Change toolkit for digital building permit

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V0.1	First fully revised draft by UM	02/09/2024	Luciana Miranda et al.
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Contents

1. Executive Summary

This is deliverable D2.5, named "Exchange information requirements for DBP". In the Grant Agreement of this project, D2.5 is described as "*Exchange Information Requirements (EIR) template for DBP use case*". Naturally, an Exchange Information Requirements (EIR) is a document that is required according to EN ISO 19650 between the appointing party and the lead appointed party. Therefore, in the case of the municipality, which is a permitting agency, the EIR is not really issued by the municipality. Nonetheless, the municipality can display the necessary information that appointing parties can request from appointed parties, in a "EIR-like format" so that the purpose of submitting information for digital building permits according to CHEK can be satisfied. Therefore, this document aims at providing appointing parties with the necessary information that they need to input in their Exchange Information Requirements, so that when the lead appointed parties and appointing parties are preparing information, it will be done according to the most stringent requirements of EN ISO 19650 as well as the real requirements of CHEK toolkit. At the same time, the purpose of this Exchange Information Requirements is also of an educational nature, bringing good practices to the entire supply chain and we include several rules of good practice in the document itself while not disrupting normal good practices of design. It is also noticed that the capacity to implement these requirements in terms of modeling guidelines and tutorials is addressed elsewhere, particularly in the CHEK e-learning platform which is mentioned in the shared resources section of this document.

The CHEK deliverable definition according to the Grant Agreement mentions a preparation of a 'template'. However, considering that the process is going to be applied into four pilot cases in the project, the team decided to be more ambitious and go beyond the objective of the deliverable, rather producing an actual EIR for the pilot case in Ascoli Piceno. It is important to mention that this deliverable states on the current progress of the modeling guidelines and it will be upgraded iteratively by WP6 with the rule checking implementation task until the end of the project. Therefore, more than a mere document to be filled in with specific information for an actual case, this document contains an actual contribution for the pilot case to be used in WP6. Also, this will facilitate the work of WP6 in the production of similar EIRs for the cases to be adopted there, if deemed necessary.

Due to the nature of the development of the project, the municipality of Ascoli Piceno has been selected to be the one that represents this Exchange Information Requirements because at the present point, the information that is needed to produce the EIR in the project is only available as a first example in Ascoli Piceno. It is expected that throughout the project, the CHEK IFC and the Level of Information Need tasks of the project evolve to such a maturity that this deliverable can be extended in a manner that satisfies also the EIR for the other municipalities. Also, as soon as a CityGML model of the Municipalities becomes available within the CHEK project, it can be added to the supporting information in the EIR, as a reference. This will allow lead appointed parties to evaluate important aspects such as zoning directly and enhance BIM-GIS integration as a whole.

The main content of the present document is directly presented in the format of the parts of EIR that need specific attention for the purpose of digital building permitting.

2. Introduction and overall strategy of the document

Generally speaking, and strictly abiding to the requirements of EN ISO19650-2, the EIR should contain:

1. Introduction
2. Information requirements
    2.1 Organizational information requirements (OIR)
    2.2 Project information requirements (PIR)
    2.2 Requirements table
    2.4 Level of Information Need
3. Acceptance criteria
    3.1 Project information standards
    3.2 Methods and procedures for producing project information
    3.3 Acceptance table
4. Supporting information
    4.1 Reference information
    4.2 Shared resources
5. Dates, information delivery milestones and key decision points
Appendices (for further information needed such as nomenclature, etc.)

For the purpose of this CHEK deliverable, the intent is only to set (or show) requirements that need specific definition in the scope of the CHEK digital building permitting process. These requirements are further presented in the annex of the present document based on the above table of contents. For the sections that no specific definitions are required, concrete examples are provided in order to demonstrate the type of information that can be included according to specific cases. The same numbering is used in the table of contents, to provide a clear picture that some of the items do not necessarily need added definition (or they need minor adjustments) in the scope of producing digital building permits.

The contents of this EIR were created with basis on the work performed in previous Tasks in the project. It is particularly relevant to mention that the 'Level of Information Need' was predominantly produced from the IDS files supplied by WP2.3 (scope of CHEK). This was related to the fact that deliverable D2.1 (in the scope of WP2.2) did not specify Level of Information Need in a manner compatible with the EN ISO7817:2024 (and that was the intent to be followed in this EIR).

