Logan International Airport

**BIM/VDC on TAA Projects:**

- Direct Tenant TAA Projects
- Third Party Development Properties

Massachusetts Port Authority

Capital Programs & Environmental Affairs
Preface

Massport appreciates the investment made by tenants in its facilities, and is committed to doing everything possible to support the investment of our tenant partners in the built environment we share. Tenants are encouraged to establish ongoing communication with Massport staff during their projects’ design and construction phases, to help ensure that project information complies with Massport’s design and construction criteria and standards. This information supports Massport’s goal to create digital information on its facilities and assets.

This addendum covers the TAA project deliverables with additional information concerning Building Information Modeling (BIM) tools and methods to develop project design and construction documentation. It does not conflict with the requirements as defined in the 2016 Guide to Tenant Construction.

1 Introduction to BIM/VDC Use and Resources

Massport is committed to implementing Building Information Modeling (BIM) and Virtual Design and Construction (VDC) processes on most projects throughout its facilities. BIM is a 3D model-based process that replaces 2D CAD for developing design and construction documentation. When used successfully, BIM achieves higher quality projects, better visualization with fewer errors, and standardized information that is more coordinated and reliable. The information created during a BIM project, can be re-purposed for operations and facility management. This information helps Massport and tenants better operate and manage our joint facilities, reducing costs for post construction turnover to Massport.

Most architects and engineers already use BIM, given the benefits to their practice. If you are reviewing 3D renderings, animations, and 3D construction views, then your designer is probably using BIM software.

For some TAA projects, Massport will require BIM and VDC use. A BIM/VDC Project Decision Matrix has been developed and included in this document to help you determine whether BIM is required, recommended, or unnecessary on your project.

If BIM is required on your TAA project, there is help from Massport through the Design Technologies Integration Group (DTIG) and the TAA representative for the project.

1.1 The Massport Design Technology Integration Group (DTIG)

The DTIG is responsible for BIM, templates, submittal standards and related technology and information used for projects at Massport. This group is available to answer questions concerning BIM use for Massport projects.

1.1.1 Your Massport TAA contact will provide DTIG contact information.

Capital Programs Department Massachusetts Port Authority
One Harborside Drive, Suite 200S
East Boston, MA 02128
Telephone: (617) 561-1851
1.2 Massport BIM Guidelines for Vertical and Horizontal Construction.

Massport has developed BIM Guidelines to be used by architects and contractors on Massport projects. If you would like to learn more about Massport’s BIM Guidelines, please visit the Massport Capital Improvements Important Documents page at:

http://www.massport.com/massport/business/capital-improvements/important-documents/

2 The TAA BIM/VDC Project Decision Matrix

Full TAA projects may require BIM use. Massport has developed a BIM/VDC Project Decision Matrix included herein which includes project types, definition, registration, TAA, deposit requirements, and BIM use.

Also to be considered are the two (2) main lease types that TAA projects are categorized under, which are Direct Leases and 3rd Party Leases. Included is a Project Decision Matrix for either type.


Other factors considered when determining if a project should be developed in BIM include:

- Internal projects of sufficient complexity as to impact building systems, specifically mechanical, plumbing, and electrical and lighting systems
- Visual impact of the space on the facility and surrounding spaces – commercial, food, and retail spaces conveying the Massport aesthetic goals for the traveler experience
- Projects which impact security and passenger flow
- Extensive rework of existing spaces – internal and external shell modifications

If there is a question concerning BIM and VDC use, it is recommended that you consult with the DTIG and your design team to determine BIM value and requirements for your review and submission process.
## Project Decision Matrix: Appendix ‘A1’ – Direct Tenant TAA Projects

