DES BIM4I

OCT 2026

Implementation Roadmap

The Division of Engineering Services (DES) started the BIM4I journey in 2020 when the Caltrans BIM for Bridges and Structures committee was established. In 2022, the DES BIM Branch was created to start advancing foundational activities to build BIM capabilities through pilot projects. This roadmap has been prepared to describe the DES approach to BIM4I deployment, and it is being coordinated with the Caltrans BIM4I Program efforts. To manage the pace of change, DES BIM4I deployment will use a phased approach increasing the complexity of project types and use cases over time. This roadmap is based on the Caltrans BIM4I Implementation Plan dated April 2023 and will be updated periodically.

Establish Plans, Programs and Strategies

- Establish Implementation Plan
- Expand Pilot Project Program
- Establish Communication Plan
- Establish Engagement Plan
- Establish Change Management Plan

JANUARY **2025**

Establish Policies & Procedures

Standardize Practices, Procedures & Guidelines

- Policies, Procedures, Guidelines
- Information Requirements
- Information Standards
- BIM Standards and Templates
- Capability Building
- Tools and Technologies

2025

HQ Implements DABs & Database GIS App

HQ Selects CDE for Implementation

Implementation Priority 1

USE CASES:
DA, 3DC, CPP, QTO, DR, B2F

2026

HQ Launches Refined PD Process

HQ Uses 3D Visualization Statewide

HQ Strengthens UAS

JULY **2026**

Deploy During Predevelopment

Implementation Priority 2

USE CASES:
ECM, DA, 3DC, CPP, QTO, DR

Implementation Priority 3

USE CASES:
ECM, DA, VIZ, DR

Implementation Priority 4

USE CASES:
DA, 3DC, CPP, QTO, CA, DR

Implementation Priority 5

USE CASES:
B2F, FMT, CPP, ACM

2027

HQ Implements full PIMs for Contracts

HQ Adopts for Concrete Structures Projects

HQ Integrates Ebid

JANUARY **2028**

Deploy through Final Design

2028

HQ Adopts 4D & 5D

HQ Implements Enterprise CDE

HQ Expands Implementation for all Structure Types

2029

JULY **2029**

Deploy through Construction

DECEMBER **2029**

Report to Legislature

Implementation Priority 6

USE CASES:
SE, D2M, SIM, SA, AM, RM

2030

- California Assembly Bill 1037 (2022) requirements
- DES BIM4I Milestone - Proposed
- BIM4I Implementation Plan - dated April 2023

BIM4I Use Cases

DES Groups	Primary Use Cases								Secondary Use Cases				Tertiary Use Cases				
	ECM	DA	DR	PP	3DC	QTO	B2F	VIZ	CPP	FMT	SE	ACM	RM	SIM	SA	D2M	AM
BD	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	
OSFP	●	●	●	●	●	●	●	●	●						●	●	
OPPI	●	●	●	●	●												
SOE			●		●	●	●										
ODTS		●	●		●	●	●										
OTA		●	●	●	●	●	●	●			●	●	●				
OEMWW		●	●	●	●	●	●										
OEEAR			●		●										●		
GS		●	●	●	●		●						●				
PPMOE																	
METS			●		●	●	●			●							
SC		●	●		●		●		●	●	●		●	●			
SM&I		●	●	●	●	●	●				●		●			●	●

DES Groups

- Bridge Design (BD)
  - Office of Photogrammetry and Preliminary Investigation (OPPI)
  - Office of Bridge Design (OBD)
  - Structure Office Engineer (SOE)
- Structures and Engineering Services (SES)
  - Office of Transportation Architecture (OTA)
  - Office of Electrical, Mechanical, Water, and Wastewater (OEMWW)
  - Office of Earthquake, Engineering, Analysis, and Research (OEEAR)
  - Office of Design Technical Services (ODTS)
  - Office of Special Funded Projects (OSFP)
- Geotechnical Services (GS)
- Program/Project Management and Office Engineer (PPMOE)
- Material Engineering and Testing Services (METS)
- Structure Construction (SC)
- Structure Maintenance & Investigation (SM&I)
- Quality Management (QM)

Implementation Priorities (by project type)

