scanned site plans and photographs, in the absence of any better identification” (d) updating the URI of requirements (removing all the links) and so on.

Once all the agreed changes had been applied to the Part 2 document by the ISO editor, the revised document was shared with the LADM editors for a final check. The LADM editors checked the document at the beginning of May 2025 and submitted their small editorial change requests (e.g. capitalization, references, etc.) to the ISO editor. After the final editorial changes had been applied to the document, **ISO 19152-2 Land registration was published as an international standard (IS) by ISO on 27 May 2025**, please see Figure 2 for the cover page of the published standard. This can be seen as a milestone for the project, as one of the major aims is to edit, revise, refine and extend the scope of LADM Edition II Parts 2, 4 and 5, taking into account the outputs of project team meetings, up to the publication of these parts as international standards.

It should be noted that UML of Part 2 was also created by the project editors, and it was approved by the Harmonized Model Maintenance Group (HMMG). The UML of Part 2 (and also the current UMLs of the other parts) can be achieved through GitHub repository of HMMG (URL). The final changes made to the document (e.g. refined descriptions and adjusted multiplicities between classes) have been included in the UML model.

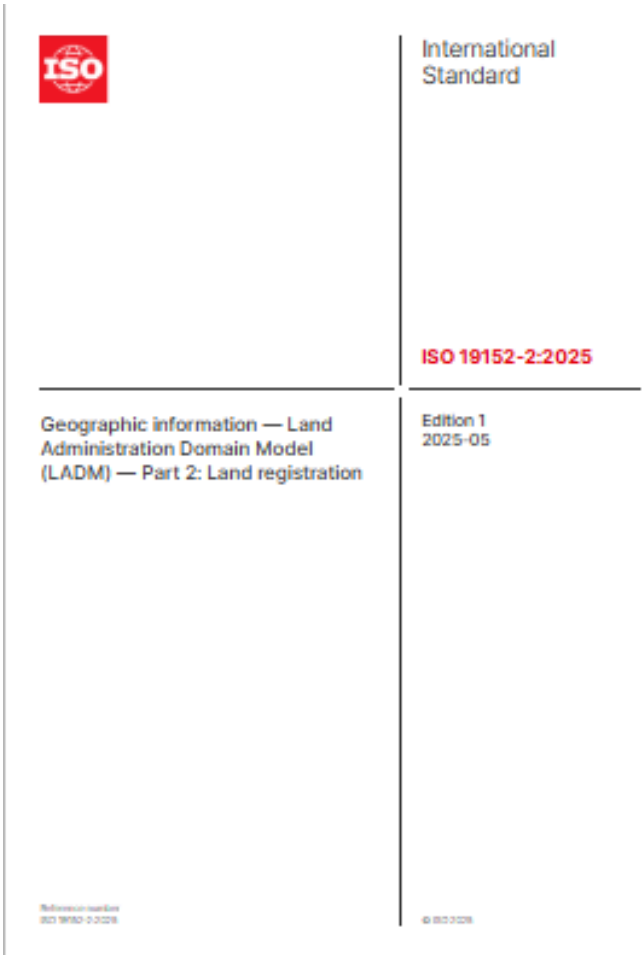


Figure 2. Cover page of the ISO 19152-2:2025 (source: https://www.iso.org/standard/81264.html)

Part 3 – Marine Georegulation

The International Hydrographic Organization (IHO) developed the IHO standard S-121 based on IHO S-100 the Universal Hydrographic Model, which is based on the ISO 19152:2012 LADM. Part 3 will provide a model for representing rights, restrictions and responsibilities (RRRs) within the context of the marine space. Since this part directly refers to the IHO S-121 (content is similar, only some revisions made to fit ISO template and received comments), project time is identified as 24 months, unlike the other parts (36 months).

It should be noted here that the main editorial team of LADM Edition II (Christiaan Lemmen, Peter van Oosterom and Abdullah Kara) has not taken a role other than observing the process of this part of LADM.

ISO/PWI 19152-3 document (NWIP/NP) as well as the Form 4 document have been prepared at the beginning of 2022. The documents have been submitted to ISO/TC 211 by Standards Australia (SA) amongst others from the author team on behalf of the FIG. These documents (**ISO/TC 211 N 5714**) were launched in ISO eBallotting Portal in January 2022.

The proposed standard development track for Part 2 is 24 months. The project leader is Chris Body. The result of voting was received in May 2022, and it was positive (17-yes, 0-no, 17-abstain; **ISO/TC 211 N 5739**). Therefore, the proposal is approved to be added to the programme of work. Further,

comments for Part 3 have been submitted by the ISO/TC211 members. From July 2022 to September 2022, many issues and comments have been discussed in several virtual meetings, held with a proposed group of experts. After agreeing upon the comments, they were processed and used in order to create the Committee Draft (CD) document.

The Part 3/CD was submitted for the next stage in October 2022 (**ISO/TC 211 N 5801**). The expert from 7 countries (Australia (SA), Canada (SCC), China (SAC), France (AFNOR), Korea, Republic of (KATS), Malaysia (DSM), United Kingdom (BSI)) together with TMG submitted 120 comments (**ISO/TC 211 N 5844**).

The Part 3/DIS was submitted for the next stage in April 2023 (**ISO/TC 211 N 5892**), and the result of voting was positive (22-yes, 0-no, 17-abstain; **ISO/TC 211 N 5936**).

The Part 3/FDIS was submitted for the next stage in February 2024 (**ISO/TC 211 N 5978**), and the result of voting was positive (23-yes, 1-no, 17-abstain; **ISO/TC 211 N 6015**).