See BIMxP Template for Appendix ‘A1’: Direct Tenant TAA Projects

### BIM/VDC Project Decision Matrix - Appendix A1: Direct Tenant TAA Projects

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>BIM Requirement</th>
<th>Notes and Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Building Alteration (Work Done to Existing Buildings)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Exterior alterations to building    | Roof replacement; new wall panels; new or replacement windows; canopies, awnings or other new building elements | Yes                      | BIM if there is significant change to the building exterior. **BIM Uses:**  
• Existing Conditions Model  
• New Building Elements |
| Interior alterations to building    | Interior fit-outs which may include repartitioning, installation or renovation of MEP (mechanical, electrical, plumbing) systems, structural changes, finishes and furniture or other components. | Yes BIMxP Record Model    | BIM for MEP - Specifically mechanical, plumbing, electrical and fire protection - to capture major building systems and connection points to the existing building systems. |
| **Equipment and Systems**           | | | |
| Installation of new standalone systems | Electrical, mechanical, plumbing/gas, HVAC, telecommunications, security, fueling or other complete systems or individual components OR replacement of individual components of the above systems | Yes                      | BIM for complete system redesign and changes. No BIM for equipment replacement. |
| **New Construction**                | | | |
| New Buildings                       | All Single or Multi-phased                                                 | Yes BIMxP Record Model   | BIM for:  
• Architectural  
• Building Systems  
• Utilities and Connections |
| **Horizontal, Civil**               | | | |
| All Horizontal and Site Utility Replacement | Parking lots/paving; site grading; sidewalks; site utilities; maritime-repairs to docks and piling; Aprons | Yes                      | Civil 3D and 3D utility information is required to be in State Plane Coordinates (NAD 83) and modeled to show an accurate "Z" coordinate for underground utilities and surface features. |
| **Other**                           | | | |
| Building demolition, total or partial | Any                                                                       | No                       |  |
| Temporary Structures                | Including modular buildings, but not including construction trailers       | No                       |  |
| Signage                             | Ground-mounted identity signs; Building-mounted identity signs; wayfinding signs or sign systems (blade or flat-mounted, powered or not powered) | No                       |  |
# Project Decision Matrix: Appendix ‘B1’ – Third Party Development Properties

See BIMxP Template for Appendix ‘B1’: Third Party Development Properties

## BIM/VDC Project Decision Matrix - Appendix B1: Third Party Development Properties 2018

Massport reserves the right to modify the following guidelines as deemed necessary by project circumstances.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>BIM Requirement</th>
<th>Notes and Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Alteration (Work Done to Existing Buildings)</td>
<td>Small Repairs and Replacements: Architectural and finish repair/replace</td>
<td>No</td>
<td>BIM if there is significant change to the building exterior.</td>
</tr>
<tr>
<td></td>
<td>Roof Repairs and Replacements: Roof work</td>
<td>No</td>
<td>BIM Uses:</td>
</tr>
<tr>
<td></td>
<td>Exterior Alterations to Building: Wall panels; new windows locations; canopies, awnings or other new building elements</td>
<td>Yes</td>
<td>• Existing Conditions Model</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• New Building Elements</td>
</tr>
<tr>
<td></td>
<td>Interior Fitouts: Simple: Interior fit-outs involving re-partitioning and minor MEP work in finished space; office renovations that do not significantly alter the base building structural elements.</td>
<td>No</td>
<td>BIM for MEP – Specifically</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NEW Construction: All Single or Multi-phased</td>
</tr>
<tr>
<td></td>
<td>Complex: Interior fit-outs in raw space or fit-outs that require new and/or extensive renovation of MEP (mechanical, electrical, plumbing) or changes to the building structure would require a full TAA.</td>
<td>Yes</td>
<td>BIM for MEP - Specifically mechanical, plumbing, electrical and fire protection - to capture major building systems and connection points to the existing building systems.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RECORD Model:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Architectural</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Building Systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Utilities and Connections</td>
</tr>
<tr>
<td>Equipment and Systems</td>
<td>New Installation or Significant Modifications: Electrical, mechanical, plumbing/gas, HVAC, telecommunications, fueling or other complete systems or individual components</td>
<td>Yes</td>
<td>BIM for complete system redesign and changes. No BIM for equipment replacement.</td>
</tr>
<tr>
<td></td>
<td>Replacement or Minor Modifications: Replacement of individual components of above systems, or components or systems with minimal impact to the facility</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>New Construction</td>
<td>New Buildings: All Single or Multi-phased</td>
<td>Yes</td>
<td>BIM for:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Architectural</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Building Systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Utilities and Connections</td>
</tr>
<tr>
<td>Horizontal, Civil</td>
<td>Parking lots/paving; site grading; sidewalks; site utilities; maritime-repairs to docks and piling</td>
<td>Yes</td>
<td>Civil 3D and 3D utility information is required to be in State Plane Coordinates (NAD 83) and modeled to show an accurate “Z” coordinate for underground utilities and surface features.</td>
</tr>
<tr>
<td>Signs</td>
<td>Identity: Ground-mounted identity signs; Building-mounted identity signs; wayfinding or other functional signs (blade or flat-mounted), powered signs</td>
<td>Yes</td>
<td>As Part of an associated BIM Project, otherwise No</td>
</tr>
<tr>
<td></td>
<td>Others: 1) Wayfinding or other functional signs or sign systems; 2) New construction identity signs that are part of the base building review.</td>
<td>Yes</td>
<td>As Part of an associated BIM Project, otherwise No</td>
</tr>
<tr>
<td>Other</td>
<td>Demolition, Total or Partial: Any</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Temporary Structures: Including modular buildings, but not including construction trailers</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

(1) Projects that do not require a TAA will be registered using the Project Registration Process protocol. Registered projects must provide information including applicant name, architect name, contractor name, start and end dates, and description of the work. Copies of all jurisdictional permits which are legally required for the project must be submitted to Massport for record throughout the course of the project, and evidence of final signoff from the jurisdictional authorities must be provided at completion of the project.

