

## I. Introduction

**BIM Excellence** (BIMe) is a unique *research-based* approach to digital innovation in the construction industry. It provides an integrated methodology and a modular language for performance assessment, learning and process optimisation. The **BIMe Initiative** is *not-for-profit effort* guided by a set of **Principles**<sup>1</sup> undertaken by volunteer researchers from both industry and academia. The BIMe Initiative is supported by in-kind contributions, commercial services, and institutional/corporate [sponsorship](#).

This document must be read in conjunction with *101in BIMe Initiative Explainer*, *102in BIMe Initiative Knowledge Structures*, and *104in BIMe Initiative Network* (refer to list of [publications](#)). The BIM Excellence approach and the BIMe Initiative are based on the published research of [Dr. Bilal Succar](#) and a growing cohort of esteemed international collaborators.

## II. What is a BIMe Initiative Project?

BIMe Initiative Projects aim to deliver *software applications* and *published guides* of direct practical benefit to individuals, organisations and project teams within the construction industry. BIMe Initiative Projects also aim to deliver *conceptual models* and *learning resources* that can be used by researchers, educators and policy makers to conduct investigations, educate industry stakeholders and develop research-based policies. The [BIM Dictionary](#) is an example of such an online learning resource developed through a BIMe Initiative Project (refer to [Projects List](#)).

### A. Types of Projects

A **BIMe Initiative Project** refers to a coordinated effort – a single **Activity** (with multiple **Tasks**) or multiple activities – to deliver a *usable product* or some of its *components*. There are two types of projects:

- **Top-level Projects** deliver a *usable end product*; and
- **Micro Projects** deliver *interim components* used within products.

### B. Products and Components

**BIMe Initiative Products** are *software applications* or *publications* (e.g. a guide) that stakeholders can use to assess and improve their own performance. Products are composed of multiple interconnected **Components** organised according to five Knowledge Sets (refer to **102in**):

- Knowledge **Foundations** representing conceptual constructs (e.g. a [taxonomy](#) or methodology);
- Knowledge **Blocks** representing modular units of [Structured Information](#) (e.g. Competency Items) that can be combined into larger modular units (e.g. [Defined Roles](#));
- Knowledge **Workflows** representing procedures (e.g. assessment procedure), scripts or routines;
- Knowledge **Tools** representing software application (e.g. phone App), modules or templates; or
- Knowledge **Views** representing videos, lectures or websites.

The development of these components represents the *main deliverables* of the BIMe Initiative.

<sup>1</sup> BIMe Initiative Principles (BIMe Principles, or Principles for short) includes both [General Principles](#) and the [Excellence Manifesto](#).

## III. Organising Top-Level Projects

Top-level Projects are initiated according to a number of criteria – including:

### A. Focus Areas (Disciplinary Lens<sup>2</sup>)

BIMe Initiative Projects will cover the following Focus Areas:

- **Performance Management** – covering performance assessment and benchmarking;
- **Learning Management** – covering education, training and e-learning;
- **Implementation Management** – covering implementation/diffusion of innovative systems;
- **Information Management** – covering information/data capture and analysis;
- **Knowledge Management** – covering knowledge capture, engineering and sharing; and
- **Research and Delivery Management** – covering development/management of the BIMe Initiative, its network and innovative projects.

Focus Areas (and their subdivisions – Focus Topics) help organise projects, products and components around common themes. A project may belong to one or more focus area. Also, a focus area may be served by multiple projects.

### B. Organisational Scales (Scoping Lens)

BIMe Initiative Projects generate practical solutions for individual practitioners, organisations, project teams and whole markets. To accurately identify the intended beneficiaries, projects can be classified according to the 12 scales of the [Organisational Hierarchy](#).

### C. Concepts (Conceptual Lens)

BIMe Initiative Projects can be tagged using the 50 or more **Concepts** identified within the [BIM Ontology](#) (e.g. facility, role and system). Using 'concepts as tags' generates explicit semantic connections between varied projects and enables the search, collation and filtration of products and their components within the **Knowledge Object Library** and **Product Library** (refer to Summary Diagram below).

### D. Programmes

BIMe Initiative Projects can be clustered into **Programmes** if they need to (a) be repeated in different markets (e.g. conducting benchmarking exercises in a number of countries); (b) form part of a collaborative agreement with other research groups or networks; or (c) conform with specific funding arrangements.

