

Rebecca David

From: Rebecca David
Sent: Thursday, 5 December 2019 10:20 AM
To: '@.com.au'
Cc: 'com.au'; Greg Wheeldon; Ashley Lowe; Mitchell Hamrey
Subject: DETA7001_State Secondary College - Learning Centre_CSA
Attachments: CSA 3180_00_Architecture_CN&CA (DETA7001).pdf

Importance: High

Please find attached Consultancy Service Agreement no. 3180 for Architectural Services for the above project.

Once you have read the document fully please forward the signed acknowledgement (page 3) via email.

Please ensure that the CSA no. 3180 and Project No. ZDETA7001 are on your invoice.

Invoices are to be emailed to accounts@paynters.com.au

Many Thanks

Rebecca David
Preconstruction Contracts Administrator

07 3368 5558
rebecca.david@paynters.com.au



CONSULTANCY SERVICE AGREEMENT

TO:		CS-AGREEMENT No.:	3180
		VERSION:	(Original Order)
ABN:		PROJECT REF:	ZDETA7001
		DATE:	5 December 2019
PROJECT:	[REDACTED] Y SSC LEARNING CENTRE		

SCOPE OF CONSULTANCY SERVICES

ARCHITECTURAL SERVICES

The consultant shall undertake the design and documentation of the **Architecture** elements for the proposed **design and construct of a new building and associated works at [REDACTED] State Secondary College.**

GENERAL NOTES

- The Consultant shall use Paynters Project Reference number on all correspondence relating to this project.
- The Consultant shall establish drawings and numbering standards to match the DET (BAS) Paynters Drawing Submission Guidelines and continue to maintain standards throughout all phases of the project.
- The Consultant shall check general compliance against the BCA, NCC and in particular AS 1428 and other accessibility requirements.
- The consultant shall regularly coordinate with other project consultants throughout all phases of the engagement and review their documentation to avoid discrepancies in documentation and clashes of on-site installed items of the various disciplines.
- The Consultant shall not change the project personnel without written prior approval from Paynters.
- The consultant shall attend all design meetings as required.
- Paynters will take and circulate all minutes of design meetings throughout all phases of the project.
- Paynters will manage all Client communications and Client project presentations throughout all phases of the project.
- The Consultant shall provide a Safety in Design Risk Analysis in the Paynters template format as required by the Safe Design of Structures Code of Practice 2013 and participate in a Safety in Design meeting with the whole of the project team.
- All travel, accommodation, printing and all other consumable disbursements are included in this agreement.
- Project Hold Points and Deliverable Milestones –
 - The Consultant shall prepare documentation so as to comply with the Hold Points on the project and shall not proceed to the next phase without prior approval from Paynters.

CN – TENDER AND CONSTRUCTION DOCUMENTATION

The consultant shall undertake the following tasks including but not limited to:

- Prepare construction documents sufficient for the calling of subcontract and supply tenders including, as appropriate, liaising with other specialist consultants.
- Prepare Building Approval documentation and other authorities controlling building documentation as an early works package (EWP) and a main building approval.
- Attend Client and Paynters Coordination Meetings during the documentation stages of the project as required.
- Supply copies of drawings to Paynters as they are produced and one (1) electronic copy of each drawing upon completion of the documentation stage of the project. One (1) electronic copy to be supplied if amended by the consultant.
- Preparation of a Technical Specification is not included within the commission. However, the consultant shall liaise with Paynters on matters requiring incorporation of technical information to allow the appropriate construction or installation of the item.

- Incorporate and coordinate information provided from other consultants highlighting discrepancies.
- Incorporate information and review documentation for issues relating to the BCA Section J assessment.
- Review design to meet project budget constraints.
- Attend Paynters Safety in Design Review Meeting.
- Review shop drawings prepared by consultants or subcontractors for non-conformances and omissions from architectural documentation.
- Where required by Paynters, subcontractors shall submit workshop drawings of items prepared for incorporation within the works.
- The consultant shall examine workshop drawings particular to the architecture discipline and either:
 - Reject.
 - Comment on, or request changes to.
 - Permit the subcontractor to use any shop drawings.
- Coordinate with other consultants and review their documentation to avoid discrepancies in documentation and clashes of on-site installed items of the various disciplines.
- Prepare drawings including, but not necessarily limited to:
 - Location Plan (1:100).
 - Site Plan (1:5001:200).
 - Floor Plans of each level (1:100).
 - Reflected Ceiling Plan of each level (1:100).
 - Elevations of each façade showing proposed finishes (1:100).
 - Elevations indicating proposed colours (1:100).
 - Sections through the building to show level relationships (1:100).
 - Detail sections sufficient to enable construction of the works (1:50/1:20).
 - Detail design of major items such as roof/wall connections, head and sill details, glazing details, flashings, stairs, awnings, joinery, etc.
 - Finishes schedule.
 - Fixture and fittings schedule.
 - Door and window schedule.
 - Hardware schedule.
- Provide sufficient documentation to allow refinement of Paynters firm price and construction of the works.
- Liaise with specialist consultants and incorporate any applicable requirements of other disciplines within the documentation prepared by the consultant.
- Examine the documentation prepared by specialist consultants to ensure that the documentation is consistent with the specialist consultant's brief and the documentation prepared by all other disciplines.
- Should documentation prepared by specialist consultants not be consistent with either the brief, the requirements of any other disciplines or the consultant's discipline documentation, then the consultant shall liaise with the specialist consultant and any other applicable consultants through the Paynters Design Manager to cause the documentation to be amended (if required) to be consistent with the brief and the requirements of the other disciplines.

CA – CONSTRUCTION AND COMMISSIONING SERVICES

The consultant shall undertake the following tasks including but not limited to:

- Attend Site Meetings called by the Project Manager as required.
- Review, comment, reject or permit the subcontractor to use the working drawings, together with any amendments.
- Use best endeavours to ensure that all work shall comply with Statutory Regulations, WorkCover requirements, Local Authorities, Australian Standards and any other authority bodies related to the works.
- Use best endeavours to ensure that all items covered in the Specifications and nominated by statutory authorities are incorporated in the works.
- Inspect and comment on quality when making site visits as requested by the Project Manager.