The reader is now directed to the Annex for further reading, where the additions are marked in the relevant sections and in places where no specific information is needed (or not fundamental), concrete examples of information are provided. Moreover, in order to avoid producing an overloaded document, some of the sub-sections for which no specific text needs to be added are merely represented as bullet points (it means implicitly that these would be independent subsections, but this document does not recommend any specific text for them).

3. Conclusion

This document has included the example of Exchange Information Requirements in the Annex, and it completes the fulfillment of the requirements set for this deliverable, even surpassing the 'template' intent with the production of the relevant EIR information for the pilot case of Ascoli Piceno. The information on requirements is now in a proper format for designers to prepare models that are satisfactory in regard to the information requirements of CHEK toolkit in Ascoli Piceno.

ANNEX I – Exchange Information Requirements (EIR) – Ascoli Piceno

Deliverable number	D2.5 – Annex I
Deliverable name	Exchange Information Requirements for DBP
Work package number	WP2 Information requerements for the DBP use case
Deliverable leader	University of Minho

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Contents

1. Introduction

No specific text added to EIR, except for some possible general information about the purpose of digital building permitting being included in the document's purpose. An example of introduction from buildingSMART Portugal EIR can be seen as follows:

"This document is an example of an EIR (Exchange Information Requirements of the Appointing Party) for the design phase of a multi-family building in Lisbon, complying with EN ISO 19650-2:2018. This is a concrete example applied to a fictitious situation and is intended as an illustration of good practice in BIM contracting during the design phase. Inherent in its nature, this is a document that will undergo various improvements over time. The web version is available at https://github.com/buildingSMART-Portugal/EIR (updated permanently) and the PDF version (updated periodically)."

2. Information requirements

2.1 Organizational information requirements (OIR)

This section is related to information requirements of the high-level strategic objectives of the appointing party as can be seen in the following example from buildingSMART Portugal EIR:

"The OIR is in line with the company's ESG (Environmental Social and Governance) policies. The following aspects stand out:

- *Developing properties that have the least impact on the environment and on the safety and health of the surrounding community and future property users.*

- *Construction of properties that comply with national regulations and incorporate sustainable solutions, including sustainability certification.*

- *Investment decisions supported by cost analyses and preliminary impact studies. Choosing solutions that optimise operating and maintenance costs."*

2.2 Project information requirements (PIR)

- Appointing party
- Designation of the project
- Scope of the project
- Purposes for which the information will be used by the requesting organization
  - PIR 01: Regulatory compliance:
    - Development of all the necessary elements for licensing the development with the municipal authorities. All the written and drawn documents for the licensing procedure.
- Phases
- Tendering process
- Key decision points
- Decisions taken at each key decision point
- Questions that require answer for decision making (PLQ – Plain Language Questions)

2.3 Table of requirements

Table 1 Table of requirements

PIR Reference	Information purpose	EIR Reference	Exchange Information Requirement (EIR)
PIR 01	Regulatory compliance	EIR 01	Apply for digital building permit at municipal level with IFC

2.4 Level of Information Need

The development of the tables with the Level of Information Need (EN ISO 7817-1:2024) to be followed in the various exchanges of information between the different actors is the responsibility of the Lead Appointed Party. The tables must be contained in the BEP, and in this document, there are reference tables with minimum requirements. The appointed parties must include alphanumeric information which has not been provided for in the aforementioned tables, and which is relevant to characterizing the objects of the project.

For EIR01, the minimum requirements for the Level of Information Need for the Architectural model are shown in the link below:

- Architecture

3. Acceptance criteria

Acceptance criteria are used to verify if the information is delivered properly. According to clause 5.2.1 c) of EN ISO 19650-2, there are four resources that provide rules for how information requirements are defined, delivered and verified for the entire project, namely: (a) project information standards; (b) project information production methods and procedures; (c) reference information; and (d) shared resources.

3.1 Project information standards

Project information standards aim to describe the criteria that will provide support and consistency for the information that will be developed throughout the project. According to clause 5.1.4 of EN ISO 19650-2, their definition must consider how information will be exchanged, the structure and classification of the information, the method used to specify the Level of Information Need and the use of the information in post-project phases and for asset operation.

- Standards
  EN ISO 19650 series and EN ISO 7817-1:2024 and other relevant standards at national level.