### E. Portfolios

BIMe Initiative Projects can be collated into custom **Portfolios** including: (a) an overall ledger of every projects conducted using the initiative's Knowledge Object Libraries; and (b) personal ledgers collating all projects and products delivered by individual BIMe Members.

<sup>2</sup> Refer to three types of [BIM Lenses](#), one of the main components of the BIM Framework

## IV. BIMe Initiative Projects

To organise the selection and delivery of *Top-Level* BIMe Initiative Projects, the BIMe Initiative follows a *three-phase process*: **Problem Statement Phase**, **Solution Development Phase** and **Product Extension Phase** – each includes several milestones or steps:

### A. Problem Statement Phase

This first phase covers the step by step identification and selection of industry challenges as candidate BIMe Initiative Projects - in three Steps: **Identification** of a challenge through a well-defined *Problem Statement*, **Testing** the *Problem Statement's* validity, usefulness and alignments with other projects, and **Approving** the *Problem Statement* as a base for a new top-level BIMe Initiative Project:

#### Step A1. Problem Statement Identification

For an idea to be considered as a *potential* top-level BIMe Initiative Project, the **performance improvement challenge** to be resolved need to be *formulated* into a simple Problem Statement:

#### Step A2. Problem Statement Testing

For a formulated Problem Statement to be considered as valid, the following questions need to be answered with a simple YES or NO:

- Does the formulated Problem Statement clearly identify a challenge to be addressed?
- Does the identified challenge fall under one or more BIMe Initiative Focus Areas?
- Is the identified challenge considered – upon consultation with BIMe Members and external parties - of significant magnitude to warrant a BIMe Initiative Project?
- Have all prerequisite (major) challenges been identified by the BIMe Initiative Network or - publicly – by other researchers outside the network?
- Have all proposed solutions to the problem – by others outside the BIMe Initiative Network - been investigated, identified and reviewed?
- Have all Player Groups and Player Types that would benefit from a solution to this problem been identified and privately consulted for their views and relevant aspirations?
- Is the potential solution to the identified challenge of direct benefit to industry practitioners?
- Is the potential solution a software application or a publication of practical benefit?

If the answer is **YES** to all questions, then the now valid Problem Statement can proceed to Step 3.

#### Step A3. Problem Statement Approval

For a valid Problem Statement to be approved and launched as a top-level BIMe Initiative Project, it needs to be reviewed by the *Leadership Group/Team* (**104in**) so it meets the following conditions:

- There is adequate expertise to undertake the project within the BIMe Initiative Network;
- There are adequate resources/funding to undertake the project;
- The solution is based-on and will extend existing Knowledge Foundations (**102in**);
- The solution has or may attract adequate (minimal viable) development funds or grants; and
- The solution – once fully developed - can be self-sustainable.

Upon passing these three steps, the approved Problem Statement passes to the second phase.

## B. Solution Development Phase – through a Top-Level Project

After a BIMe Initiative Project is selected and a solution to the Problem Statement has been identified, tested and approved, the Solution Development Phase starts with the initiation of a **Top-Level BIMe Project** and the formation of a **BIMe Project Team** to transform the approved problem statement into a BIMe Product. The Solution Development Phase includes *four Steps*:

### Step B1. Exploration

The exploration of all possible solutions to the problem statement. This step includes (a) the identification and comparison of *solution scenarios*, (b) assessment of project team competencies against preferred scenarios, and (c) identification of the components needed to reach the solution.

### Step B2. Extension

If the components needed to deliver the BIMe Product are not available within the **Knowledge Object Library**, they are developed<sup>3</sup> through concurrent Micro Projects<sup>4</sup>. Upon delivery of these components for use by the Top-Level Project, they are fed back into the Knowledge Object Library for re-use by the community and other Top-Level Projects.

**Important:** the remainder steps vary depending on the nature of the *end product*. The below steps are applicable to Software Applications only. If the intended end product is a *Published Guide*, then *Step B3* becomes **Generate First Draft**, *Step B4* **Submit for Peer-Review**, and *Phase C* **Publication Phase**. A diagram to guide BIMe Members through all Phases and Steps will be provided in the future.

### Step B3. Experimentation – applicable to Software Applications only

The development of a working prototype followed by trialling/testing of these prototypes through pilot projects and/or beta programs.

### Step B4. Execution – applicable to Software Applications only

The development of a functioning tool – a static template or a dynamic module within the **BIMe Online Platform** (the semantic-web platform hosting all online tools).