- Provide and maintain defects list as required to enable the Project Manager to ensure appropriate rectification is completed.
- Highlight any non-conforming items within the constructed works.
- Check and comment on the maintenance manuals and commissioning data for the project.
- Provide ongoing resolution of operational problems, disputes, etc. and assist the Project Manager.
- Attend contractor's handover with Client and Project Manager and assist the Client with their understanding of the operations of the equipment/systems and their maintenance obligations.
- Check Council/Authority approved documents if requested by the Project Manager, resolving any issues raised, and amending documents as required.
- Respond to Request for Information (RFI's).
- Review and mark-up of shop drawings submitted by the subcontractor to ensure compliance with the intended design.
- Assist with resolution of variation claims in relation to scope of work issues as required by the Project Manager.
- Provide quality control inspections, advice and reports as requested by the Project Manager.
- Periodic inspections, as requested by the Project Manager, of the works to ensure compliance with design documentation and quality requirements.
- Provide assistance with identification and correction of defects, commissioning and handover of the project.
- Provide certification to the Project Manager that the works relevant to the architectural content of the project has reached a stage of Practical Completion.
- Provide all necessary documentation including certification of the works necessary to achieve the Certificate of Classification (or other certification in order to allow lawful transfer of title and occupation) and participate in any discussions and presentations necessary to achieve and expedite the process.

EXCLUSIONS

- Payment of Statutory Fees and Charges

VARIATIONS TO SCOPE

Where Paynters request a change to the scope then either:

- negotiated fixed fee OR
- agreed hourly rates (Hourly rates shall remain fixed for the whole of the project life) for such works shall apply. Where hourly rates are to be charged the agreed rates are:

Resource	Hourly Rate (excl GST)
Architecture	\$220.00
Interior Design	\$180.00
BIM Project Management	\$180.00
Architectural Drafting	\$160.00
Interior Design Drafting	\$90.00
Administration	\$80.00

When submitting a claim for a variation to the scope of services (b) the Consultant shall provide a detailed breakdown including description of the works undertaken, the resources allocated, and their position and the number of hours worked.

BRIEF DOCUMENTS: Invitation to Submit a Proposal for Consultancy Services dated 18 October 2019 and tender documentation as issued via EstimateOne.

DURATION: The consultant shall undertake the design and documentation services in accordance with Paynters program or as otherwise directed by Paynters.

PAYNTERS DESIGN MANAGER: Greg Wheeldon

SPECIFIED PERSONNEL: [REDACTED]

ATTACHMENTS: Conditions of Consultancy Agreement, Consultancy Services Scope of Works plus Drawing Submission Guidelines and **returnable** Order Acknowledgement Form.

SPECIAL CONDITIONS: Nil

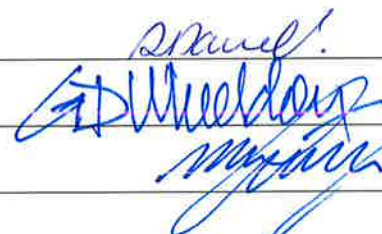
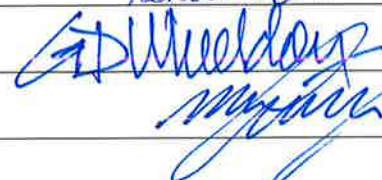
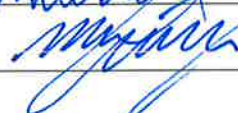
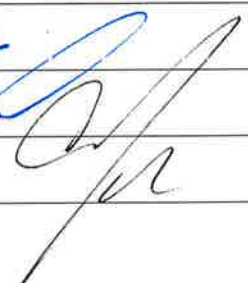
FEE PAYMENT: Refer to Clause 4.2 of the Conditions of Consultancy Agreement. The Consultant shall submit detailed breakdown by building and phase supporting their claim. Note that no payments shall be made until such time as the signed acknowledgement of Consultancy Service Agreement together with Certificates of Currency of Insurances have been provided to Paynters. Claims for Payment must be submitted to accounts@paynters.com.au .		
BASIS OF FEE CALCULATION: Fixed Fee		
The Consultancy Services are to be undertaken in Accordance with the conditions of Consultancy Agreement Attached. Commencement of the services will be deemed to be acceptance of this Consultancy Services Agreement.	CS AGREEMENT VALUE (Commitment to date)	(EX GST)

Preconstruction Contracts Administrator

Design Manager

Contracts Manager

Preconstruction Manager

**CONSULTANTS INSURANCE & BUSINESS PARTICULARS FORM TO BE RETURNED IMMEDIATELY
ACKNOWLEDGEMENT OF CONSULTANCY SERVICE AGREEMENT 3180
JOB REFERENCE ZDETA7001**

We acknowledge receipt of the Consultancy Services Agreement dated 5 December 2019 and we also authorise Paynters to obtain confirmation of the insurance details set out below from the nominated insurers.

Contractors Name: _____
Contact: _____ Phone No: _____
Postal Address: _____
Description of Business: _____

PROFESSIONAL INDEMNITY

Name of Insured: _____
Insurer: _____
Policy Number: _____ Expiry Date: _____
Limit of Indemnity: _____ Excess on Policy: _____

PUBLIC LIABILITY

Name of Insured: _____
Insurer: _____
Policy Number: _____ Expiry Date: _____
Limit of Indemnity: _____ Excess on Policy: _____
Extension Required: _____

- *Principal's indemnity nominating Paynters.*
- *Indemnity to Workers of Subcontractor.*

WORKCOVER QUEENSLAND INSURANCE *Note: Certificate of currency for WorkCover Queensland must accompany this form.*

Name of Insured: _____
Insurer: _____
Policy Number: _____ Expiry Date: _____
Limit of Indemnity: _____ Excess on Policy: _____
Common Law Limit (if not unlimited): _____

AUSTRALIAN BUSINESS NUMBER

ABN: _____

We certify that the above details are correct and up-to-date.

Representative: _____
Position: _____ Date: _____

Please note that the Acceptance of this Consultancy Services Agreement is conditional upon this information being provided to our satisfaction.