ISO 19152-3 is published as an IS in July 2024, see Figure 3.

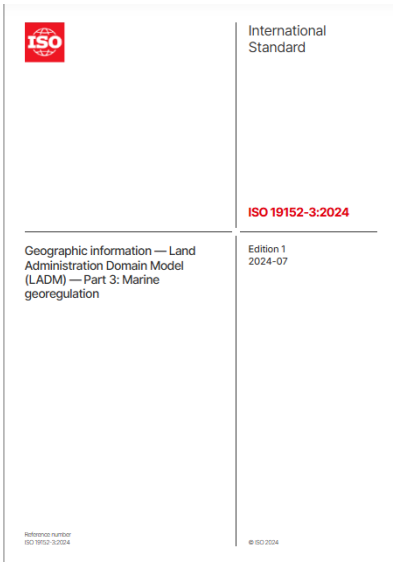


Figure 3. Cover page of the ISO 19152-3:2024 (source: https://www.iso.org/standard/81265.html)

Part 4 – Valuation Information

Part 4 is designed to represent all stages of administrative property valuation. It is designed as an extension of core LADM. It is expected that Part 4 will provide a common basis for governments to direct the development of local and national databases and for the private sector to develop information technology products.

ISO/PWI 19152-4 document (NWIP/NP) as well as the Form 4 document have been prepared in the second half of 2021. The documents have been submitted to ISO/TC 211 by FIG. These documents (**ISO/TC 211 N 5619**) were launched in ISO eBallotting Portal in September 2021.

The proposed standard development track for Part 2 is 36 months. The project leader is Professor Christiaan Lemmen, and the project editors are Professor Peter van Oosterom and Abdullah Kara. The result of voting was received in June 2022, and it was positive (21-yes, 0-no, 14-abstain; **ISO/TC 211 N**

5764). Therefore, the proposal is approved to be added to the programme of work. Further, comments for Part 4 have been submitted by the ISO/TC211 members. In September 2022, many issues and comments have been discussed in a virtual meeting, held with a proposed group of experts. After agreeing upon the comments, they will be processed and used in order to create the Committee Draft (CD) document.

The Part 4/CD was submitted for the next stage in December 2022. The expert from 4 countries (China (SAC), France (AFNOR), Indonesia (BSN), United Kingdom (BSI)) together with TMG submitted 52 comments (**ISO/TC 211 N 5901**). The responses of main editorial team members are formulated, and one project team meeting was held for resolving the comments. The Part 4/DIS was submitted in February 2024 (ISO/TC 211 N 6009) for the ballot voting to proceed the next stage (i.e., DIS).

Result of voting on DIS 19152-4, Geographic information — Land Administration Domain Model (LADM) — Part 4: Valuation information was received by the editors (Professor Christian Lemmen, Professor Peter van Oosterom and Abdullah Kara) on 08 August 2024 (document number: **ISO/TC 211 N 6052 and N 6118**). For ISO/DIS 19152-4, P-Members vote: 19 in favour out of 20 = 95 % (requirement >= 66.66%) and 1 against out of 25 = 4 % (requirement <= 25 %); therefore Part 4 is accepted as DIS and a right of submission for FDIS after addressing the comments received in DIS ballot.

A total of 116 comments were received on the DIS ballot. Of these, 97 are editorial comments, 3 are technical comments and 16 are general comments. The editors organized two online meetings in October to discuss the received comments and agreed to accept 111 comments, and these accepted comments were first processed in Part 4 by Abdullah Kara with the help of Professor Christian Lemmen and Professor Peter van Oosterom. These accepted editorial comments include redrawing all figures of Part 4 (around 20 figures) in order to provide an editable figure to ISO/TC 211.

Remaining comments: 3 are "accepted in principle / noted" and 2 are marked as "to be discussed with the project team". This means that a total of 5 comments should be discussed with the project team (ISO country experts on valuation information) in a project team meeting. In order to discuss the not fully agreed comments (namely the comments marked as "accepted in principle / noted" and "to be discussed with the project team"), one online project team meetings were organised on 18 November 2024 to discuss the remaining 5 comments with the project team. After agreeing on all other comments, the agreed solutions were processed by Abdullah Kara with the help of Professor Christian Lemmen and Professor Peter van Oosterom. Taking into account the changes in the document, the UML model of part 4 is updated by Abdullah Kara. The updated UML model is submitted to the Harmonised Model Maintenance Group (HMMG) of ISO/TC 211 and the new model is approved on 23 December 2024. Editors have agreed that ISO 19152-4 will be submitted to ISO/TC 211 for the FDIS phase at the beginning of January 2025, following HMMG approval.

The Part 4/FDIS was submitted in January 2025. FDIS voting started on 26 March 2025 and ends on 21 May 2025 (**ISO/TC 211 N N 6118**). The voting result for FDIS 19152-2, Geographic Information - Land Administration Domain Model (LADM) - Part 4: Valuation information, was received by the editors (Professor Christian Lemmen, Professor Peter van Oosterom and Abdullah Kara) on 23 May 2025 (document number: **ISO/TC 211 N 6155**). For ISO/FDIS 19152-4, P members vote: 23 in favour out of 24 = 96 % (requirement >= 66.66 %) and 1 against out of 28 = 4 % (requirement <= 25 %); therefore Part 4 is accepted as FDIS.