<sup>3</sup> The development of missing components follows a specific method – building upon existing components to develop new ones – as depicted by the [Conceptual Reactor](#).

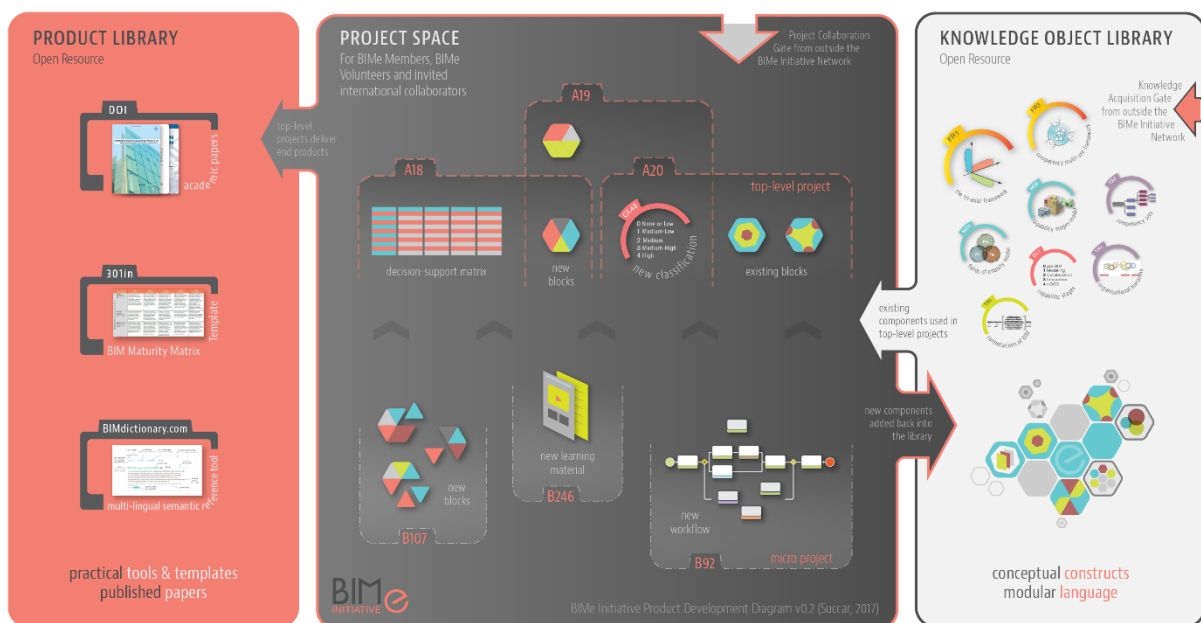
<sup>4</sup> There is no minimum size/effort limit for micro projects. For example, within the *top-level* BIM Dictionary project, there are several micro projects - including: one requires the translation of hundreds of [Dictionary Items](#) into a new language; a second focuses on defining a small set of items covering a specific topic (e.g. Lean Construction); and a third is intended to harvest or develop an 'extended description' for a single Dictionary Item ([see example](#));

## C. Product Extension Phase – applicable to Software Applications only

Upon completion of the Solution Development Phase, a Top-level Project will transform into a **BIMe Initiative Product**. The project team will be supplemented by a specialist product team to assist in charting the product's growth path and sustaining its continuous success. Starting with this phase, development processes and activities will be guided by the general project management principles discussed in [ISO 21500:2012](#). Project/Product leaders are expected to apply these general principles with the assistance of Project Managers from within the BIMe Initiative Network. These BIMe Initiative Products will be released under the same Creative Commons license as the earlier phases but – depending on how each project or Work Package (explained later) was funded - may carry restrictions on their commercial use.

## D. Summary Diagram

The below diagram summarises how a BIMe Initiative Product is delivered:



As illustrated in the above diagram ([full size image](#)), to deliver a *BIMe Product* (a Published Guide or a Software Application), a *Top-Level Project* must be first launched. Each Top-Level Project typically includes both existing components (e.g. a taxonomy or a metric) and new components. Existing components are (a) selected from the **Knowledge Object Library**, a public resource available through BIMexcellence.org. New components (e.g. a framework or a software module) are (b) generated by BIMe Members through *Micro Projects*. Once completed and validated, all components are (c) packaged into a new BIMe Product. Once tested and verified, the new product is (d) released through the **Product Library** (a webpage on BIMexcellence.org) and all newly generated components are (e) added to the Knowledge Object Library for future reuse. As opposed to the Knowledge Object Library and the Product Library, which are both publicly available resources, the generation of new components and end products are conducted within the **Project Space** (wiki pages, chat rooms and physical meetings) which are only accessible to BIMe Members and invited international collaborators.