DETA7001 BURPENGARY STATE SECONDARY COLLEGE

ARCHITECTURAL CONSULTANCY SERVICES

SCOPE OF WORKS

1. COMMISSION OF SERVICES

All Consultants are to be commissioned for their services using Paynters Consultancy Services Agreement together with a copy of the Conditions of Consultancy Agreement.

All work, both design and/or subsequent construction, undertaken as part of this commission, shall be in accordance with the relevant parts of the Building Code of Australia, Queensland Building Act 1975-1992 and current amendments there with, Standard By-laws and current Codes and Standards.

We expect that Consultants shall at all times exercise reasonable skill, care and diligence in the performance of the brief in accordance with the ethics of their profession.

Where budgets are prepared and/or tenders assessed as part of this commission Paynters requires that these values remain confidential.

Any request for information from a third party should be referred to the Project Manager or Design Manager responsible for this project.

It is the responsibility of all consultants to obtain (where applicable), a copy of the Client's brief and to produce their documentation to reflect the most cost-effective building element that the brief calls for.

The Project Manager is responsible for the project once the Contract is signed.

Any alterations to the design or direct communications with the Client after the contract is signed should first be cleared through the Project Manager so that costs and overall construction implications can be monitored.

The Architect is the principal coordinating consultant and shall be responsible for all document and design coordination.

2. GENERAL NOTES

The following notes shall apply throughout all phases of the commission:

- The Consultant shall use Paynters Project Reference number on all correspondence relating to this project.
- The Consultant shall establish drawings and numbering standards to match the DET (BAS) - Paynters Drawing Submission Guidelines and continue to maintain standards throughout all phases of the project.
- The Consultant shall supply copies of drawings to Paynters in .DWG and .PDF format at intervals and upon completion of each stage.
- The Consultant shall check general compliance against the BCA, NCC and in particular AS 1428 and other accessibility requirements.
- The consultant shall regularly co-ordinate with other project consultants throughout all phases of the engagement and review their documentation to avoid discrepancies in documentation and clashes of on-site installed items of the various disciplines.
- The Consultant shall not change the project personnel without written prior approval from Paynters.
- The consultant shall include in its fees to attend all design meetings with authorities, consultants and relevant parties as required.
- Paynters will take and circulate all minutes of design meetings throughout all phases of the project.
- Paynters will manage all Client communications and Client project presentations throughout all phases of the project.
- The Consultant shall provide a Safety in Design Risk Analysis in the Paynters template format as required by the Safe Design of Structures Code of Practice 2013 and participate in a Safety in Design meeting with the whole of the project team.

- All travel, accommodation, printing and all other consumable disbursements are included in this agreement.
- Project Hold Points and Deliverable Milestones:
 - The Consultant shall prepare documentation so as to comply with the Hold Points on the project and shall not proceed to the next phase without prior approval from Paynters.

3. BUDGET

Preparation of budgets as nominated in the Conditions of Consultancy Agreement.

- At various times, consultants are to provide and warrant opinions of probable costs of the works for the disciplines covered by their commission to Paynters, for use in determining the contract sum with the Client. It is the responsibility of each consultant to ascertain the form of contract applicable and whether or not it is subject to Rise and Fall adjustment. This information must be given due consideration, together with the effects of market forces at the time, when preparing estimates.
- Where trade package Bills of Quantities are prepared, check and report on same for adherence to contract documents and intent, prior to trade Tenders closing.

4. CN – TENDER AND CONSTRUCTION DOCUMENTATION

- Prepare construction documents sufficient for the calling of subcontract and supply tenders including, as appropriate, liaising with other specialist consultants.
- Prepare Building Approval documentation and other authorities controlling building documentation as an early works package (EWP) and a main building approval.
- Attend Client and Paynters Coordination Meetings during the documentation stages of the project as required.
- Supply copies of drawings to Paynters as they are produced and one (1) electronic copy of each drawing upon completion of the documentation stage of the project. One (1) electronic copy to be supplied if amended by the consultant.
- Preparation of a Technical Specification is not included within the commission. However, the consultant shall liaise with Paynters on matters requiring incorporation of technical information to allow the appropriate construction or installation of the item.
- Incorporate and coordinate information provided from other consultants highlighting discrepancies.
- Incorporate information and review documentation for issues relating to the BCA Section J assessment.
- Review design to meet project budget constraints.
- Attend Paynters Safety in Design Review Meeting.
- Review shop drawings prepared by consultants or subcontractors for non-conformances and omissions from architectural documentation.
- Where required by Paynters, subcontractors shall submit workshop drawings of items prepared for incorporation within the works.
- The consultant shall examine workshop drawings particular to the architecture discipline and either:
 - Reject.
 - Comment on, or request changes to.
 - Permit the subcontractor to use any shop drawings.
- Coordinate with other consultants and review their documentation to avoid discrepancies in documentation and clashes of on-site installed items of the various disciplines.
- Prepare drawings including, but not necessarily limited to:
 - Location Plan (1:100).
 - Site Plan (1:500/1:200).
 - Floor Plans of each level (1:100).
 - Reflected Ceiling Plan of each level (1:100).
 - Elevations of each façade showing proposed finishes (1:100).
 - Elevations indicating proposed colours (1:100).
 - Sections through the building to show level relationships (1:100).
 - Detail sections sufficient to enable construction of the works (1:50/1:20).
 - Detail design of major items such as roof/wall connections, head and sill details, glazing details, flashings, stairs, awnings, joinery, etc.

