SECTION 34

DOCUMENTATION

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34.12.2 Survey Drawings.....

- Effect of the aspect on the design and on other trades
- Effects on users, maintenance, access, life of plant, energy efficiency, cost
- Effects on future reallocation of the space / system etc.
- Recommended solution to the issue

A Non-Conformance register is to be maintained by the Consultant and the details of each request

34.4.2 Information Requests

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34.5.5

Operation & Maintenance Manual		:	:	;	:	;	
Building Design Report		;	:	;	;	;	
Safe Design Report		;	:	;	;	;	

34.7 RECORD DOCUMENTS - AS BUILTS

34.7.1 General

This section outlines the minimum requirements for Record Documents and Record Models.

For the purpose of this section, the terms building record, record drawings, as built, and as constructed are synonymous.

34.7.2 Record Model

Unless specified otherwise, the contract conditions shall enforce the delivery of a Record Model for any building work carried out for the University. This applies to new buildings and renovations.

JCU requires Record Models to be Autodesk Revit Building Information Models (BIM).

The Record Model may be considered as a subset of the "As Constructed" documentation for the explicit purpose of facilities management. The Record Model becomes the base information for the ongoing planning, financial management, operation and maintenance of the facility.

The project team is responsible for the creation, development and supply of a Record Model.

The level of development (LOD) of the Record Model shall be defined in the project specific BIM Management Plan (BMP) and form part of the Contract.

Refer to the JCU Organisational BIM Management Plan to establish starting point for individual projects.

34.7.3 Building Record Deliverables

The complete list of final drawing deliverables are unique to each project, and shall be defined in the Contract. Typically, at each project milestone, James Cook University requires the delivery of the current model, electronic versions of hardcopy submissions and other files that support the intent of the project.

Mandatory deliverables are listed in the following table.

Deliverable	Responsible Party	Quantity	Format	Due Date
Interim BIM Model – All disciplines as per project plan	Principal Consultant	1 set	.rvt	3-6 months prior to Practical Completion
Operations & Maintenance Manuals	Principal Consultant All disciplines	1 set	.pdf/paper	At Practical Completion
Certificate of Classification	Principal Consultant	1 set	.pdf	At Practical Completion
Other certification documents and dossiers (e.g. Hazardous Areas Classification)	Principal Consultant All disciplines	1 set	.pdf	At Practical Completion
As-Built Services	Principal Consultant All disciplines	1 set	.rvt/.dwg/.pdf/paper	At Practical Completion

Minimum information required to prepare the Emergency Evacuation Signs:

- Emergency evacuation sign mounting locations
- Main path of egress
- Path of exit
- Emergency evacuation point
- Emergency exit
- Fire hose reel
- Manual call point
- Fire indicator panel
- Warden intercom
- First aid
- Switchboard
- Hydrant
- Fire extinguisher
- Gas isolation
- Zoning

Other building features relating to the fire and emergency design solution

34.9 OPERATING AND MAINTENANCE MANUALS

Details of the requirements for Operations and Maintenance Manuals are given in each section of these Design Guidelines, generally under point XX.3.6.6.

In addition to the O&M Manuals, plant and equipment shall be modelled (BIM) to the level of Development as specified in the BIM Management Plan. Each item shall include attributes that capture make, model and serial number in the model.

34.10 BIM STANDARDS

34.10.1 General

34.10.2 Methodology

The project team shall refer to the NATSPEC National BIM Guide and its supporting documents to establish the implementation of BIM on each project.

Hyperlink: http://bim.natspec.org/

A Project BIM Brief shall be prepared for each project by Estate Office. This shall form part of the project brief.

A BIM Management Plan (BMP), otherwise known as a BIM Execution Plan (BEP) shall be prepared for each project by the project manager. The BMP is a formal document that defines how the

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- Energy Analysis
- Lighting Analysis
- Mechanical Analysis
- Sustainability Evaluation
- Disaster Planning
- Existing Conditions Modelling
- Site Analysis
- Design Authoring
- Design Reviews
- Programming
- design review in regard to spatial requirements
- Cost Estimation
- Code Validation
- Engineering Analysis
- 3D Coordination (Design)
- Structural Analysis
- Phase Planning (4D Modelling)
- 3D Coordination (Construction)
- Clash detection

34.10.4 Model Development Methodology

Models may be created and developed over a staged process that is suitable to support the required project outcomes. This methodology shall be defined and recorded in the BMP.

The selected overall model development category may be adjusted to accommodate a specific project or University use.

Four categories of model development are described as follows:

	Model Development Category
I:	This model will support project planning through space and volume illustration, adjacencies, and site positioning.
II:	This model will include a sufficient level of development to support document and system review, clash detection and coordination, and support a built format for Owner use after completion. If no Model Development Category (“MDC”) is identified, then MDC II will apply.
III:	This model will include all the benefits and requirements of the early model categories, and will provide sufficient detail to support a detailed model development of systems supporting building occupancy and facility management.
IV:	This model will include the benefits and requirements of the earlier model categories, and support highly detailed logistical, scheduling, and estimating efforts.

34.10.5 Level of Development (LOD)

The level of development for each model component is based on the model content criteria established by AIA Document E202, Building Information Modeling Protocol Exhibit.

Hyperlink:

Refer to the following example table showing levels of development for specific building systems.