At the FDIS stage, changes required for committee agreement are not possible, since no meetings are held at this stage. In other words, only editorial changes proposed by experts from participating organisations are permitted at this stage. Conversely, the LADM editors (Professors Christian Lemmen, Peter van Oosterom and Abdullah Kara) cannot edit Part 4 at the FDIS stage. The documents can only

be edited by ISO editors in the FDIS stage. However, LADM editors can add editorial comments to the comments list if they wish to suggest changes. It should be noted that the document containing the comments received and the responses to these comments cannot be shared with third parties, as these documents are identified as ISO property.

At the FDIS stage of Part 4, 72 comments were included in the final list of comments, comprising 23 from experts of participating members (i.e. from the UK, Sweden, China and Canada) and 49 from LADM editors. The ISO editor checked all the comments submitted and decided which were editorial and which were not. In some cases, the ISO editor required the agreement of the LADM editor in order to apply proposed changes. In the case of Part 4 of the LADM, the ISO editor asked the LADM editors for their opinion on 8 comments. The LADM editors (Professors Christian Lemmen, Peter van Oosterom and Abdullah Kara) organised an online meeting in May 2025 to discuss these comments. The observations of LADM editors were shared with the ISO editor again at the end of May.

Of the 23 comments submitted by experts from participating members, 15 were not accepted by the ISO editor as they required committee agreement. The remaining 8 comments were discussed at the online meeting arranged by the LADM editors. All 49 comments submitted by the LADM editors were accepted by the ISO editor and applied to the FDIS document of Part 4.

The changes in FDIS stage includes but not limited to: (a) adding a URI for all the references in the bibliography, (b) revising the definition of assessed value, valuation, condominium unit, (c) revising a number of figures as the relationships in the UML are not displayed well (the lines in the arrows (arrowheads) and diamonds are missing in the associations) (d) updating country profiles in Annex G and so on.

Once all the agreed changes had been applied to the Part 4 document by the ISO editor, the revised document was shared with the LADM editors for a final check. The LADM editors checked the document at the beginning of June 2025 and submitted their editorial change requests (e.g., references, etc.) to the ISO editor. After the final editorial changes had been applied to the document, ISO 19152-4 Valuation information was published as an international standard (IS) by ISO on 9 July 2025, please see Figure 4 for the cover page of the published standard.

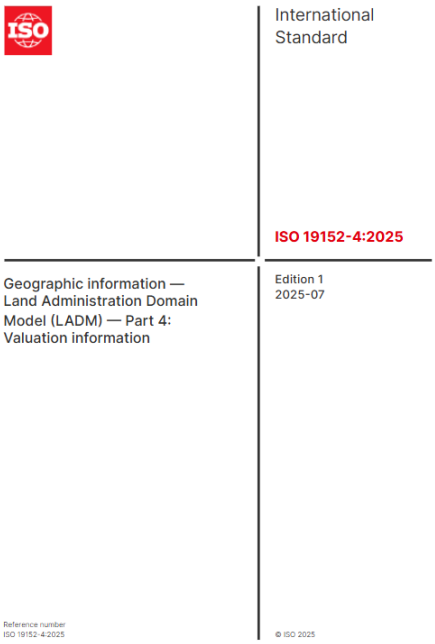


Figure 4. Cover page of the ISO 19152-4:2025 (source: https://www.iso.org/standard/81266.html)

Part 5 – Spatial plan Information

Part 5 includes planned land use (zoning) information to be converted into rights, restrictions, and responsibilities (RRRs). It enables the integration of the RRRs information from the spatial plan into LADM.

ISO/PWI 19152-5 document (NWIP/NP) as well as the Form 4 document have been prepared in the second half of 2021. The documents have been submitted to ISO/TC 211 by FIG. These documents (**ISO/TC 211 N 5615**) were launched in ISO eBallotting Portal in **September 2021**.

The proposed standard development track for Part 2 is 36 months. The project leader is Professor Christiaan Lemmen, and the project editors are Professor Peter van Oosterom and Abdullah Kara. The result of voting was received in **September 2022**, and it was positive (19-yes, 1-no, 15-abstain; **ISO/TC 211 N 5789**). Therefore, the proposal is approved to be added to the programme of work. Further, comments for Part 5 have been submitted by the ISO/TC211 members. From September 2022 to October 2022, many issues and comments have been discussed in several virtual meetings, held with a proposed group of experts. After agreeing upon the comments, they will be processed and used in order to create the Committee Draft (CD) document.

The Part 5/CD was submitted for the next stage in January 2023. The expert from 5 countries (China (SAC), France (AFNOR), Indonesia (BSN), Sweden (SIS), United Kingdom (BSI)) together with TMG submitted 57 comments (**ISO/TC 211 N 5917**). The responses of main editorial team members are formulated, and one project team meeting was held for resolving the comments.

The Part 5/DIS was submitted for the next stage in March 2024 (**ISO/TC 211 N 6068 and N 6127**). Result of voting on DIS 19152-5, Geographic information — Land Administration Domain Model (LADM) — Part 5: Spatial plan information was received by the editors (Professor Christian Lemmen, Professor Peter van Oosterom and Abdullah Kara) on 17 September 2024 (document number: ISO/TC 211 N 6068). For ISO/DIS 19152-5, P-Members vote: 25 in favour out of 26 = 96 % (requirement >= 66.66%) and 1 against out of 29 = 3 % (requirement <= 25 %); therefore Part 5 is accepted as DIS and a right of submission for FDIS after addressing the comments received in DIS ballot.