- Naming of information blocks – Files
  The nomenclature must follow any national requirements. In the absence of national or other specific indications, the following is suggested: [insert UK national annex]
- Metadata for information containers
- Nomenclature for IFC objects
- Units
  International System of Units consistent with Directive 80/181/EEC and its addenda. ISO 80000-1:2022. The monetary unit is €.

- Coordinate system

  The coordinate system to adopt for Ascoli Piceno EPSG:3004.
- Classification system
- Format and size of information containers
  - Editable documents and spreadsheets following the ISO/IEC 29500-1:2016 standard (XLSX and DOCX formats are valid, for example).
  - Point cloud survey files in ASTM E57.
  - Drawings in editable DWG format.
  - Documents, spreadsheets and non-editable drawings in PDF format following the ISO 32000-2:2020 standard.
  - Models in the proprietary format of the platform used to be delivered at the end of each phase.
  - Templates in IFC 4.0.2.1 (IFC4 ADD2 TC1) ISO 16739-1:2018. Desirable maximum of 300 MB per independent information block.
  - Images in JPG or PNG format (1080p or 4K resolution).
  - Videos in MP4 format (1080p or 4K resolution).
  - Information request exchanges in BCF templates.
- Software – Appointed Parties
- Platform and software – Appointing Party

  The appointing party must perform submission through the CHEK platform.
- Information for the operational phase of the asset

3.2 Methods and procedures for project information production

The project's information production methods and procedures define the approaches and techniques that the requesting entity uses to create, manage and approve information.

- Capture of information on existing assets
- 3.2.2 Production, review and approval of new information

  a) Information production:

  All IFC files shall be created with the Reference View MVD from IFC 4 ADD2 TC1.

  The submission for permitting shall include two distinct model containers (files):
  - One for the underlying terrain of the plot (and all entities outside the main construction(s)/building(s)) for which the permit is required). This is henceforward referred to as TERR.
  - One for the construction (e.g. building) itself (or one file per each building being analyzed), as an architectural domain model. This is henceforward referred to as CONSTR.

  TERR model shall contain an IFCSite and does not need to meet specific requirements other than those set for the Site (and respective georeferencing) in the Level of Information Need Specification. All geometry not directly connected to the building or within the building should be defined in TERR. This second IFC file will not contain an IFCBUILDING instance and is not CHEK IFC compliant.

  CONSTR model(s) shall respect all the requirements set in this EIR and must contain only one IFCBUILDING.

The terrain should be modeled to match the limits of the parcel or plot.

The production of native models and associated data must allow the creation of IFC models. Proxy objects must not be used when a specific object class is available in the IFC standard.

The design team must define an origin for the coordinate reference point of the design. This origin should be common to all models.

The local reference point may have a rotation relative to true north, and this rotation must be identified and justified in the BIM Execution Plan.

The origin of the local reference point for the design coordinates must be identified with a geometric element with the designation "DesignOrigin": an inverted square pyramid with a base of 0.5m and a height of 1m, with the bottom vertex coinciding with the origin.

In addition, there may also be a second point (labeled "Landmark") with the same characteristics and local coordinates (1,1,0).

All models, of all disciplines, must follow a common determination of elevations and floor nomenclature.

Spatial objects must contain consistent information on the type, function and compartment numbering.

All object instances must be assigned to the correct floor of the building according to the floor on which they are located.

Object instances with different properties, e.g. external/internal, structural/non-structural properties, should be divided into different instances. For example, a wall that runs from the inside to the outside should be divided into the building envelope.

The delivered IFC models must not contain duplication of elements between different files.

The structure of the CONSTR should comply with the nomenclature in the following table (example created for a four-storey building with two underground floors):

Table 2 Table of CONSTR naming example

IFC entity	Naming	Comment
IfcProject	Project name	
-- IfcSite	Site name	
--- IfcBuilding	Building name	
---- IfcBuildingStorey	U02	Underground -2
---- IfcBuildingStorey	U01	Underground -1
---- IfcBuildingStorey	G00	Ground floor
---- IfcBuildingStorey	F01	Floor 1
---- IfcBuildingStorey	F02	Floor 2
---- IfcBuildingStorey	F03	Floor 3
---- IfcBuildingStorey	F04	Floor 4
---- IfcBuildingStorey	R05	Roof (al level 5)

Whenever the CHEK.common Property set is invoked, the definitions are present in the Wiki of CHEK.

Auxiliary work floors are allowed in native models however they cannot be exported to models in IFC format.

IFC models must always have the objects allocated to the corresponding IfcBuildingStorey.