## V. Project Roles

Top-Level Projects are conducted by **Active Members** and **Volunteers** (refer to **104in**) playing varied but well-defined roles. Roles are organised into five **Role Classes** (A-E) which carry a **Nominal Title** (see examples) yet vary in responsibilities across different projects and products. Role Classes are:

→ **Class E: Leaders | Primary Authors**

*Leaders are responsible for identifying measurable project goals, securing technical, financial and knowledge resources, adherence to ethical standards, project reporting, and managing the research team. Primary Authors lead the delivery of a peer-reviewed paper and/or the development of its main concepts and methods*

→ **Class D: Investigators | Managers | Secondary Authors**

*Investigators work with Leaders and are responsible for a Micro Project or Work Package within a large project. Secondary Authors contribute to the delivery of peer-reviewed papers.*

→ **Class C: Contributors | Facilitators**

*Contributors take part in the overall research and are potentially responsible for a specialized set of research or admin activities. An active contributor may be a research officer, data analyst, psychometrician, learning provider, software developer or an administrative officer. A workshop Facilitator is also considered a contributor to a project.*

→ **Class B: Reviewers | Testers**

*Activities include critical review and software testing.*

→ **Class A: Users | Readers**

*Activities vary depending on project requirements..*

## VI. Project Subdivisions

BIME Initiative Projects vary in size and complexity and may need to be subdivided into smaller manageable **work units**. When necessary, the following taxonomy will be used to assign milestones and resources:

→ **Level 1: [Project](#)**

A set of activities leading to an *end product* or *interim component*. As discussed earlier, Top-Level Projects can include multiple Micro Projects if the new components need to be first developed.

→ **Level 2: Work Package**

An *optional* cluster of activities within *large or complex* projects

→ **Level 3: Activity**

A set of related tasks within a work package or a project

→ **Level 4: Task**

The simplest undividable work units

→ **Level 5: Step**

The chronological order (if any) to complete a task

## VII. Numbering System

The numbering system covers projects, components and R&D activities; naming protocols are explained further below:

1. **Projects:**
  - 1.1. Top-level Projects **A, B, C, ...** *Projects delivering end products*
  - 1.2. Micro Projects **A1, A2, ...** *Projects delivering interim components*
  
2. **Components:**
  - 2.1. **Knowledge Foundations:**
    - 2.1.a. Framework **FR1, FR2, ...**
    - 2.1.b. Model **MD1, MD2, ...**
    - 2.1.c. Taxonomy **TX1, TX2, ...**
    - 2.1.d. Classification **CL1, CL2, ...**
    - 2.1.e. Term **N/A** *replaced by Dictionary Item*
  
  - 2.2. **Knowledge Blocks:**
    - 2.2.a. Competency Item **CI.F02.256** *Competency Item in Set F | Topic 02 | 3-digit No.*
    - 2.2.b. Dictionary Item **DI.0765** *Code generated within BIMdictionary.com*
    - 2.2.c. Model Use **MU4120** *Model Use (MU) | Category (1-9) | 3-digit No.*
    - 2.2.d. Learning Unit **LU1, LU.2, ...**
    - 2.2.e. Video Item **VI.1, VI.2, ...** *A video covering a single or a set of Competency Items*
    - 2.2.f. ...
  
  - 2.3. **Knowledge Tools:**
    - 2.3.a. Tool **TL1, TL2, ...**
    - 2.3.b. Module **TL1.1, TL2.2** *Modules as sub-parts of Tools*
    - 2.3.c. Template **N/A** *Encased in a publication*
  
  - 2.4. **Knowledge Workflows:**
    - 2.4.a. Workflow **WF1, WF2, ...**
    - 2.4.b. Routine/Script **RS1, RS2, ...**
    - 2.4.c. Method **MT1, MT2**
    - 2.4.d. ...
  
  - 2.5. **Knowledge Views:**
    - 2.5.a. Publication **201in, 301in, ...** *Series 200 | Document 1*
    - 2.5.b. Paper/book **N/A** *Digital Object Identifier (DOI) to be used*
    - 2.5.c. Audio Visual **N/A** *Published title to be used*
    - 2.5.d. Websites/blogs **N/A** *Uniform Resource Locator (URL) to be used*
    - 2.5.e. ...
  