- Finishes schedule.
- Fixture and fittings schedule.
- Door and window schedule.
- Hardware schedule.
- Provide sufficient documentation to allow refinement of Paynters firm price and construction of the works.
- Liaise with specialist consultants and incorporate any applicable requirements of other disciplines within the documentation prepared by the consultant.
- Examine the documentation prepared by specialist consultants to ensure that the documentation is consistent with the specialist consultant's brief and the documentation prepared by all other disciplines.
- Should documentation prepared by specialist consultants not be consistent with either the brief, the requirements of any other disciplines or the consultant's discipline documentation, then the consultant shall liaise with the specialist consultant and any other applicable consultants through the Paynters Design Manager to cause the documentation to be amended (if required) to be consistent with the brief and the requirements of the other disciplines.
- The consultant shall examine the design as it progresses for value management purposes including risk reduction, potential cost savings, improved efficiencies and minimization of potential problems.
- The consultant shall liaise with other consultants and incorporate any reasonably applicable requirements of other disciplines within the documentation prepared by the consultant.
- The consultant shall examine the documentation prepared by other consultants and ensure that the documentation is consistent with the documentation prepared by the consultant.
- Should the documentation prepared by other consultants not be consistent with documentation prepared by the consultant, the consultant shall liaise with the other consultants through Paynters Design Manager, to allow the documentation to be amended (if required) to be consistent with the brief and the requirements of the other disciplines.

5. CA - CONSTRUCTION AND COMMISSIONING SERVICES

The consultant is required within the scope of this commission to visit the site as required by Paynters and to:

- Attend Site Meetings called by the Project Manager as required.
- Review, comment, reject or permit the subcontractor to use the working drawings, together with any amendments.
- Use best endeavours to ensure that all work shall comply with Statutory Regulations, WorkCover requirements, Local Authorities, Australian Standards and any other authority bodies related to the works.
- Use best endeavours to ensure that all items covered in the Specifications and nominated by statutory authorities are incorporated in the works.
- Inspect and comment on quality when making site visits. Provide and maintain defects list as required to enable the Project Manager to ensure appropriate rectification is completed.
- Highlight any non-conforming items within the constructed works.
- Check and comment on the maintenance manuals and commissioning data for the project.
- Provide ongoing resolution of operational problems, disputes, etc. and assist the Project Manager.
- Attend contractor's handover with Client and Project Manager and assist the Client with their understanding of the operations of the equipment/systems and their maintenance obligations.
- Check Council/Authority approved documents if requested by the Project Manager, resolving any issues raised, and amending documents as required.
- Respond to Request for Information (RFI's).
- Review and mark-up of shop drawings submitted by the subcontractor to ensure compliance with the intended design.
- Assist with resolution of variation claims in relation to scope of work issues as required by the Project Manager.
- Provide quality control inspections, advice and reports as requested by the Project Manager.
- Periodic inspections of the works to ensure compliance with design documentation and quality requirements.

- Provide assistance with identification and correction of defects, commissioning and handover of the project.
- Provide certification to the Project Manager that the works relevant to the architectural content of the project has reached a stage of Practical Completion.
- Provide all necessary documentation including certification of the works necessary to achieve the Certificate of Classification (or other certification in order to allow lawful transfer of title and occupation) and participate in any discussions and presentations necessary to achieve and expedite the process.

6. AS BUILT DRAWINGS

Coordinate, review and amend drawings to represent any changes made during the construction process. Issue "As Built" drawings in hard copy, PDF and CAD format.

7. OTHER SERVICES

Any alterations, omissions or additional works required by Paynters to be undertaken to the documents will be documented by the Consultant in accordance with the Consultancy Services Agreement.

8. HIERARCHY OF DOCUMENTS

Should the consultant have submitted a proposal for works detailed in this Agreement and should conditions in this Agreement and the consultant's proposal conflict, then the conditions detailed in this Agreement shall prevail.

9. COMPLIANCE WITH AUTHORITY REQUIREMENTS

The design will comply with all legislation, subordinate legislation, relevant Australian Standards and requirements of Authorities applying to the works.

10. INVOICE OF SERVICES

All Invoices of Services must quote the Consultancy Services Agreement Number and the Job Reference. As a statutory requirement all Invoices must be designated as a "Tax Invoice", including ABN and addressed specifically to "Paynters Pty Ltd". Invoices shall only be accepted by email to accounts@paynters.com.au. Invoices emailed directly to individuals shall be rejected.

11. ELECTRONIC MAIL

Formal issue of documents shall be uploaded to the Paynters secure file sharing site with a notification to the Design/Project Manager and the Project Contracts Administrator. The responsibility of notification of drawings being available for collaboration and co-ordination shall be on Paynters. Notification shall be issued in the form of a transmittal issued from Paynters document management system.

Copyright of emailed information to be the responsibility of sender and receiver.

CONDITIONS OF CONSULTANCY AGREEMENT

1. Role of the Consultant

- 1.1 The Consultant acknowledges that it has the requisite skills and experience to provide the Services and acknowledges that Paynters has relied upon these skills and experience in appointing the Consultant.
- 1.2 The Consultant must perform the Services.
- 1.3 In performing the Services the Consultant must:
 - a) exercise proper skill and care in conformity with the highest standards of the profession of the Consultant.
 - b) use all reasonable efforts to inform itself of Paynters requirements (including, but not limited to cost, time, quality and the requirements referred to in clause 13) in relation to the Services and keep Paynters fully informed of the state and stages of performance of the Services;
 - c) have regard to the requirements of Paynters and advise Paynters of appropriate alternative designs available and make recommendations in relation to them;
 - d) comply with all reasonable directions given by Paynters;
 - e) carry out such investigations on the Project, including the physical characteristics of the Site, as are relevant to the Services and in doing so shall satisfy itself of the correctness of any information acquired as a result of carrying out such investigations or any information provided by Paynters;
 - f) be deemed to have adequate information to enable the Consultant to perform its obligations under this Agreement, unless the Consultant has notified Paynters to the contrary in a timely and adequate manner;
 - g) ensure that if the Services involve design work that the design is prepared with full regard to the Occupational Health and Safety issues relevant to the construction of the works the subject of the design and the ongoing maintenance of those works; and
 - h) in compliance with Paynters Quality Assurance Plan.
 - i) comply with Paynters site safety policy applicable to the site of the Project.
- 1.4 The Consultant is an independent contractor and not an employee or agent of Paynters and shall not bind or purport to bind Paynters.
- 1.5 The Consultant shall perform the Services within the period nominated by Paynters to the Consultant, and will immediately notify Paynters when it becomes apparent to the Consultant that delays may occur. To enable Paynters to monitor progress, the Consultant will provide Paynters with a program for the performance of the Services and will update this if necessary at reasonable intervals.