In the IFC file, an entity IfcRoof must exist, that covers the complete building and has at least a 3D representation. An IfcRoof has either its complete geometry defined or an IfcRoof is decomposed in at least one IfcSlab instance(s) where the geometry of all decomposed elements together represents the roof geometry. Geometry has to have at least one shape representation 'Body' defined by type 'SolidModel', 'SweptSolid', 'AdvancedSweptSolid', 'Brep', 'AdvancedBrep', 'CSG' or 'Clipping'.

If chimneys exist, they must be exported as IfcChimney. For all elements that do not fit into chimney (wall, slab) and do not fit in any other entity in IFC, they can be modeled using the IfcBuildingElementProxy.

Within CHEK we expect each IfcBuildingStorey to represent exactly one individual building storey. This corresponds to the finish floor level. The IFC file is expected to have second level space boundaries, in most applications this is an export setting. The second level space boundaries entities must have the IFC class IfcRelSpaceBoundary2ndLevel.

There should be at least one instance of IfcDoor entity. Geometry must have at least one shape representation 'Body' defined by type 'SolidModel', 'SweptSolid', 'AdvancedSweptSolid', 'Brep', 'AdvancedBrep', 'CSG' or 'Clipping'.

There should be at least one instance of IfcWindow entity. Geometry must have at least one shape representation 'Body' defined by type 'SolidModel', 'SweptSolid', 'AdvancedSweptSolid', 'Brep', 'AdvancedBrep', 'CSG' or 'Clipping'.

If stairwells exist, they should be represented by exactly one IfcStair instance that might be decomposed. PredefinedType (IfcStairTypeEnum) is not allowed to be UserDefined or NotDefined. Any IfcStair instance represents exactly one real stairwell.

For each room and space an IfcSpaceType should be created. The possible "Name" attributes: Single bedroom, Double bedroom, Living room, Kitchen, Garage, Corridor, Hallway, Closet, Bathroom, Anti-bathroom, Changing-room, Mezzanine, Patio, Balcony, Loggia, Pergola.

For the case of walls, upon export to IFC, the geometry has to have at least one shape representation 'Body' defined by type 'SolidModel', 'SweptSolid', 'AdvancedSweptSolid', 'Brep', 'AdvancedBrep', 'CSG' or 'Clipping'.

For each "Balcony", "Canopy" and "Terrace", an IfcSpace instance has to be created defining the exact space (this can be omitted in case of Canopies, balconies and terraces if their length is smaller than 1.50 meter). IfcSpace.PredefinedType =. EXTERNAL. (IfcSpatialZoneTypeEnum). LongName should have the value 'Balcony', 'Canopy' or 'Terrace' according to the applicable case (See table 3).

Table 3 Definitions regarding spaces[1]

Spaces	Definitions
Balcony	A practicable building element open on at least two sides, horizontally projecting, with a railing or parapet and directly accessible from one or more interior rooms
Canopy	A building element covering an open space supported by a discontinuous structure, used for ancillary uses or for the protected use of appurtenant spaces.
Terrace	An uncovered and practicable building element covering parts of the building, fitted with a railing or parapet, directly accessible from one or more interior rooms.

The IFC export settings must include second level space boundaries.

In the case of IFCStair elements, the predefined types 'UserDefined' or 'NotDefined' are not allowed.

An elevator should be connected exclusively to the IFCBUILDINGSTOREY of the base floor, even if its geometry is defined on other IFCBUILDINGSTOREY instances also. An elevator should be modelled as an IFCTRANSPORTELEMENT where PredefinedType =. ELEVATOR. (IfcTransportElementTypeEnum).

For the case of columns, the geometry has to have at least one shape representation 'Body' defined by type 'SolidModel', 'SweptSolid', 'AdvancedSweptSolid', 'Brep', 'AdvancedBrep', 'CSG' or 'Clipping'.

For the case of floors, the geometry has to have at least one shape representation 'Body' defined by type 'SolidModel', 'SweptSolid', 'AdvancedSweptSolid', 'Brep', 'AdvancedBrep', 'CSG' or 'Clipping'.

b) Coordination

c) Revision and approval of information

- Delivery of information to the Appointing Party
- Security

3.3 Acceptance tables

- Global evaluation
- Model quality

Perform model checks to identify and rectify issues such as duplicate elements, missing properties, or geometric inaccuracies.