A total of 164 comments were received on the DIS ballot. Of these, 124 are editorial comments, 16 are technical comments and 24 are general comments. The editors organized three online meetings in October to discuss the received comments and agreed to accept 130 comments, and these accepted comments were first processed in Part 5 by Abdullah Kara with the help of Professor Christian Lemmen and Professor Peter van Oosterom. These accepted editorial comments include redrawing all figures of Part 5 (around 15 figures) in order to provide an editable figure to ISO/TC 211.

Remaining comments: 26 are "accepted in principle / noted" and 8 are marked as "to be discussed with the project team". This means that a total of 26 comments should be discussed with the project team (ISO country experts on spatial plan information) in project team meetings. In order to discuss the not fully agreed comments (namely the comments marked as "accepted in principle / noted" and "to be discussed with the project team"), two online project team meetings were organised on 19 and 20 November 2027 to discuss the remaining 26 comments with the project team. After agreeing on all other comments, the agreed solutions were processed by Abdullah Kara with the help of Professor Christian Lemmen and Professor Peter van Oosterom. In the Part 5 project team meetings, it is agreed by the editors and the Norwegian expert that the requirements and the abstract test suite should be recognized in the way described in ISO 19105:2022. This agreement applies to all unpublished parts of

the LADM (i.e. parts 2, 4 and 5). As Part 2 has already been submitted to ISO/TC 211 before this agreement was made, Part 2 will be revised in the FDIS stage taking into account the agreement. On the other hand, Part 5 and Part 4 have been revised taking into account the rules defined in ISO 19105:2022. Moreover, taking into account the changes in the document, the UML model of part 5 is updated by Abdullah Kara. The updated UML model is submitted to the Harmonised Model Maintenance Group (HMMG) of ISO/TC 211 and the new model is approved on 23 December 2024. Editors have agreed that ISO 19152-5 will be submitted to ISO/TC 211 for the FDIS phase at the beginning of January 2025, following HMMG approval.

The Part 5/FDIS was submitted in February 2025. FDIS voting started on 3 April 2025 and ends on 29 May 2025 (**ISO/TC 211 N 6127**). The voting result for FDIS 19152-2, Geographic Information - Land Administration Domain Model (LADM) - Part 5: Spatial plan information, was received by the editors (Professor Christian Lemmen, Professor Peter van Oosterom and Abdullah Kara) on 3 June 2025 (document number: **ISO/TC 211 N 6155**). For ISO/FDIS 19152-5, P members vote: 24 in favour out of 25 = 96 % (requirement >= 66.66 %) and 1 against out of 26 = 4 % (requirement <= 25 %); therefore Part 5 is accepted as FDIS.

At the FDIS stage, changes required for committee agreement are not possible, since no meetings are held at this stage. In other words, only editorial changes proposed by experts from participating organisations are permitted at this stage. Conversely, the LADM editors (Professors Christian Lemmen, Peter van Oosterom and Abdullah Kara) cannot edit Part 5 at the FDIS stage. The documents can only be edited by ISO editors in the FDIS stage. However, LADM editors can add editorial comments to the comments list if they wish to suggest changes. It should be noted that the document containing the comments received and the responses to these comments cannot be shared with third parties, as these documents are identified as ISO property. The presentations have been shared with the FIG Foundation at the end of this report.

At the FDIS stage of Part 5, 46 comments were included in the final list of comments, comprising 22 from experts of participating members (i.e. from the UK, Norway, China, France, Indonesia and Canada) and 24 from LADM editors. The ISO editor checked all the comments submitted and decided which were editorial and which were not. In some cases, the ISO editor required the agreement of the LADM editor in order to apply proposed changes. In the case of Part 5 of the LADM, the ISO editor asked the LADM editors for their opinion on 10 comments. The LADM editors (Professors Christian Lemmen, Peter van Oosterom and Abdullah Kara) organised an online meeting in June to discuss these comments. The observations of LADM editors were shared with the ISO editor again in June.

Of the 22 comments submitted by experts from participating members, 12 were not accepted by the ISO editor as they required committee agreement. The remaining 10 comments were discussed at the online meeting arranged by the LADM editors. All 24 comments submitted by the LADM editors were accepted by the ISO editor and applied to the FDIS document of Part 5.

The changes in FDIS stage includes but not limited to: (a) adding a URI for all the references in the bibliography, (b) revising the definition of assessed plan unit, plan block, spatial planning, plan group unit, (c) revising a number of figures as the relationships in the UML are not displayed well (the lines in the arrows (arrowheads) and diamonds are missing in the associations) (d) new figure is added for type of geometry of plan group unit and plan group, (e) updating country profiles in Annex G and so on.

Once all the agreed changes had been applied to the Part 5 document by the ISO editor, the revised document was shared with the LADM editors for a final check. The LADM editors checked the document at the beginning of August 2025 and submitted their editorial change requests (e.g.,

references, etc.) to the ISO editor. After the final editorial changes had been applied to the document, ISO 19152-5 Spatial plan information was published as an international standard (IS) by ISO on 20 August 2025, please see Figure 5 for the cover page of the published standard.