- 1.6 Should Paynters requirements change or the extent of the Services change or delays occur due to causes beyond the Consultants reasonable control, then the Consultant shall be entitled to a reasonable extension of time to complete its Services.
- 1.7 The Consultant must:
 - a) when requested, give to Paynters a forecast cost of the construction works the subject of the Services;
 - b) in giving the forecast cost referred to in (a) above, exercise the appropriate standard of care, skill, judgment and diligence and immediately notify Paynters when it becomes apparent to the Consultant that the cost of the construction works the subject of the Services may exceed the forecast cost; and
 - c) use its best endeavours to ensure that the cost to Paynters of the construction works the subject of the Services does not exceed the Approved Budget.

2. Role of Paynters

- 2.1 Paynters must provide the Consultant with the information documents and other particulars required to enable the Consultant to undertake the Services.

3. Consultancy Service Agreement

- 3.1 All Consultant's are to be engaged for their Services using Paynters Consultancy Service Agreement Form.

4. Payment

- 4.1 Paynters must pay the Consultant for the Services in accordance with this Agreement.
- 4.2 On or before the 4th day of each month (Closing Date), the Consultant may submit progress claims compliant with GST Legislation to Paynters on a percentage complete basis. Progress claims submitted by facsimile will not be accepted and submissions made after a Closing Date will be treated as having been made by the Closing Date of the following month. When an invoice includes for costs of inspections, a report is to be provided for each inspection outlining, the inspection date, time, and details of the inspection. No payment will be made for inspections until such time that the report is provided.
- 4.3 Progress claims shall be settled for any undisputed amount within thirty-six (36) days of the Closing Date. Paynters is not bound to pay any disputed amount nor any interest pertaining to late payment.
- 4.4 Any moneys to which Paynters may be entitled from the Consultant under this Agreement, as a result of a breach of this Agreement or at all may be set-off against any moneys due or which may become due to the Consultant under this Agreement.
- 4.5 Any progress payment made to the Consultant by Paynters shall be a payment on account and shall not constitute an admission on the part of Paynters that the work performed by the Consultant is in conformity with the Consultant's obligations under this Agreement and no payment shall release the Consultant from the requirements of this Agreement.

- 4.6 The Consultant waives claims for additional fees in respect of additional work under this Agreement unless written notice that a claim will be made is given within fourteen (14) days of the commencement of events giving rise to the claim.
- 4.7 Within fourteen (14) days of the completion of the Services the Consultant must give to Paynters an invoice entitled "Final Payment Invoice" seeking payment for any amount outstanding and stating that no further monies are due and payable under this Agreement.

5. The Consultant's Organisation and Personnel

- 5.1 The Consultant must ensure that the Services are performed by the Specified Personnel.
- 5.2 Paynters may at any time (but always acting reasonably) direct the Consultant that a person in the employ of the Consultant no longer be involved in the provision of the Services. Upon receipt of such direction the Consultant shall ensure that such person is no longer involved in the provision of the Services.

6. Project Documentation

- 6.1 The Consultant will be fully responsible for the Project Documentation produced by it in performance for the Services. Project Documentation includes but is not limited to sketches, drawings, specifications, sample boards, budget estimates, reports, schedules and the like relating to the Project.
- 6.2 The Consultant acknowledges and agrees that Paynters may at any time have the Project Documentation reviewed by any party nominated by Paynters. Such review shall not in any way diminish the Consultant's obligations and liabilities under this Agreement; and
- 6.3 The Consultant must provide to Paynters one (1) copy of all such information, calculations and documents that may be requested and necessary to review the Design Documentation.

7. Copyright

- 7.1 Copyright in Project Documentation:
 - a) produced by either party to this Agreement shall, upon creation, vest in and remain with that party; or
 - b) produced jointly by Paynters and the Consultant shall, upon creation, vest jointly in Paynters and the Consultant.
- 7.2 Upon creation of any Project Documentation the Consultant grants to Paynters an irrevocable licence to use that Project Documentation in relation to the Project. The Consultant must not without Paynters written approval assign any part of the Consultant's right, title, interest or intellectual property in Project Documentation to any third party.
- 7.3 The Consultant acknowledges and agrees with Paynters that the licence granted pursuant to clause 7.2 may be assigned by Paynters on the same terms without Paynters being obliged to give notice of such assignment to the Consultant.

8. Confidentiality

- 8.1 The Project Documentation and any information or documentation given to the Consultant by Paynters is confidential. Neither Paynters nor the Consultant shall disclose the Project Documentation or information or documentation given to the Consultant by Paynters to any person other than as is necessary for the performance of the Services or the completion of the Project.

9. Records

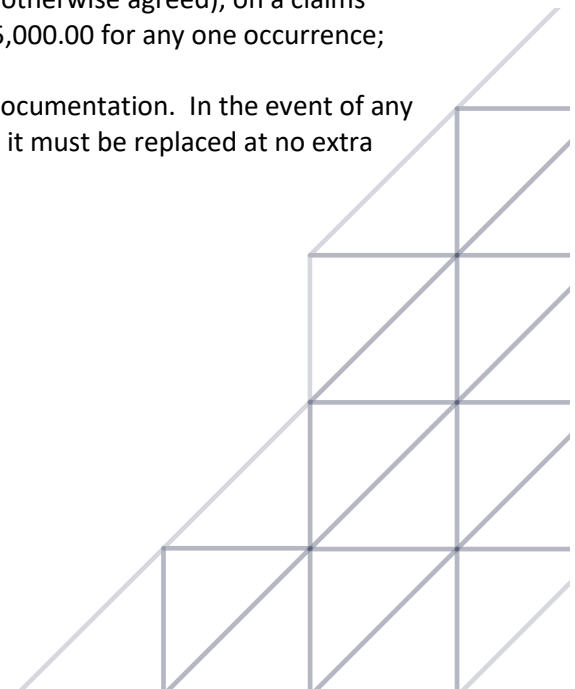
- 9.1 The Consultant must keep accurate records, which shall include Project Documentation. These records must not be destroyed without the prior written approval of Paynters.