(2) Projects that require a TAA will submit project data on the standard Tenant Alteration Application (TAA) form and provide a deposit as noted above; plans proceed through normal TAA process, including the issuance of a Massport Permit for Tenant Alteration.

(3) Record Document Deposits are collected for certain projects in order to assure the submittal of as-built documentation at the close of the project. If your project requires a deposit, contact the Manager of Tenant Alterations at jrevill@massport.com to obtain the deposit form and directive.
3 BIM/VDC on Projects

Building Information Modeling (BIM) and Virtual Design and Construction (VDC) are processes allowing teams to work in a collaborative manner on a digital or virtual model of the project. To facilitate this collaboration, basic information is required and documented for team and Massport use. This information is documented utilizing industry standards and forms developed by Massport.

3.1 BIM Authoring Software

Massport’s BIM Authoring tool is Autodesk Revit. Review the Massport resource page for Revit templates and the current version of Revit being used by Massport. Autodesk Civil 3D and AutoCAD are also used as the authoring tools for any site / civil and survey projects.

3.2 Massport Existing Conditions Documentation

Massport may provide existing documentation (Revit models, CAD files, PDF drawings) appropriate for the project location. This information shall be verified by the tenant prior to any design or construction.

3.3 Massport BIM Execution Plan

Massport’s BIM Execution Plan (BIMxP) was developed to standardize project data requirements and reporting on BIM projects. There are two (2) BIMxP templates developed for TAA projects:

- Appendix ‘A2’ for Direct Tenant TAA Projects
- Appendix ‘B2’ for Third Party Development Properties

The documents are available on the Massport Capital Improvements Important Documents page of the website at:

http://www.massport.com/massport/business/capital-improvements/important-documents/

The spreadsheet contains:

- Project Information – Responsible Parties Abbreviations
- Record Model Documentation - identifies the responsible party/company (R/P) of a design element and the level of development (LOD) for that element, per the MPA LOD guidelines (See Section 4.0 for LOD definitions)

3.4 Record Models and Trade As-Built Deliverables

The Revit (.rvt) model is considered a deliverable on BIM projects. All linked and associated models and any other file types used in project creation must be submitted along with the central model, and must be clearly named according to the MPA BIM Guidelines. Also, if laser scanning has been performed, associated point clouds must be submitted in a registered format, preferably Autodesk ReCap.

3.5 Record Drawings

PDF of record drawings shall be submitted. Refer to section 5.1 in this guide for PDF submittal standards.

3.6 Equipment Information

The following information is submitted for projects with new equipment for utilities, and major building systems

- Manufacturer of equipment
- Model and Serial Number
- Location - Actual room or location the asset resides
### 4 BIM Model and Drawing Standards

BIM uses a set of industry standards to identify the level of graphic and information development required on a project. This standard, developed through the BIMFORUM, is called Level of Development Specification Part I (LOD). A copy of the latest BIMFORUM LOD Specification is available on the BIMFORUM website: [http://bimforum.org/lod/](http://bimforum.org/lod/)

#### FUNDAMENTAL LOD DEFINITIONS

**BIMFORUM Revision: November 2017**

<table>
<thead>
<tr>
<th>Architectural</th>
<th>Structural</th>
<th>MEP/FP</th>
<th>LOD 100</th>
<th>LOD 200</th>
<th>LOD 300</th>
<th>LOD 350</th>
<th>LOD 400</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Architectural LOD 100" /></td>
<td><img src="image2" alt="Structural LOD 100" /></td>
<td>No Model</td>
<td>The Model Element may be graphically represented in the Model with a symbol or other generic representation, but does not satisfy the requirements for LOD 200. Information related to the Model Element (i.e. cost per square foot, tonnage of HVAC, etc.) can be derived from other Model Elements.</td>
<td>The Model Element is graphically represented within the Model as a generic system, object, or assembly with approximate quantities, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element.</td>
<td>The Model Element is graphically represented within the Model as a specific system, object or assembly in terms of quantity, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element.</td>
<td>The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of quantity, size, shape, location, orientation, and interfaces with other building systems. Non-graphic information may also be attached to the Model Element.</td>
<td>The Model Element is graphically represented within the Model as a specific system, object or assembly in terms of size, shape, location, quantity, and orientation with detailing, fabrication, assembly, and installation information. Non-graphic information may also be attached to the Model Element.</td>
</tr>
</tbody>
</table>
5 Project Review Models

5.1 TAA Model and PDF Submittal Guidelines:
The electronic files will be reviewed to verify that all the files meet all the Massport TAA guidelines. All Design/Record drawings that are not in compliance with these standards will be returned and resubmitted by the Tenant.