Priority 1

- Structural culverts
- Retaining walls (conventional)
- Single span concrete bridges

Priority 2

- Single span steel bridges
- Retaining walls (non-gravity)

Priority 3

- Multi-span bridges (small)

Priority 4

- Superstructure replacements
- TA (buried structures)

Priority 5

- Multi-span bridges (large)
- TA (small buildings)

Priority 6

- Complex structures
- TA (large buildings)
- Tunnels

BIM4I Use Cases

Primary Use Cases

ECM — Existing Conditions Modeling
The process of modeling the existing conditions for a project or site using 3D survey technologies

DA — Design Authoring
The process of using a 3D modeling tool to create a project information model (PIM) to communicate design intent for construction

DR — Design Review
The process of using a PIM and 3D model review software to evaluate compliance against design and constructibility criteria

PP — Plan Production
The process of deriving contractual plans directly from the PIM. The plans are a true representation of the model design intent

3DC — 3D Coordination
The process of using multi-disciplinary 3D models to avoid clashes, coordinate clashes detected, and identify potential field conflictst

QTO — Quantity Take Off
The process of extracting quantities directly from 2D and 3D models for project cost estimation. Cost analysis/estimation is implied to be part of this use case

B2F — Digital Layout - BIM 2 Field
The process of transferring BIM data to digital layout tools for enabling the use of construction automation equipment; and to assist with field verification tasks

VIZ — Visualization
Visualize design intent and constructibility

Secondary Use Cases

CPP — Construction Phase Planning
The process of connecting the PIM to a critical path method (CPM) schedule to simulate sequence of construction (4D modeling)

FMT — Field & Material Tracking
The process of connecting the PIM to the delivery of materials for tracking progress towards completion and payment

SE — Sustainability Evaluation
The process of using a PIM to analyze environmental impacts

ACM — As Constructed Modeling
The process of updating the design model to represent the accepted as-built conditions. This model is NOT a contractual deliverable

Tertiary Use Cases

RM — Record Modeling
The process of updating the design model to represent the accepted as-built conditions. This model is a contractual deliverable

SA — Structural Analysis
The process of using a model to analyze and simulate structural performance

SIM — Simulation
The process of using a model simulation to evaluate design alternatives, performance optimization, construction safety, etc.

D2M — Design to Maintenance Analysis
The process of connecting design data to maintenance strategies

AM — Asset Management
The process of using 3D models in an enterprise asset management system to assist with the maintenance and operation of existing assets

ISO Standards



Figure Notes

AIM: Asset Information Model

PIM: Project Information Model

- **A** Start of Caltrans Delivery Phase (K-2): Transfer relevant information from AIM to PIM, and start progressive development of design intent model authorized for bidding and construction of the project
- **B** Start of Caltrans Construction Phase (3): Create construction contract deliverables and prepare digital files for field Structure Construction personnel
- **C** End of Caltrans Construction Phase (3): Update PIM to capture as-accepted digital record as-built model of the structure
- **D** Start of Caltrans Operations and Maintenance Phase: Transfer relevant information from PIM to AIM and update AIM as Structure Maintenance & Investigation activities take place

Training Categories

General BIM Knowledge

BIM Fundamentals

- Core concepts and principles of BIM
- BIM terminology and key industry standards (ISO 19650, FHWA, AASHTO guidelines, IFC)
- Benefits of BIM across the project and asset lifecycle (planning, design, construction, operations, maintenance)

Common Data Environment (CDE) Basics

Introduction to collaboration through the selected CDE

DES BIM4I Guidance & Procedures

- Overview of DES BIM policies, strategies and objectives
- BIM roles and responsibilities
- BIM use cases and their implementation in DES projects
- Alignment with HQs implementation plan

Procedures, Guidance BIM use Training

1. Model development and management
2. Production methods and procedures
3. Applying BIM standards (CAD standards and libraries, LOD, attribution)
4. Quality management & compliance

Technical Support

1. Establish DES BIM4I Technology Support Team
2. Update policies and procedures to enable BIM4I
3. Create and maintain production templates and libraries for project use
4. Establish supporting tools and platforms
5. Assist subdivisions to develop role-specific trainings
6. Oversee phased adoption and monitor performance