10. Scope of Liability

- 10.1 The Consultant must rectify any deficiencies or omissions in the Services, promptly after notification from Paynters.
- 10.2 The Consultant must indemnify Paynters against:
- a) any damages, expenses or costs (including legal costs on an indemnity basis) suffered or incurred by Paynters in respect of personal injury (including death) to any person or damage to property, arising in respect of the provision of the Services, to the extent that they are due to the negligence or default of the Consultant, its employees, sub-consultants or agents; and
 - b) any damages, expenses or costs (including legal costs on an indemnity basis) suffered by Paynters as a result of a claim made against Paynters in relation to anything done or not done by the Consultant in relation to the Services.

11. Insurance

- 11.1 The Consultant must effect and maintain at its own cost for ten (10) years after completion of the Project:
- a) public liability insurance;
 - b) a WorkCover policy under the relevant legislation in respect of any person employed in connection with the Services;
 - c) professional indemnity insurance to cover the risk of liability arising from anything done or not done by the Consultant in relation to the provision of the Services, with a minimum level of \$5 million cover (unless otherwise agreed), on a claims made basis and with a minimum deductible of \$5,000.00 for any one occurrence; and
 - d) insurance against the risk of loss of any Project Documentation. In the event of any loss or partial loss of the Project Documentation, it must be replaced at no extra cost to Paynters.



12. Variation of Services

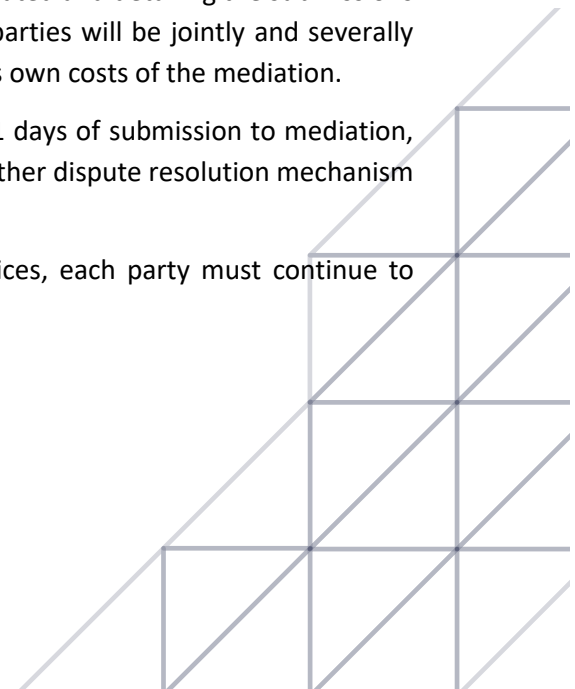
- 12.1 Paynters may instruct the Consultant to increase, decrease or omit any part of the Services, or provide additional work or services (Variation) and the Consultant shall carry out the Variation. Prior to commencing the Variation, the Consultant shall forward to Paynters its written estimate of a fair valuation for the cost of performing the Variation;
- 12.2 Paynters shall thereafter agree with the Consultant the value of the Variation;
- 12.3 If the parties cannot agree then the value shall be calculated by reference to the original agreed Fee or a reasonable fee as determined by Paynters.
- 12.4 Paynters shall determine an adjustment to either the Completion Date and/or the Fee as is reasonable.

13. Legislation

- 13.1 In performing the Services, the Consultant will comply with and ensure compliance by any sub-consultants appointed by the Consultant, the requirements and provisions of all acts of Parliament, ordinances, regulations, by-laws, orders, proclamations and relevant standards in any way affecting or applicable to the Services.
- 13.2 This Agreement shall be governed and construed in accordance with the laws of the state or Territory where the Project is located.

14. Dispute Resolution

- 14.1 If the parties are in dispute in relation to anything arising from or relating to this Agreement or the Project or the Site, either party shall notify the other in writing of the dispute, including the particulars of the dispute.
- 14.2 Paynters and the Consultant shall endeavour to resolve any disputes so notified speedily by negotiation. If a notified dispute is not resolved by negotiation within 14 days of the date of the notification, then before either party has recourse to litigation, the parties agree to submit the dispute to mediation in accordance with clause 14.3.
- 14.3 A mediator shall be agreed between the parties, or if no agreement, shall be appointed by the Australian Commercial Disputes Centre. The parties shall submit to the mediator documents defining the nature of the issues to be mediated and detailing the submissions made by each party in relation to those issues. The parties will be jointly and severally liable for the fees of the mediator and each will bear its own costs of the mediation.
- 14.4 In the event that any dispute is not resolved within 21 days of submission to mediation, either party may refer the dispute to litigation or any other dispute resolution mechanism as may be agreed.
- 14.5 If any dispute arises prior to completion of the Services, each party must continue to perform its obligations under this Agreement.

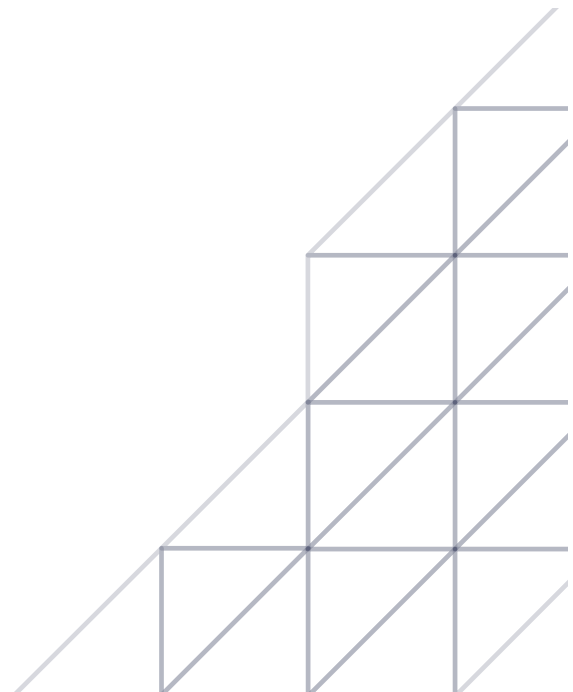


15. Termination

- 15.1 Paynters may terminate this Agreement immediately by giving written notice if in its opinion there is a reasonable risk that the Consultant is or will become unable to pay debts as they fall due.
- 15.2 Either party may terminate this Agreement on the expiration of reasonable notice given to the other party in writing.
- 15.3 The Consultant shall upon the termination of this Agreement or at any other time on demand by Paynters, deliver up to Paynters within five (5) working days any Project Documentation which may be in the Consultant's control or possession.
- 15.4 Termination of this agreement does not affect accrued rights, nor does it affect the Consultant's obligation to indemnify and to maintain confidentiality.
- 15.5 Where this Agreement is terminated:
 - a) the Consultant shall be entitled to payment for Services completed up to the date of termination;
 - b) the Consultant shall not be entitled to payment for lost profit in respect of unperformed Services; and
 - c) not with standing Clause 4, Paynters shall not be obliged to make payment to the Consultant until after the completion of the Project.