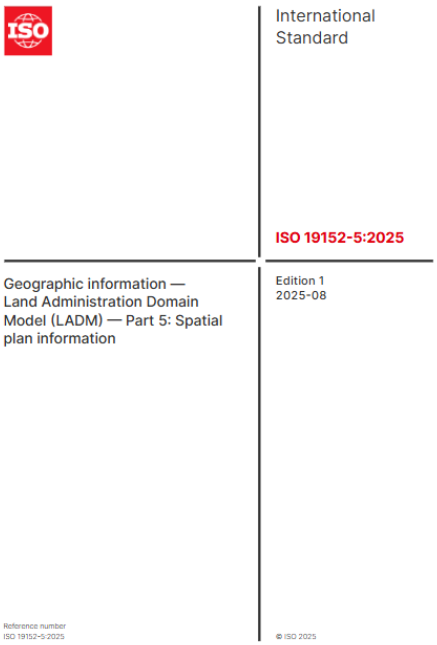


Figure 5. Cover page of the ISO 19152-5:2025 (source: https://www.iso.org/standard/81267.html)

Part 6 – Implementation aspects

There is no prepared document for this part yet there has been some preparation. This part will be prepared in collaboration with OGC. ISO/TC 211 will reach out to the Open Geospatial Consortium (OGC) and other interest parties for their assistance to implement LADM Edition II. OGC formed Land Administration Domain Model Standards Working Group and Public Comment sought on Charter.

This part will include several technical encodings (e.g., gml, geojson, rdf, etc.) and a proposal for service-oriented approach based on OGC APIs for LADM implementation, methodology to develop a country profile, LA processes and more.

At the OGC Meetings, LADM WG organized a meeting to form the project group and determine the content of the possible implementation standard. One of these meetings was organized at the 132nd OGC Member Meeting in Mexico on 10 June 2025 (see URL). A session was organized by the Land Administration DWG. This session included three presentations:

(1) 'Update on the progress within ISO/TC211 on finalizing LADM parts 2, 4 and 5 (parts 1 and 3 are already ISO standards)' by Abdullah Kara;

(2) 'Mexico's National Cadastral Platform' by Eduardo Gonzaga (Gobierno de México);

(3) 'Discussion with the (candidate) chairs of the LADM SWG on getting started and setting priorities/agenda' by Peter van Oosterom. During the session, the priorities for LADM Part 6 were discussed, and it was decided that service-based implementation would be prioritized.

This part first will be designed as an OGC standard then sync with ISO. The last co-chair of the LADM SWG was selected recently. Co-chairs: Javier Morales Guarin (Univ Twente), Hans-Christoph Gruler (Leica/Hexagon), Amir Bar-Maor (Esri), Joost Venema (Kadaster). The kick-off meeting was held by co-chairs, recently. The first draft document for this part is expected to be prepared in collaboration with the OGC in 2026.

Final Notes

The current status of all parts of LADM can be tracked at [URL] and can be seen in Figure 6. It can be concluded that the first five parts of LADM Edition II has been published by August 2025 (please also remember the figure given in the first page of this report).

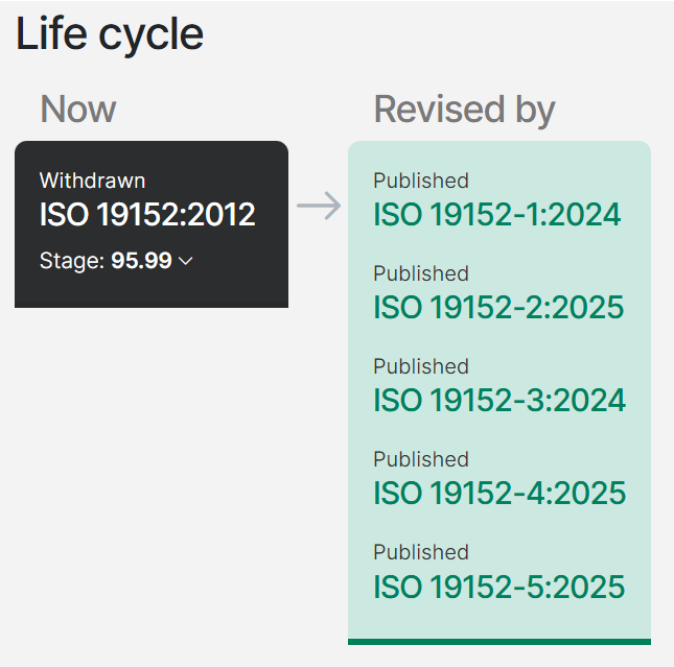


Figure 6. Current status of all parts of LADM (URL) (see https://www.iso.org/standard/51206.html)

The goals of LADM Edition II are to:

- refine the existing content and extend the scope of Edition I to include land value, land use and land development.
- integrate diverse land administration functions and ensure interoperability across institutional domains.
- provide a foundation for the development of digital land administration ecosystems, improve the quality and comparability of land-related data, and support international efforts to achieve Sustainable Development Goals (SDGs), particularly SDG 1 (No Poverty), SDG 11 (Sustainable Cities and Communities), and SDG 15 (Life on Land).
- include, but are not limited to, supporting tenure security, supporting access to credit, enabling fair taxation, contributing to peace building and security, promoting social justice, strengthening disaster management, improving resource management, fostering smart and resilient societies, supporting sustainable land use, protecting the environment, enabling slum

upgrading, improving access to housing, enhancing city management, and ensuring access to basic infrastructure.

The publication of the first five parts of LADM Edition II means that the planned goals have been achieved. Throughout the standardisation process, all parts underwent a ballot process, with the participating members of ISO/TC 211 voting on each part. The voting results for each part are shown in Figure 7.