For checking the adequacy of georeferencing of the model, the CHEK IFC Georeferencing tool can be used: https://ifcgref.bk.tudelft.nl/.

Self-checking of satisfaction of information requirements through the IDS supplied by the Municipality is necessary.

1. Geometry:
2. Non-graphical information:

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[1] D2.3 CHEK CityGML specification. 2024, p. 51.

4. Support information

Supporting information consists of information that is intended to be made available by the Appointing Party to the Lead Appointed Party in order to avoid redundant work and ensure that the information is developed in accordance with their standards. This enables the Appointed Parties to have a better understanding of what is required for the project. According to clause 5.2.1 d) of EN ISO 19650-2, supporting information can consist of existing asset information, shared resources, examples of deliverables, supporting documents, guidance material and references to international, national or industry standards. This may include any further information made available by the Municipality on the CHEK platform in concern to aspects such as the CityGML available and consultation of city zoning among others.

4.1 Reference information

This section specifies the existing information (normative / reference material) that can be made available by the appointing party. An example of reference information is demonstrated as follows:

Nomenclature	State	Revision	Classification	Date	Description
OBG-BSP-ZZ-ZZZ-CE-XXX-XX-0001.pdf	A1	C01	PM_40_50	11.01.2024	Application
OBG-BSP-ZZ-ZZZ-CE-XXX-XX-0002.pdf	A1	C01	PM_40_50_49	11.01.2024	Power of attorney
OBG-BSP-ZZ-ZZZ-CE-XXX-XX-0003.pdf	A1	C01	PM_10_20_03	11.01.2024	Term, insurance, OA declaration, topography
OBG-BSP-ZZ-ZZZ-LG-XXX-XX-0001.pdf	A1	C01	PM_30_10_80	11.01.2024	Urban Land Registry
OBG-BSP-ZZ-ZZZ-LG-XXX-XX-0002.pdf	A1	C01	PM_55	11.01.2024	CRC
OBG-BSP-ZZ-ZZZ-LG-XXX-XX-0003.pdf	A1	C01	PM_30_10_47	11.01.2024	CRP
OBG-BSP-ZZ-ZZZ-LV-LEV-XX-0001.dwf	A1	C01	PM_30_20_89	11.01.2024	Topographic survey

Figure 1 Example of reference information (buildingSMART Portugal EIR)

4.2 Shared resources

The IDS file for verification can be downloaded in CHEK_Ascoli_Piceno.ids. available upon request (Teams_CHEK)
Data modeling tracker: Data requirements tracker available upon request (Teams_CHEK)
Modeling guidelines: Modeling guidelines available upon request (Teams_CHEK)
Elearning resources available in elearning.chekdbp.eu
The Wiki of CHEK can be found in https://wiki.chekdbp.eu/

5. Dates, delivery milestones and key decision points

This section defines when the information must be delivered. It also considers the sequence and the purpose of the information delivery. Examples of information included in this type of section are demonstrated as follows:

"At the tender stage, bidders must submit:

- *The pre-contract BEP according to the EN ISO 19650 and national specification, including RACI matrix and demonstration of capability.*

- *The matriz de apoio à pontuação dos Candidatos ('Formulário de apoio à avaliação de candidatos') from the CT197 'Guia de Contratação'.*

- *The Proposal fee."*

EIR	Delivery date of the deliverable	Key decision point	Delivery date of the result of the key decision point
Preliminary Design			
EIR01 EIR02 EIR03 EIR04 EIR09 EIR10	02/04/2024 (10 days before the decision is made)	Decision point 2: • Decision on the level of BREEAM certification that is really desired, taking into account performance objectives and budgetary limits. • Decision on continuity of investment and possible adaptations to strategic objectives.	12/04/2024 (7 weeks before the end of the phase)
EIR04 EIR08 EIR09 EIR10	21/08/2024 (10 days before the decision is made)	Decision point 3: • Decision on final approval of phase with possible amendments.	31/08/2024 (end of the phase)
EIR05	Coordination of the models takes place before the coordination meetings, and the results of the coordination must be communicated at least 2 working days before the coordination meetings.		
EIR06	Coordination meetings held fortnightly (start date to be determined).		
Developed Design			
EIR04 EIR07 EIR08 EIR09 EIR10	22/03/2024 (10 days before the decision is made)	Decision point 3: • Decision on final approval of phase with possible amendments.	01/04/2024 (end of the phase)
EIR05	Coordination of the models takes place before the coordination meetings, and the results of the coordination must be communicated at least 2 working days before the coordination meetings.		
EIR06	Coordination meetings held fortnightly (start date to be determined).		
Technical Design			
EIR04 EIR07 EIR10 EIR11 EIR12 EIR13	10 days before the decision is made	Decision point 3: • Decision on final approval of phase with possible amendments.	In the end of the phase.
EIR05	Coordination of the models takes place before the coordination meetings, and the results of the coordination must be communicated at least 2 working days before the coordination meetings.		
EIR06	Coordination meetings held fortnightly (start date to be determined).		