- Design Phase Submittal - Revit models, and individual PDF sheet files in their latest format.
- Record Files Submittal - Revit models, and individual PDF sheet files in their latest format.
- All record drawings require both a signature and stamp.
- File naming format for Revit file submissions: TAAXXXX_ARCH_20XX.rvt, TAAXXXX_MEP_20XX.rvt, TAAXXXX_STRUCTURE_20XX.rvt, where XXXX is the TAA number, ARCH/MEP/STRUCTURE etc. is the discipline, and 20XX is the Revit version year. NOTE: This is for record drawings only. Initial (design) TAAs will not yet have the TAA number assigned.
- All PDF files will be prepared at 300 DPI.
- All PDF submissions: PDF files of the construction documents / sheets within the model shall be submitted as individual files per sheet. PDF files must follow the MPA naming convention for internal archiving purposes and shall be named as follows: TAAXXXX-A101.pdf, and orientated to landscape.

5.2 Initiating Projects with Massport
When initiating a project with Massport, the project team should obtain the required MPA Revit templates from the Project Manager. BIM and related VDC technology is constantly changing and evolving. Be sure to always obtain the latest templates, families, and shared parameters at the start of each project from the MPA Project Manager.

- Revit Version: When requesting the Revit templates, please specify the version of Revit being used. MPA currently runs the latest version along with two (2) previous versions to help with flexibility.
- Families: Along with the Revit Template files, there will also be MPA Revit families for standard symbols and sheets.
- Shared Parameters: Shared parameters will also be included with the template package.
- Legibility: Drawings must be clear and legible.

5.2.1 Site / Civil Project Submissions
Massport uses Autodesk Civil 3D for all site/civil and underground utility projects. The information taken from these submissions will be utilized for the MPA GIS program. To ensure proper submission of the site/civil work, the Project Manager will supply the consultant with the MPA Site Civil base file containing the MPA GIS layering standards. These layering standards and geospatial location (NAD83) must be followed for incorporation into Massport’s compiled utility base maps for our various campuses. Please contact the Massport Design Technologies Integration Group (DTIG) at DTIG@massport.com for additional information and standards.

5.3 BIM / Revit Submittals
Massport has implemented Building Information Modeling (BIM) and Virtual Design and Construction (VDC) into how the Authority executes projects and develops information about its assets. As part of this process, Massport Capital Programs and Environmental Affairs Department developed a BIM Guidelines
for **Vertical and Horizontal Construction** for design, construction, and facilities professionals working on MPA projects.

- **Authorized Software:** The Authority uses the Autodesk Suite of tools for our BIM needs. This includes, but is not limited to: Revit, Civil 3D, Navisworks, ReCap, and Inventor. No other software applications will be accepted for final deliverables unless previously authorized in writing by a member of the Authority’s DTI group.
- **Template Files:** The Authority will provide a set of Revit Templates, along with associated families and shared parameters to set up the project, as stated above.

The goal of the BIM Guidelines is to assure consistency in VDC processes and BIM development from Massport’s various service providers across multiple types of projects.

### 5.4 As-Bid / Design BIM Deliverables

**Final 100% Design BIM Submittal**

The following submissions are to be delivered to the Authority via physical media:

- As-Designed Revit Architectural Model – centralized
- As-Designed Revit MEP/FP and Structural models
- Navisworks Files and associated clash reports (if available)
- Individual PDF files of the Construction Documents
- 2D AutoCAD files, exported from Revit, of blank floor plans
- Civil 3D files of all site, civil, and underground utility drawings

### 5.5 Final Record BIM Deliverables

**Final 100% Record BIM Submittal**

The following submissions are to be delivered to the Authority via physical media:

- The following submissions are to be delivered to the Authority via physical media:
- Record Revit Architectural Model – centralized
- As-Designed Revit MEP/FP and Structural models
- Record As-Built point cloud files, registered, rotated and elevated (if available)
- Record Federated Navisworks Model (if available)
- Trade Contractor / Sub Contractor Native Files (if available)
- Individual PDF files of the Construction Documents. Refer to section 5.1 in this guide for PDF submittal standards and file naming.

Please contact MPA DTIG (Design Technologies Integration Group) for Revit and/or CAD templates by email: DTIG@massport.com