Fixed Furnishings	100	200	300	400
Site Improvements	100	200	200	300
Roadways	100	200	200	300
Parking	100	200	200	300
Footpaths	100	200	200	300
Landscaping	0	100	100	200
Irrigation	0	100	200	200

The model categories should be reviewed together with the JCU

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	Arial 7.0mm
Room Tag	JCU Standard Room Tag
Area schedules	
Shared parameter file	File name here
Common/standard family components	Refer resources.
BIM Bulletin view	
Geo-referenced site plan	Townsville, Cairns, Singapore

Model naming conventions

FILE NAME CONVENTION FOR MODELS	
DISCIPLINE-PROJECT NUMBER-BUILDING NUMBER-REVISION.rvt (example: ARCH-11111-BL001-REVA.xyz)	
ARCHITECTURAL MODEL	ARCH
CIVIL MODEL	CIVI
MECHANICAL MODEL	MECH
HYDRAULIC MODEL	HYDR
ELECTRICAL MODEL	ELEC
STRUCTURAL MODEL	STRUC
ENERGY MODEL	ENER
CONSTRUCTION MODEL	CONS
COORDINATION MODEL	

34.10.11 Object property/parameter

Components shall include the following basic attribute parameters regardless of graphical development level.

Attribute Table
Description
Manufacturer
Model
Serial Number
Asset tag number
Condition
Installation date
Expiry date
Warranty expiry date
NPWC Code

34.12 GEOGRAPHIC INFORMATION SYSTEM (GIS)

34.12.1 General

The university's GIS solution is comprised of the following elements:

- Oracle Spatial Relational Database Management System
- AutoCAD Map3D and AutoCAD Civil3D
-

34.12.4 Water and Chilled Water Networks

The topologies for the water networks should be captured to enable network tracing. This includes pipe locations, sizes, flow direction, and connectivity with valves and junctions (where possible). Chilled Water and Water assets shall be captured and attributes documented using the information structure defined in the following tables.

Points:

NODE_TYPE	NODE_ELEV

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Electricity Points:

NODE_TYPE	NODE_DESC	NODE_REF	COMMENTS	MEX_REF	CAPACITY
TRANSFORME	WESTERN COURTS	US45			750

Electricity Lines:

CBL_SIZE	CBL_MATRL	START_TYPE	END_TYPE

34.12.9 Services Drawing Layers

Layers shall be organised as:

Name	Description/Use
0	(System layer)
BLOCK	(System layer)
BUILDING	Building outlines
CMSNOTE	Cadastral notes
COMMS_CONDUITS	Communications
COMMS_PITS	
CONTOURS	Topographic contours
DAM	Dams
DELETED	(System layer)
DMSLABEL_CHANNEL	Stormwater drainage
DMSLABEL_CULVERT	
DMSLABEL_PIPE	
EASELINE_	Easements
EASELINE_ELECTRIC	
EASELINE_GENERAL	
EASELINE_LEASE	
EASELINE_RAILWAY	
EASELINE_RESERVE	
EASELINE_ROAD	
EASELINE_SEWER	

ELNODE_AIRLINK	
ELNODE_BILLBOARD	
ELNODE_DB	
ELNODE_HV_JUNCTION	
ELNODE_KIOSK	
ELNODE_LV_JUNCTION	
ELNODE_MINI_SUB	
ELNODE_POLE	
ELNODE_PYLON	
ELNODE_SL_JUNCTION	
ELNODE_STANDARD_SUB	
ELNODE_STRLIGHT_POLE	
ELNODE_SWITCH_STATION	
ELNODE_TRANSFORMER	
ELNOTE_DIM	
ELNOTE_TEXT	
ELSERV_SC_OH	
ELSERV_SC_UG	
ELZONE	
FLOODLINE	Flood line

SPORTSFIELDS	Sportsfields
SUBURB	Cadastral
SURVEY_MARKS	Topographic survey marks
SWCATCH	Stormwater
SWCHANNEL	
SWCULVERT	
SWDIM	
SWNODE	
SWNOTE	
SWNOTE_NOTE_TYPE_DIM	
SWNOTE_NOTE_TYPE_TEXT	

TP_ZONING_SAR	
TP_ZONING_SPECIAL	
TP_ZONING_UNKNOWN	
TREES	Trees
WARD	Cadastral
WATDIM_POTABLE	Water
WATDIMNOTE_POTABLE	
WATLABEL_ABANDON	
WATLABEL_POTABLE	
WATLABEL_RAW	
WATNODE_	
WATNODE_ABANDON	
WATNODE_POTABLE	
WATNODE_RAW	
WATNOTE_POTABLE	
WATPIPE_	
WATPIPE_ABANDON	
WATPIPE_CHILLWR	
WATPIPE_CHILLWS	
WATPIPE_POTABLE	
WATPIPE_RAW	
WATRESPIPE	
WATSERV_	
WATSERV_CHILLWR	
WATSERV_CHILLWS	
WATSERV_POTABLE	
WATSERV_RAW	
WATSYM_POTABLE	
WATZONE_POTABLE	

34.14 APPENDIX B - SHEET NUMBERING CONVENTION

Drawing sheets may be numbered using the following conventions:

[Discipline Designator][Type Designator][Sequence Number] - [Sheet Title]

Example: A101 - Site Plan

34.14.1 Discipline Designators

The following table indicates the primary (single) letter designations that may be used.

Designator	Name	Additional Description
	Cover Sheet	
G	General	Sheet list, symbols, code summary, etc.
H	Hazardous Materials	

34.14.2 Sheet Types

The Sheet Types designator takes the drawings of a single discipline and organises them.

Designator	Name
0	General: Symbol legend, abbreviations, general notes
1	Plans
2	Elevations
3	Sections
4	Large Scale Drawings: plans, elevations, sections, MCT details
5	Details
6	Schedules and Diagrams
7	User Defined
8	User Defined
9	3D drawings: isometric, perspective, photos
10	Space Data

34.14.3 Sequence Numbers

The final component of the sheet number is the two digit sequence number, which is between 01 and 99. The sequence numbers do not have to be sequential so that space may be left within the set for future additions.