Figure 2 Example of "Dates, information delivery milestones and key decision points" (buildingSMART Portugal EIR)

Appendix A – Codes for naming information blocks

This section can be used to determine code conventions for naming information blocks, that in this case are not applicable for this specific EIR. However, in terms of example, here follows a table containing a convention coming from the example EIR developed by buildingSMART Portugal:

Type	Description	Code
Communication	Agenda	AG
Communication	Correspondence	CO
Communication	Notes file	FN
Communication	Minutes	AT
Communication	Presentation	AP
Communication	Request	PI
Data	Database	BD
Project	Calculations	CA
Project	Specification	EP
Finance	Quantities map	MQ
Finance	Budget estimate	EO
Finance	Quotation	CT
Graphics	Animation file	FA
Graphics	Clash detection	DC
Graphics	Federated model	MC
Graphics	Drawing	DS
Graphics	Three-dimensional model	M3
Graphics	Two-dimensional model	M2
Graphics	Photography	FT
Graphics	Visualisation	VS
Official guidelines	Regulation	RG
Project planning	Programme	PR
Registering information	Certificate	CE
Registering information	Process map	MP
Registering information	Report	RL
Registering information	Timetable or table	CR
Registering information	Survey	LV
Registering information	Legitimacy document	LG

Appendix B – Codes for information block metadata

This section can be used to determine code conventions for naming information block metadata, that in this case are not applicable for this specific EIR. However, in terms of example, here follows a table containing a convention coming from the example EIR developed by buildingSMART Portugal:

Major Status	Description	Code
Work in Progress (WIP)	Information container being developed by the task team.	S0
Shared (non-contractual)	Information container suitable for geometric and non-geometric coordination within the delivery team.	S1
Shared (non-contractual)	Information container suitable as reference information for other task teams within the delivery team.	S2
Shared (non-contractual)	Information container suitable for revision and comments within the delivery team.	S3
Shared (non-contractual)	Information container suitable for review and approval by the Lead Appointed Party.	S4
Shared (non-contractual)	Information container suitable for review and acceptance by the Appointing Party.	S5
Published (contractual)	Information container authorized and accepted.	A1, An, etc

ANNEX II – Level of Information Need – Ascoli Piceno

Deliverable number	D2.5 – Annex II
Deliverable name	Exchange Information Requirements for DBP
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Contents

1. Introduction

The Level of Information Need for Ascoli Piceno is a living document that is still being developed in the project. Currently, the Level of Information Need contains 15 tables (see Table 1) which were included in this annex at the time of the submission of this deliverable. The tables can also be found at the following link: Architecture.

Table 1 - List of tables of the Level of Information Need - Ascoli Piceno

Tables	Objects
1	Building
2	Roof
3	Chimney
4	Other elements on the roof
5	Space type
6	Spaces
7	Building Storey
8	Wall
9	Column
10	Door
11	Window
12	Stairwell
13	Elevator
14	Project
15	Terrain

2. Level of Information Need tables

2.1 Building

Objects	Building	
Actor	Applicant for permit	
		Information Delivery Milestone
		Building permit
Purpose		Apply for digital building permit at municipal level
Minimum geometric information requirements		
Details		Not applicable
Dimension		Not requested
Location		Relative
Appearance		Not applicable
Parametric behavior		Not applicable
Minimum alphanumeric information requirements		
IFC Class		IfcBuilding
Attributes		
Name		X
Property sets		
Properties	**Property set**	
TypeOfConstruction	CHEK_common	X
Height	CHEK_common	X
IsCornerBuilding	CHEK_common	X
NumberOfBuildingLevels	CHEK_common	X
MarketCategory	Pset_BuildingUse	X
MarketSubCategory	Pset_BuildingUse	X
BuildingHeight	CHEK_common	X
LegalVolume	CHEK_common	X
AcessoryFloorArea	CHEK_common	X