3. **R&D Activities (by top-level project):**
  - 3.1. Literature Review **A | LTR** *Code is followed by start date e.g. LTR160131*
  - 3.2. Project Manag. & Admin **A | PMA**
  - 3.3. Online Data Collection **A | ODC**
  - 3.4. Data Analysis and Reporting **A | DAR**
  - 3.5. Testing, Verif. & Validation **A | TVV**
  - 3.6. Pres., Lectures & Workshops **A | PLW**
  - 3.7. ...

## A. Project Numbering

The adoption of prefixes (A and B) to Top-Level and Micro Projects respectively is intended to facilitate the development of components independently from their intended end products. The numbering system also makes it easier to subdivide Top-level Projects into Work Packages as well as identifying if Micro Projects need to be conducted to deliver needed components.

For example, a hypothetical Top-level Project M can be broken down as follows:

- M is broken down into three Work Packages or Micro Projects: M10, M20, and M90;
- M uses components developed in earlier projects including: FR2, MD3-MD5 and CL3;
- M will generate – through the three Micro Projects – the following interim components: MD11, CL35, DR1267-DR1321, and VI.342; and
- M will deliver the following end products: TL12 and 215in.

## B. Component Coding

The unique chronological identifier for each component reflects the modular nature of the BIMe Initiative. By carrying its own unique code, each component can be:

- Identified independently;
- Developed and released independently (e.g. as a blog post on [BIMframework.info](http://BIMframework.info));
- Packaged with other components into an end product (e.g. within a published guide);
- Embedded into multiple products;
- Revised and updated easily; and
- Listed as a unique resource within the **Knowledge Object Library**.

## C. Activities Labelling

To deliver a reasonably-sized project, a set of typical activities need to be planned and completed. These Activities or Work Packages include conducting a literature review, collecting data (e.g. through questionnaires, case studies or focus groups), data analysis and writing reports. As these activities require specific *individual or project team competencies*, and will need to be properly planned and funded, the R&D Labels help organise these activities and resources on a project by project basis.



## VIII. Current Projects

A number of projects are currently underway at varied phases of development. The below list includes a brief description of project A using the *draft BIMe Initiative Project Template*:

### A | BIM Dictionary Project – snapshot on Dec1, 2016 – [UPDATE AVAILABLE HERE](#)

#### Project

<i>Project Title [Code]</i>	The BIM Dictionary [A]
<i>Project Description</i>	This project aims to facilitate a common understanding of frequently used terms across the construction industry, connect these terms to vetted learning material, and act as a reference to current and future online tools. The BIM Dictionary ( <a href="#">BIMdictionary.com</a> ) includes hundreds of Dictionary Items composed of terms, descriptions, synonyms and abbreviations. Most of these terms will be translated into other languages through the efforts of BIMe Members and BIMe Volunteers (refer to <b>104in</b> ). The BIM Dictionary is part of the semantic fabric of the BIM Excellence Online Platform.

#### Project Team

<i>Project Leader</i>	Dr. Bilal Succar – Head Editor
<i>Contributors</i>	Multiple – please refer to <a href="#">project's page</a>
<i>Reviewers/Testers</i>	Public (online commentary)

#### Project Timeline

<i>Start Date</i>	Launched officially in March 2016 - ongoing
<i>Project's Current Phase</i>	B4 (Solution Development, Execution)
<i>Time to Phase C</i>	65% of Phase completed - 11 months remaining

#### Research Criteria

<i>Dependencies</i>	Conceptual <a href="#">BIM Ontology</a>
<i>Dependents</i>	All assessment, learning, implementation and information management modules
<i>Focus Areas</i>	<a href="#">Information Management</a> and Knowledge Management
<i>Organisational Scales</i>	All <a href="#">Organisational Scales</a>
<i>Interim Components</i>	Dictionary Items based on thousands of Dictionary Items
<i>End Product</i>	Online Tool TL5 with multiple modules TL5.1 – TL5.9

#### Knowledge Resources

<i>Current Contributors</i>	16 LOTE Editors in 2016 + 1 Assistant Editor
<i>Sought Contributors</i>	30 new LOTE Editors + 2 Assistant Editors

#### Financial Resources

<i>Current support level</i>	Development and maintenance funded by ChangeAgents AEC; in-kind contributions from Sean Dodsworth (software development activities); and one-off \$1k sponsorship contribution from the University of Newcastle, Australia
<i>Additional Support needed</i>	\$20-30k to complete the first set of online features 0.25 FTE full-stack developer + 0.2 FTE UI/UX designer \$5k/year expected cost for web-hosting and ongoing maintenance Additional features will depend on securing Project Sponsors