16. Non Waiver

- 16.1 No waiver by Paynters of any one or more defaults by the Consultant in the performance or observance of the terms of this Agreement shall be:
 - a) effective unless in writing and executed; or
 - b) construed as a waiver of any future default(s) by the Consultant whether or a like or of a different character



AUTOCAD Terms of Reference

Consultants Computer Aided Drafting Guidelines

Date: April, 2014

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1.0 PREFACE

1.1 GLOSSARY OF TERMS

BAS	Building and Asset Services.
Building documentation	Any electronic or paper document used to convey the design intent as a part of the building contract.
Discipline	A particular area of building design, ie Architecture.
Drawing file	Electronic version of a drawing ie AutoCAD drawing file, etc.
Drawing frame	The QA approved border that is used on a drawing. It contains information such as site name, project name, etc.
Manually produced drawings	Drawings which are created by hand, typically using a drawing board and ink pens, etc.
Model drawing	The electronic drawing file that is used to create drawing information.
MRP	Main Reference Point. A graphical representation relating a building etc. to a physical location on the building site.
Plot drawing	The electronic drawing file that is used to create paper drawings.
Project team	The team of people nominated to be involved in the documentation of a specific project.
Principal Consultant	The person nominated to be responsible for the complete documentation of a project.
Xref, Xreference	The method used to link two or more files in AutoCAD.

2.0 GENERAL INFORMATION

2.1 INTRODUCTION

This CAD Terms of Reference applies to CAD documents produced for the Queensland Government, Building and Asset Services (BAS) Clients. CAD documents shall be in accordance with the Australian Standard AS1100 unless notified otherwise and shall use the Standard Department of Housing and Public Works (DHPW) Title Block (copy attached).

The Site Number, Project Number and Project Description shall be obtained from the BAS Project Manager.

The Drawings Numbers shall use the following convention with respect to the Project Stages, Disciplines and Drawing Sheet Numbers.

Stage Abbreviations

PD – Pre-design	SD – Schematic Design	DD – Developed Design
CD – Contract Documentation	CN – Construction	PC – Post Construction

Discipline Abbreviations

A – Architect
C – Civil Engineer
D – Electronic Engineer (Data/Communication/Security)
E – Electrical Engineer
F – Fire Services
G – Surveyor
H – Hydraulics
I – Interior Design
K – Kitchen Consultant
L – Landscape Architect
M – Mechanical Engineer
R – Irrigation Consultant
S – Structural Engineer
VT – Lift/Escalator Consultant (Vertical Transportation)
X – Non Specific Consultant

2.2 DRAWING SHEET AND DISCIPLINE NUMBER FORMAT

The following list of drawing numbers is applicable to all projects and across all disciplines and must be used on all BAS projects. Electronic file naming will be covered later in this document.

ARCHITECTURAL

Cover Sheet/Drawing Schedule	A00.01,.02 etc.	Window Details	A08.01,.02 etc.
Site Plans	A01.01,.02 etc.	Door Details	A09.01,.02 etc.
Floor/Roof Plans	A02.01,.02 etc.	Stair/Walkway Details	A10.01,.02 etc.
Ceiling Plans	A03.01,.02 etc.	Metal Work Details	A11.01,.02 etc.
Elevations (usually 1:100)	A04.01,.02 etc.	Fitout Details	A12.01,.02 etc.
Sections (usually 1:100, 1:50)	A05.01,.02 etc.	Graphics Details	A13.01,.02 etc.
Detail Sections	A06.01,.02 etc.	Finishes Schedules	A14.01,.02 etc.
Details	A07.01,.02 etc.	External Works Details	A15.01,.02 etc.

CIVIL ENGINEERING

Cover Sheet	C00.01,.02 etc.	Water Site Plan	C04.01
Civilworks / Earthworks Site Plan	C01.01	Water Details	C04.02,.03 etc.
Civilworks / Earthworks Details	C01.02,.03 etc.	Sewer Site Plan	C05.01
Roadworks Site Plan	C02.01	Sewer Details	C05.02,.03 etc.
Roadworks Details	C02.02,.03 etc.	Misc. Site Plan	C06.01
Stormwater Site Plan	C03.01	Misc. Details	C06.02,.03 etc.
Stormwater Details	C03.02,.03 etc.		

ELECTRONIC ENGINEERING (DATA/COMMS/SECURITY)

Cover Sheet, Legend, Notes	D01.01,.02 etc.	Communications Details & Schematics	D06.01,.02 etc.
Site Plans	D02.01,.02 etc.	Audio Video Layouts	D07.01,.02 etc.
Security Layouts	D03.01,.02 etc.	Audio Video Details & Schematics	D08.01,.02 etc.
Security Details & Schematics	D04.01,.02 etc.	Miscellaneous Electronic Services Layouts	D09.01,.02 etc.
Communications Layouts	D05.01,.02 etc.	Miscellaneous Electronic Services Details & Schematics	D10.01,.02 etc.

ELECTRICAL ENGINEERING

Cover Sheet/Legend/Notes	E00.01,.02 etc.	Ceiling Plans/Layouts	E03.01,.02 etc.
Site Plan	E01.01,.02 etc.	Schematics	E04.01,.02 etc.
Floor Plans/Layouts	E02.01,.02 etc.	Details	E05.01,.02 etc.

