Record Modeling Process and Specification

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What is a Record Model?

**Record Model:**
- Accurate representation of the physical conditions, environment, and assets of a facility
- At least include main architectural, structural, and MEP elements information
- Combination of different models created during the design and construction process

**Application:**
- Used for facility management
- Aid in permitting process
- Aid in future renovation
- Minimize the building turnover information and dispute
UW CERC Record Modeling research activities:

1) Sound Transit Partnership with UW CERC
   • Task 4: Record Modeling Template Language

2) “Record Model Deliverables” Consortia
   • A consortia of owners and contractors
   • Hosted by UW CERC in December 2016

UW CERC Record Modeling Research Team:
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Julie Angeley – UW CERC Assistant Director of Operations
1) Record Model Intent
   - Design-Intent
   - As-built Construction

2) Level of Development (LOD)

3) Responsible Party for Record Modeling Delivery
   - Design Team
   - Construction Team

4) Information Exchange & QA Process

Key Factors for Record Modeling Specification & Process
Discussion Areas:

1) **Model Requirements**
   - One or multiple models
   - Level of Development
   - Responsible Party
   - Model uses for current and future projects

2) **Mark-ups & Quality Assurance (QA) Process**
   - Roles & responsibilities
   - 3D Mark-ups

3) **Record Model Process**
   - Challenges of information exchange
   - Level of estimated effort
Model Requirements

<table>
<thead>
<tr>
<th>Organization</th>
<th>LOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>NASA</td>
<td>500</td>
</tr>
<tr>
<td>George Washington University</td>
<td>Per LOD Matrix (400)</td>
</tr>
<tr>
<td>University of South Florida</td>
<td>500</td>
</tr>
<tr>
<td>Western Michigan University</td>
<td>500</td>
</tr>
<tr>
<td>Naval Facilities Engineering Command</td>
<td>Per eOMSI Facility Data Workbook</td>
</tr>
<tr>
<td>Cleveland Clinic</td>
<td>LOD Matrix to be provided in BEP</td>
</tr>
<tr>
<td>Pennsylvania State University</td>
<td>Owner Specifies</td>
</tr>
<tr>
<td>Florida International University</td>
<td>300 for Record Model, 500 As-built Construction Model</td>
</tr>
<tr>
<td>The Ohio State University</td>
<td>300 for Record Model &amp; 400 for As-built Construction Models</td>
</tr>
<tr>
<td>Virginia Commonwealth University</td>
<td>Per VCU LOD Matrix (300)</td>
</tr>
<tr>
<td>Princeton University</td>
<td>Per LOD Matrix</td>
</tr>
<tr>
<td>Department of Veteran Affairs</td>
<td>Per VA Object Element Matrix</td>
</tr>
<tr>
<td>Smithsonian Institute</td>
<td>350 is suggested for Record Model</td>
</tr>
<tr>
<td>Massachusetts Port Authority</td>
<td>300 for Record Model, and 350 for As-built Construction Model</td>
</tr>
</tbody>
</table>

Two typical types of modeling in current industry practices:

1) As-built Construction Record Model
   - High LOD for the Record Model
   - Construction Team delivers the Record Model

2) Design Intent Record Model
   - An As-built Construction Model for archival is also required
   - Low LOD for Design-Intent Record Model
   - High LOD for As-built Construction Model
   - Design team delivers Design-Intent Record Model
   - Construction team delivers As-built Construction Model
Recommendations:

- Model deliverables should reflect current owner needs
- Use two models today due to legal, organizational and technological limitations
- Specify different LODs:
  - Low LOD for Design-Intent Record Model (300 was suggested)
  - High LOD for As-built Construction Model (500 was suggested)
- Plan for one model in future
- Owners should specify disciplinary scopes and models
- Bring subcontractors in during design phase to clarify model needs
- Consider project delivery methods when determining modeling roles and responsibilities
Recommendations:

- Use the latest technological tools and methods for creating 3D mark-up views
- Consider Master Mark-up Model
- Explore connections between the QA mark-up processes
- The contract should clarify QA roles and responsibilities
As-built Construction Model

2D plan & 3D View Mark-ups

Design-Intent Record Model

Archived

Design Model

Start of construction

Design Support During Construction Process

Des Model updated per design changes

Design Model

End of construction

Design Model updated per field changes

Design-Intent Record Model

2D plan & 3D model view mark-ups created per field changes

As-built Construction Model

Shop/Fabrication Models Created

Shop/Fabrication Models updated per design changes

Shop/Fabrication Models updated per design changes

2D plan & 3D model view mark-ups created per field changes

Keep Updated

Design-Intent Record Model

As-built Construction Model

2D plan & 3D View Mark-ups

Archived

Design Model

Start of construction

Design Support During Construction Process

Des Model updated per design changes

Design Model

End of construction

Design Model updated per field changes

Design-Intent Record Model

2D plan & 3D model view mark-ups created per field changes

As-built Construction Model

Shop/Fabrication Models Created

Shop/Fabrication Models updated per design changes

Shop/Fabrication Models updated per design changes

2D plan & 3D model view mark-ups created per field changes

Keep Updated

Design-Intent Record Model

As-built Construction Model

2D plan & 3D View Mark-ups

Archived
Recommendations:

- Use clear contract language to set expectations
- Set milestones in the BIM PxP
- Anticipate the estimated effort for architect and contractor
  - For design team, adding interim data exchange milestones will add to their estimated effort
  - For contractors, these interim exchanges will not add as much work, but can be added into their fees
Any questions?