Figure 1 - Level of Information Need Ascoli Piceno (Building)

2.2 Roof

Objects	Roofs	
Actor	Applicant for permit	
		Information Delivery Milestone
		Building permit
Purpose		Apply for digital building permit at municipal level
Minimum geometric information requirements		
Details		Size, geometry and orientation defined. Sloping surfaces and openings represented. The external dimensions of the element are correctly defined.
Dimension		3D
Location		Relative
Appearance		Not requested
Parametric behavior		Not requested
Minimum alphanumeric information requirements		
IFC Class		IfcRoof
Property sets		

Properties	Property set	
RoofAngle	CHEK_common	X

Figure 2 - Level of Information Need Ascoli Piceno (Roof)

2.3 Chimney

Objects	Chimneys	
Actor	Applicant for permit	
		Information Delivery Milestone
		Building permit
Purpose		Apply for digital building permit at municipal level
Minimum geometric information requirements		
Details		Size, geometry and orientation defined.
Dimension		3D
Location		Relative
Appearance		Not requested
Parametric behavior		Not requested
Minimum alphanumeric information requirements		
IFC Class		IfcChimney

Figure 3 - Level of Information Need Ascoli Piceno (Chimney)

2.4 Other elements on the roof

Objects	Other elements on the roof	
Actor	Applicant for permit	
		Information Delivery Milestone
		Building permit
Purpose		Apply for digital building permit at municipal level
Minimum geometric information requirements		
	Details	Size, geometry and orientation defined.
	Dimension	3D
	Location	Relative
	Appearance	Not requested
	Parametric behavior	Not requested
Minimum alphanumeric information requirements		
	IFC Class	IfcBuildingElementProxy

Figure 4 - Level of Information Need Ascoli Piceno (Other elements on the roof)

2.5 Space type

Objects	Space type	
Actor	Applicant for permit	
		Information Delivery Milestone
		Building permit
Purpose		Apply for digital building permit at municipal level
Minimum geometric information requirements		
	Details	Size, geometry and orientation defined. The external dimensions of the element are correctly defined.
	Dimension	3D
	Location	Relative
	Appearance	Not requested [1]
	Parametric behavior	Not requested [2]
Minimum alphanumeric information requirements		
	IFC Class	IfcSpaceType
	Attributes	
	LongName	[Single bedroom, Double bedroom, Living room, Kitchen, Garage, Corridor, Hallway, Closet, Bathroom, Anti-bathroom, Changing-room, Mezzanine, Patio, Loggia, Pergola]

Figure 5 - Level of Information Need Ascoli Piceno (Space type)

2.6 Spaces

Objects	Spaces	
Actor	Applicant for permit	
		Information Delivery Milestone
		Building permit
Purpose		Apply for digital building permit at municipal level
Minimum geometric information requirements		
Details		Size, geometry and orientation defined. The external dimensions of the element are correctly defined.
Dimension		3D
Location		Relative
Appearance		Not requested [1]
Parametric behavior		Not requested [2]
Minimum alphanumeric information requirements		
IFC Class		IfcSpace
Attributes		
LongName		[Canopy, Balcony, Terrace]
Predifined Type		EXTERNAL
Property sets		
Properties	Property set	
Reference	Pset_SpaceCommon	X
IsExternal	Pset_SpaceCommon	X
GrossPlannedArea	Pset_SpaceCommon	X
AverageHeight	CHEK_Common	X

Figure 6 - Level of Information Need Ascoli Piceno (Spaces)

2.7 Building storey

Objects	Building storeys		
Actor	Applicant for permit		
		Information Delivery Milestone	
		Building permit	
Purpose		Apply for digital building permit at municipal level	
Minimum geometric information requirements			
	Details	Not applicable	
	Dimension	Not requested	
	Location	Relative	
	Appearance	Not applicable	
	Parametric behavior	Not applicable	
Minimum alphanumeric information requirements			
	IFC Class	IfcBuildingStorey	
	Property sets		
	Properties	Property set	
	GrossFloorArea	CHEK_common	X
	AccessoryFloorArea	CHEK_common	X

Figure 7 - Level of Information Need Ascoli Piceno (Building storey)