	NWIP			CD			DIS			FDIS		
	Yes	No	Abstain	Yes	No	Abstain	Yes	No	Abstain	Yes	No	Abstain
19152-1	19	0	17	21	1	15	22	1	12	25	1	12
19152-2	20	0	16	*	*	*	22	1	15	28	1	13
19152-3	17	0	17	*	*	*	22	0	17	23	1	17
19152-4	21	0	14	*	*	*	19	1	21	27	1	16
19152-5	19	1	15	*	*	*	28	1	13	27	1	16

Figure 7. Number of votes received for each part of LADM Edition II (* ISO changed to the CD phase: consultation (no ballot) from 2022 onwards)

The publication of the first five parts of LADM Edition II means that the planned goals have been achieved. Throughout the standardisation process, all parts underwent a ballot process, with the participating members of ISO/TC 211 voting on each part. The voting results for each part are shown in Figure 7.

As mentioned at the beginning of this report, each ISO standard must go through several stages.:

- NWIP concerns the New Working Item Proposal (as submitted by FIG to ISO/ TC211 on Geographic Information
- CD is the so-called Committee Draft as provided by the TC211. The procedure for this CD changed during the LADM development, for this reason the results can only be provide for Part.
- DIS is the Draft International Standard
- FDIS is the Final Draft International Standard

At each stage, all ISO/TC 211 members submit comments on the latest draft document to improve it. Table 8 shows the number of comments received at each stage for the first five parts of LADM Edition II, as well as the total number of comments received at each stage. A total of 1,664 comments were received, discussed and addressed during the development of LADM Edition II.

	NWIP	CD	DIS	FDIS	Total
19152-1	59	80	105	41	285
19152-2	29	89	269	82	469
19152-3	50	120	163	12	345
19152-4	14	52	116	72	254
19152-5	44	57	164	46	311

Figure 8. Number of comments received for each part of LADM Edition II (Total: 1664 comments)

The publication of the first five parts of LADM Edition II represents not only technical advancement but also a strategic opportunity for countries to modernize their land administration infrastructure in alignment with international best practices. It opens new pathways for integration between cadastral, marine, valuation, and spatial plan systems, thereby improving land governance, reducing disputes, and enabling data-driven policy development. As LADM continues to evolve—with additional parts under development and ongoing discussions on implementation (with key role for OGC), the newly released ISO standards set a robust framework for innovation, collaboration, and capacity building in land administration worldwide.

Standards provide many benefits, such as enabling interoperability, cost effective (as solution can be reused after possible local adaptation), and reusing the knowledge of a global community. Standards documents are often quite difficult to understand due to the rather high abstract level and formal language. Therefore, the LADM edition II series also contains several annexes, providing examples in the form of instance level diagrams (cases), country profiles (showing how LADM can be applied in the specific setting of a country), mappings to the corresponding European INSPIRE models, and much more. Further, FIG and ISO have produced a LADM overview for managers (FIG publication no. 84) and a textbook LADM in de classroom. All these efforts have resulted in rapidly growing adaption of LADM (e.g. more than 50 country profiles published) and STDM (Social Tenure Domain Model, a specialisation of LADM for developing countries) has been applied 17 countries by UN-HABITAT.

Finally, it is worth noting that the progress of LADM has been communicated in a number of ways, one of which is through the publication of papers. For more detailed information on the content, development process and implementation, please see the following papers, together with the references:

- van Oosterom, P., **Kara, A**., & Lemmen, C. (2025). The first five parts of LADM Edition II have been published as ISO standards now. FIG Brazil Joint Land Administration Conference (3DLA2025, UN-Habitat STDM, FIG Commissions 7+8 AM), 3-5 November 2025, Florianópolis, Santa Catarina, Brazil.
- Body, C., van Oosterom, P. J., Lemmen, C., **Kara, A**. (2025). ISO 19152 LADM Progress. In the ISO/TC 211 61th Plenary meeting in Göteborg, Sweden, November 17th-21st.
- van Oosterom, P., **Kara, A.**, & Kalogianni, E. (2025). Land administration domain model and 3D land administration. Survey Review, 57(405), 509-511.
- Chen, M., **Kara, A**., van Oosterom, P., Orvañanos Murguía, R., Gitau, J., & Lemmen, C. (2025). Analyzing and formalising land indicators of LGAF, GLII and SDGs through LADM. Survey review, 1-20.