## B | Knowledge Sharing Project

**Description:** This project aims to facilitate knowledge-sharing between BIMe Members/Volunteers and the wider community. The Knowledge Sharing Project will achieve its aims through:

- Releasing all components through the **Knowledge Object Library** – a list on [BIMexcellence.org](http://BIMexcellence.org);
- Releasing all products through the **Product Library**;
- Publication of research activities through blog posts, videos and social media;
- Publication of research findings through peer-reviewed papers;
- Translation of BIMe Initiative deliverables into multiple languages; and
- Delivering presentations at organisations, academic institutions and international fora.

The Knowledge Sharing Project started informally in October 2005 through the [BIM ThinkSpace blog](#) and extended in December 2013 through the [BIM Framework Blog](#). All knowledge-sharing efforts – through any medium – are conducted as part of this project.

## C | Competency Development Project

**Description:** This project aims to assess and develop the digital competency of individual practitioners in different markets using (1) an inventory of **Competency Items**; (2) a dedicated **online assessment module**; and (3) a tailored **assessment and benchmarking methodology**. This project is intended to enable 'big data' analytics and the generation/comparison of competency benchmarks across countries.

A number of Competency Development micro projects are planned with international collaborators. The first of these projects is currently underway in Qatar by ChangeAgents AEC in collaboration with Qatar University and Teesside University: "*Development and application of a novel and integrated performance driven approach for assessing, benchmarking, and improving BIM Competency of Qatar's construction industry practitioners* (NPRP9-124-2-062)". This three-year project is funded by **Qatar's National Research Fund** (QNRF) and has been awarded on November 2016.

## D | Performance Improvement Project

**Description:** This project aims to assist Design, Construction, and Operation (DCO) organisations in assessing and developing their BIM Capability/Maturity. The project will deliver technology-focused organisational strategies, implementation guides and - innovative, lean, and agile - processes.

## E | Macro Adoption Project

**Description:** This project aims to assist policy makers to develop (and assess) the macro BIM diffusion policies, strategies and plans within their respective markets.

The Macro Adoption Project is led by AProf. Mohamad Kassem with potential participants from outside the BIMe Initiative Network. Project deliverables include: an online **Macro BIM Assessment Module**; an international **Macro BIM Adoption Benchmark**; and a **Macro BIM Adoption Guide**.

The Macro Adoption Project is based on three years of research with four peer-reviewed papers published to date. The project expanded **mid-2017** with the signing of collaboration agreements with international partners.



## F | Integrated Information Project

**Description:** This project aims to deliver an intuitive online solution for managing **Structured Information** throughout a project's life cycle. It is composed of a large number of Micro Projects leading to the:

- Development of an integrated information framework;
- Development of information assessment indices;
- Generation of information exchange workflows;
- Development of verification and validation routines;
- Collation of Model Use information modules; and
- Generation of learning materials.

Foundational work for this project started in February 2016.

## IX. New Projects - Announcements

New BIMe Initiative Projects will be publicly announced through [BIMexcellence.org](http://BIMexcellence.org) and relevant social media. Announcements are typically made once a project reaches Step B1 - Exploration.

## X. More Info

To join the BIMe Initiative, please complete the online [Membership Application Form](#). Alternatively, to stay informed of the Initiative's main activities, new tools and publications, please subscribe to the [Mailing List](#) and/or follow [@BIMeInitiative](#) on Twitter. To request more information, suggest an improvement or simply get in touch, please [Contact Us](#); thank you.

## XI. License to use

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## XII. Change Log

VERSION	DATE	DESCRIPTION
0.1	Jul 29, 2016	Initial draft - 1 <sup>st</sup> Cycle Limited Peer Review
0.2-0.3	Aug 9-22, 2016	Minor changes; 2 <sup>nd</sup> Cycle Peer Review
0.4	Sep 5, 2016	Major changes incl. project/component numbering system + new diagram
0.5	Jan 10, 2017	Project numbering updated; new diagram; aligned with other 100 Series documents
1.0	Jan 18, 2017	First Official Version for release through BIMexcellence.org
1.1	Jun 8, 2017	Introduced Role Classes + added new project + changed project numbering
1.2	Jan 18, 2018	Updated project numbering system