2.8 Wall

Objects	Walls		
Actor	Applicant for permit		
		Information Delivery Milestone	
		Building permit	
Purpose		Apply for digital building permit at municipal level	
Minimum geometric information requirements			
	Details	Size, geometry and orientation defined. Openings represented. The external dimensions of the element are correctly defined.	
	Dimension	3D	
	Location	Relative	
	Appearance	Not requested	
	Parametric behavior	Not requested	
Minimum alphanumeric information requirements			
	IFC Class	IfcWall	
	Property sets		
	Properties	Property set	
	IsExternal	Pset_WallCommon	X

Figure 8 - Level of Information Need Ascoli Piceno (Wall)

2.9 Column

Objects	Columns	
Actor	Applicant for permit	
		Information Delivery Milestone
		Building permit
Purpose		Apply for digital building permit at municipal level
Minimum geometric information requirements		
Details		Size, geometry and orientation defined. The external dimensions of the element are correctly defined.
Dimension		3D
Location		Relative
Appearance		Not requested
Parametric behavior		Not requested
Minimum alphanumeric information requirements		
IFC Class		IfcColumn

Figure 9 - Level of Information Need Ascoli Piceno (Column)

2.10 Door

Objects	Doors	
Actor	Applicant for permit	
		Information Delivery Milestone
		Building permit
Purpose		Apply for digital building permit at municipal level
Minimum geometric information requirements		
Details		Size, geometry and orientation defined. The external dimensions of the element are correctly defined.
Dimension		3D
Location		Relative
Appearance		Not requested
Parametric behavior		Not requested
Minimum alphanumeric information requirements		
IFC Class		IfcDoor

Figure 10 - Level of Information Need Ascoli Piceno (Door)

2.11 Window

Objects	Windows	
Actor	Applicant for permit	
		Information Delivery Milestone
		Building permit
Purpose		Apply for digital building permit at municipal level
Minimum geometric information requirements		
Details		Size, geometry and orientation defined. The external dimensions of the element are correctly defined.
Dimension		3D
Location		Relative
Appearance		Not requested
Parametric behavior		Not requested
Minimum alphanumeric information requirements		
IFC Class		IfcWindow

Figure 11 - Level of Information Need Ascoli Piceno (Window)

2.12 Stairwell

Objects	Stairwells	
Actor	Applicant for permit	
		Information Delivery Milestone
		Building permit
Purpose		Apply for digital building permit at municipal level
Minimum geometric information requirements		
Details		Size, geometry and orientation defined. The external dimensions of the element are correctly defined.
Dimension		3D
Location		Relative
Appearance		Not requested
Parametric behavior		Not requested
Minimum alphanumeric information requirements		
IFC Class		IfcStair

Figure 12 - Level of Information Need Ascoli Piceno (Stair)

2.13 Elevator

Objects	Elevators	
Actor	Applicant for permit	
		Information Delivery Milestone
		Building permit
Purpose		Apply for digital building permit at municipal level
Minimum geometric information requirements		
Details		Size, geometry and orientation defined.
Dimension		3D
Location		Relative
Appearance		Not requested [1]
Parametric behavior		Not requested
Minimum alphanumeric information requirements		
IFC Class		IfcTransportElement
Attributes		
	Predifined Type	ELEVATOR

Figure 33 - Level of Information Need Ascoli Piceno (Elevator)

2.14 Project

Objects	Project	
Actor	Applicant for permit	
		Information Delivery Milestone
		Building permit
Purpose		Apply for digital building permit at municipal level
Minimum geometric information requirements		
Details		Not applicable [1]
Dimension		3D
Location		Absolute
Appearance		Not applicable [2]
Parametric behavior		Not applicable
Minimum alphanumeric information requirements		
IFC Class		IfcProject
Attributes		
	MapConversion.Eastings	X
	MapConversion.Northings	X
	MapConversion.OrthogonalHeight	X
	MapConversion.XAxisAbscissa	X
	MapConversion.XAxisOrdinate	X
	ProjectedCRS.Name	X

Figure 44 - Level of Information Need Ascoli Piceno (Project)

2.15 Terrain

D2.5: Exchange information requirements for DBP

02/12/2025

Objects	Terrain	
Actor	Applicant for permit	
		Information Delivery Milestone
		Building permit
Purpose		Apply for digital building permit at municipal level
Minimum geometric information requirements		
Details		Size, geometry and orientation defined.
Dimension		3D
Location		Relative
Appearance		Not requested
Parametric behavior		Not requested
Minimum alphanumeric information requirements		
IFC Class		IfcSite

Figure 55 - Level of Information Need Ascoli Piceno (Terrain)