- Lemmen, C. H. J., van Oosterom, P. J., **Kara, A**., & Kalogianni, E. (2025). The Land Administration Domain Model: An overview. FIG Publication 84. ISSN 2311-8423 (pdf), ISBN 78-87-93914-23-0 (pdf), Copenhagen, Denmark. Available at: https://www.fig.net/resources/publications/figpub/pub84/figpub84.asp
- Lemmen, C., Chipofya, M., Mano, A., **Kara, A.**, Huera, D., van Oosterom, P., Kalogianni, E., Morscher- Unger, E., Guarin, J., Beck, A., Honer, S., Bennett, R., Dijkstra, P. & Zevenbergen, J. A. (2025). LADM in The Classroom. ISSN 2311-8423 (pdf), ISBN 978-87-93914-24-7 (pdf), Copenhagen, Denmark. Available at: https://www.fig.net/resources/publications/figpub/LADM_extended/ladmpub_ext.asp
- **Kara, A.**, van Oosterom, P. J., & Lemmen, C. H. J. (2025). New Edition of the Land Administration Domain Model Now Nearly Completed. In the FIG 2025 Working Week, Collaboration, Innovation and Resilience: Championing a Digital Generation, 6-10 April 2025, Brisbane, Australia. Available at: https://willorganise.eventsair.com/2025-locate-fig-working-week
- **Kara, A.**, (2025). 'Update on the progress within ISO/TC211 on finalizing LADM parts 2, 4 and 5. In 132nd OGC Member Meeting in Mexico, 10 June 2025. Available at: https://events.ogc.org/132MemberMeeting#/agenda?day=2
- Body, C., van Oosterom, P. J., Lemmen, C., **Kara, A**. (2025). ISO 19152 LADM Progress. In the ISO/TC 211 60th Plenary meeting in Wuhan, China May 19th - 23th, 2025.
- **Kara, A**., Chen, M., van Oosterom, P. J., & Lemmen, C. H. J. (2024). Monitoring Indicators of International Guidance Documents and Frameworks through LADM. In *12th International FIG Land Administration Domain Model & 3D Land Administration Workshop, 24-26 September 2024, Kuching, Malaysia.*
- Morscher-Unger, E. M., **Kara, A**., Gitau, J., & Kavanagh, J. (2024). STDM Valuation of Unregistered Land. In *12th International FIG Land Administration Domain Model & 3D Land Administration Workshop, 24-26 September 2024, Kuching, Malaysia.*
- Poulaki, M., Xagoraris, N., Kalogianni, E., Kyriakidis, C., **Kara, A**., & Dimopoulou, E. 2024. Developing a LADM Part 5–Spatial Plan Information country profile for Greece. In *12th International FIG Land Administration Domain Model & 3D Land Administration Workshop, 24-26 September 2024, Kuching, Malaysia.*
- **Kara, A**., Lemmen, C., van Oosterom, P., Kalogianni, E., Alattas, A., & Indrajit, A., 2024. Design of the new structure and capabilities of LADM edition II including 3D aspects. Land Use Policy, 137, 107003.
- **Kara, A**., Lemmen, C. H. J., Kalogianni, E., & van Oosterom, P. J., 2023. Requirements Based Design of the LADM Edition II. In 11th International FIG Workshop on LADM & 3D LA, 11-13 October 2023, Gävle, Sweden.
- Unger, E. M., van Oosterom, P., **Kara, A**., Simmons, S., & Lemmen, C., 2023. Land Administration Domain Model OGC Standards Working Group. In 11th International FIG Workshop on LADM & 3D LA, 11-13 October 2023, Gävle, Sweden.
- Lemmen, C. H. J., van Oosterom, P. J., **Kara, A.,** Kalogianni, E., Alattas, A., & Indrajit, A., 2023. Overview of developments of edition II of the land administration domain model. In FIG Working Week 2023: Protecting our world, conquering new frontiers.
- **Kara, A.**, & Zevenbergen, J. (2023). Valuation Information/LADM Part 4: Position paper 4. In 11th International FIG Workshop on LADM & 3D LA, 11-13 October 2023, Gävle, Sweden.

- **Kara, A.**, Unger, E. M., van Oosterom, P., & Lemmen, C., 2023. LADM's Links with International Standards, Guidelines and Frameworks. In 11th International FIG Workshop on LADM & 3D LA, 11-13 October 2023, Gävle, Sweden.
- Lemmen, C., Abdullah, A., Indrajit, A., Eftychia, K., **Kara, A.**, Van Oosterom, P., & Oukes, P., 2021. The Foundation of Edition II of the Land Administration Domain Model. In FIG e-Working Week 2021.
- Lemmen, C. H. J., van Oosterom, P. J. M., Unger, E. M., Kalogianni, E., Shnaidman, A., **Kara, A.**, ... & de Zeeuw, C. J., 2020. The land administration domain model: advancement and implementation. In (Cancelled) Annual World Bank Conference on Land and Poverty 2020: Institutions for Equity&Resilience.
- Lemmen, C. H. J., van Oosterom, P. J., **Kara, A.**, Kalogianni, E., Shnaidman, A., Indrajit, A., & Alattas, A., 2019. The scope of LADM revision is shaping-up. In 8th Land Administration Domain Model Workshop 2019.
- van Oosterom, P. J., **Kara, A.**, Kalogianni, E., Shnaidman, A., Indrajit, A., Alattas, A., & Lemmen, C. H. J., 2019. Joint ISO/TC211 and OGC Revision of the LADM: Valuation Information, Spatial Planning Information, SDG Land Indicators, Refined Survey Model, Links to BIM, Support of LA Processes, Technical Encodings, and Much More on Their Way!. In FIG Working Week 2019: Geospatial Information for a Smarter Life and Environmental Resilience.

References

FIG, 2017. Documentation of the 6th Land Administration Domain Workshop, Delft, The Netherlands. http://isoladm.org/LADM2017Workshop

FIG, 2018. Proceedings 7th Land Administration Domain Workshop, Zagreb, Croatia, 11-13 April 2018. Editors: Christiaan Lemmen, Peter van Oosterom & Elfriede Fendel. ISBN 97887-92853-69-1. International Federation of Surveyors FIG, Copenhagen, Denmark. https://wiki.tudelft.nl/bin/view/Research/ISO19152/LADM2018Workshop

FIG, 2019. Proceedings 8th Land Administration Domain Model Workshop, Kuala Lumpur, Malaysia, 1-3 October 2019. Editors: Peter van Oosterom, Christiaan Lemmen and Alias Abdul Rahman. International Federation of Surveyors FIG, Copenhagen, Denmark. https://wiki.tudelft.nl/bin/view/Research/ISO19152/LADM2019Workshop

FIG, 2021. Proceedings of the 9th FIG Workshop on the Land Administration Domain Model / 3D Land Administration, on-line, 24 June 2021. https://wiki.tudelft.nl/bin/view/Research/ISO19152/LADM2021Workshop

FIG, 2022. Proceedings of the 10th International FIG workshop on the Land Administration Domain Model, Dubrovnik, Croatia. Editors: Abdullah Kara, Rohan Bennett, Christiaan Lemmen and Peter Van Oosterom. International Federation of Surveyors (FIG). Copenhagen, Denmark. https://doi.org/10.4233/uuid:446ad684-b9e0-48c2-81d9-85fc22537ddc

FIG, 2023. Proceedings of the 11th International FIG Workshop on LADM & 3D LA, 11-13 October 2023, Gavle, Sweden. Editors: Peter Van Oosterom and Jesper Paasch. International Federation of Surveyors (FIG). Copenhagen, Denmark. http://www.gdmc.nl/3DCadastres/workshop2023/programme/ProceedingsLADM_3DLA_2023.pdf

FIG, 2024. Proceedings 12th International FIG Workshop on LADM & 3D LA. Editors: Peter van Oosterom, Alias Abdul Rahman, Abdullah Kara, and Eftychia Kalogianni. International Federation of

Surveyors (FIG). Copenhagen, Denmark. Available at: https://www.gdmc.nl/3DCadastres/workshop2024/programme/ProceedingsLADM_3DLA_2024.pdf

FIG, 2025. Proceedings 13th International FIG Workshop on LADM & 3D LA. Editors: Peter van Oosterom, Abdullah Kara, and Eftychia Kalogianni. International Federation of Surveyors (FIG). Copenhagen, Denmark. Available at: https://gdmc.nl/3DCadastres/workshop2025/programme/3DLA2025_V3.pdf

Hespanha, Joao, Jan van Bennekom-Minnema, Peter van Oosterom and Christiaan Lemmen, 2008. The Model Driven Architecture Approach Applied to the Land Administration Domain Model Version 1.1 - with Focus on Constraints Specified in the Object Constraint Language, FIG Working Week 2008, Integrating Generations, June 2008, Stockholm, 19 pp.

ISO, 2018. Result of voting on Systematic review ISO 19152:2012, Geographic information – Land Administration Domain Model (LADM), ISO/TC 211 N 4812, 22 May 2018.

Kalogianni, E; Janečka, K., Kalantari, M., Dimopoulou, E., Bydłosz, J., Radulović, A., Vučić, N., Sladić, D., Govedarica, M., Lemmen, C. & Van Oosterom, P., 2021. Methodology for the development of LADM country profiles. Land Use Policy, 105, 105380.

Lemmen, C. H. J., Alattas, A., Indrajit, A., Kalogianni, E., Kara, A., Oukes, P. R., & van Oosterom, P. J., 2021. The Foundation of Edition II of the Land Administration Domain Model. In FIG e-Working Week 2021: Challenges in a new reality.

Lemmen, C., 2012. A Domain Model for Land Administration. PhD thesis, Delft University of Technology.

Lemmen, C., van Oosterom, P., Kara, A., Kalogianni, E., Shnaidman, A., Indrajit, A., & Alattas, A., 2019. The scope of LADM revision is shaping-up. In Proceedings of the 8th International FIG Workshop on the Land Administration Domain Model, Kuala Lumpur, Malaysia.

Lemmen, C., van Oosterom, P., Uitermark, H., Thompson, R., & Hespanha, J. P., 2009. Transforming the Land Administration Domain Model (LADM) into an ISO standard (ISO19152). FIG Working Week Eilat, Israel.

Lemmen, C., van Oosterom, P., Unger, E. M., Kalogianni, E., Shnaidman, A., Kara, A., Alattas, A., Indrajit, A., Smyth, K., Milledrogues, A., Bennett, R.M., Oukes, P., Gruler, H.C., Casalprim, D., Alvarez, G., Aditya, T., Ary Sucaya, K.G., Morales Guarin, M.J., Balas, M., Zulkifli, N.A. & de Zeeuw, C. J., 2020. The land administration domain model: advancement and implementation. In (Cancelled) Annual World Bank Conference on Land and Poverty 2020: Institutions for Equity & Resilience.

Lemmen, C.H.J. and P.J.M. van Oosterom, 2006. Version 1.0 of the FIG Core Cadastral Domain Model. XXIII FIG Congress. Munich, Germany, FIG.

OGC, 2019. OGC White Paper on Land Administration. Editors: Christiaan Lemmen, Peter van Oosterom, Mohsen Kalantari, Eva-Maria Unger and Cornelis de Zeeuw. External identifier of this OGC document: http://www.opengis.net/doc/wp/land-adminInternal reference number of this OGC document: 18-008r1. Open Geospatial Consortium.

UN-GGIM, 2019. Framework for Effective Land Administration – A reference for developing, reforming, renewing, strengthening or modernizing land administration and management systems. Expert Group on Land Administration and Management United Nations Committee of Experts on Global Geospatial Information Management (UNGGIM).

Van Oosterom, P., Kara, A., Kalogianni, E., Shnaidman, A., Indrajit, A., Alattas, A., & Lemmen, C., 2019. Joint ISO/TC211 and OGC Revision of the LADM: Valuation Information, Spatial Planning Information, SDG Land Indicators, Refined Survey Model, Links to BIM, Support of LA Processes, Technical Encodings, and Much More on Their Way!. In FIG Working Week 2019: Geospatial Information for a Smarter Life and Environmental Resilience.

Van Oosterom, P.; Lemmen, C.; Ingvarsson, T.; Molen, P.; Ploeger, H.; Quak, W.; Stoter, J. & Zevenbergen, J., 2006. The Core Cadastral Domain Model. Computers, Environment and Urban Systems, 30, 627-629.