FIRE SERVICES

Cover Sheet / Drawing Schedule	F00.01,.02 etc.	Elevations (usually 1:100)	F04.01,.02 etc.
Site Plans	F01.01,.02 etc.	Sections (usually 1:100, 1:50)	F05.01,.02 etc.
Floor/Roof Plans	F02.01,.02 etc.	Detail Sections	F06.01,.02 etc.
Ceiling Plans	F03.01,.02 etc.	Details	F07.01,.02 etc.

HYDRAULICS

Cover Sheet	H00.01,.02 etc.	Plumbing Plans	H04.01,.02 etc.
Site Plans	H01.01,.02 etc.	Details / Others	H05.01,.02 etc.
Drainage Plans	H02.01,.02 etc.	Sewerage Plans	H06.01,.02 etc.
Water Reticulation Plans	H03.01,.02 etc.	Standards	H07.01,.02 etc.

INTERIOR DESIGN

Cover Sheet	i00.01,.02 etc.	Workstations – New/Relocated	i07.01,.02 etc.
Building Act Compliance	i01.01,.02 etc.	Workstation Screen	i08.01,.02 etc.
Demolition	i02.01,.02 etc.	Storage – Mobile/Static	i09.01,.02 etc.
Partitions / Building Works	i03.01,.02 etc.	Furniture – New/Relocated	i10.01,.02 etc.
Reflected Ceiling	i04.01,.02 etc.	Signage	i11.01,.02 etc.
Finishes – wall, floor, film, window treatment	i05.01,.02 etc.	Tenancy Plans	i12.01,.02 etc.
Joinery	i06.01,.02 etc.		

LANDSCAPE ARCHITECT

Cover Sheet	L00.01,.02 etc.	Details	L04.01,.02 etc.
Legends and Notes	L01.01,.02 etc.	Irrigation	L05.01,.02 etc.
Construction/Surface Treatment/Grading and Setout	L02.01,.02 etc.	Elevations/Sections/3D Views	L06.01,.02 etc.
Planting	L03.01,.02 etc.		

MECHANICAL ENGINEERING

Cover Sheet	M01.01,.02 etc.	Mechanical Services Air Conditioning Layout	M07.01,.02 etc.
Legend/Notes	M02.01,.02 etc.	Mechanical Services Chilled Water Layout	M08.01,.02 etc.
Sections/Details	M03.01,.02 etc.	Mechanical Services Chilled Water/Hydronic System Schematic	M09.01,.02 etc.
Mechanical Services Schedules	M04.01,.02 etc.	Mechanical Services Pipework Schematic	M10.01,.02 etc.
Mechanical Services Site Plan	M05.01,.02 etc.	Mechanical Services Air Schematic	M11.01,.02 etc.
Mechanical Services Floor Plan	M06.01,.02 etc.	Mechanical Services Builders' Works	M12.01, 02 etc.

STRUCTURAL ENGINEERING

Notes/Schedules	S00.01,.02 etc.	Wall/Column Details	S05.01,.02 etc.
Footing/Slab/Floor Framing Plans	S01.01,.02 etc.	Roof Details	S06.01,.02 etc.
Wall/Column Framing Plans	S02.01,.02 etc.	External/Miscellaneous Structures	S07.01,.02 etc.
Roof Framing Plans/Elevations	S03.01,.02 etc.	Details Other	S08.01,.02 etc.
Footing/Slab/Floor Details	S04.01,.02 etc.		

2.3 VERSION CONTROL

All drawings duly completed, checked and signed for Authorised for Issue by the Director/Partner of the relevant discipline are records under the Library and Archive Act and must be kept for a period outlined in the disposal schedule. Any amendments to these drawings must be by a process that ensures that the original drawing is kept intact. To comply with the above a new version of the original drawing must be made with an appropriate identifier being placed on this newer version in the issue section of the Title Block.

Issue version identifiers with the following format:

Issue prior to tender (CD stage)	76543/CD/A03.01 P1
Tender issue (to be left blank)	76543/CD/A03.01
Amendment (during tender)	76543/CD/A03.01 A
Amendment (during construction)	76543/CN/A03.01 A (or subsequent letter if issued during tender).

2.4 ELECTRONIC FILE FORMAT

Both CAD and PDF files are required to be submitted to BAS at the following milestones:

Schematic Design Full SD set

Tender: Full CD set

End of construction: Full set including as constructed updated information and details

The CAD file format must comply with the requirements in subsequent chapters of this document.

PDF file format must comply with the following:

- All drawings provided are to be in *.pdf file format unlocked with no exceptions.
- One drawing per file and each *.pdf file should not exceed one page.
- Drawings to be in the correct orientation (images are not to require rotating for viewing).
- The file name of the electronic drawing is to reflect the site and drawing number.

eg: 31360_20202_CD_E03_01.pdf(for first tender issue)

31360_20202_CD_E03_01_issue_A.pdf (for addendum during tender)

31360_20202_CN_E03_01_issue_A.pdf (for variations during CN stage)

2.5 SIGNATURES

Both CAD and PDF files must have a signature of the Director/Partner of the relevant discipline located in the "Authorised for Issue" box and bound into the PDF or CAD file.

3.0 CAD DRAWING FILE SETUP AND CONVENTIONS

3.1 DRAWING ACCURACY

Drawing with CAD allows true accuracy of building elements. On manually produced drawings this can't be achieved to the same level of accuracy so the accurate building features are conveyed to other disciplines by visual dimensions only. On CAD drawings, every discipline depends on the accuracy of visual dimensions and the actual sizes of building elements. Therefore, they both must always be the same accurate value. To ensure accuracy at all times, there must be no "fudging" by altering dimension values without altering the drawn elements to the same value.

Only use decimal places where it is a requirement of the discipline for output such as civil, or where specific information needing decimal places is to be conveyed for construction purposes.

Associative dimensions that automatically calculate the length between two points must be used at all times. This means that, if building elements are altered, the dimension will automatically update to the appropriate value.

3.2 FILE STRUCTURE

The aim of this section is to allow a degree of flexibility in setting up CAD files and, at the same time, maintaining some control over the end product supplied to BAS.

The supply of electronic CAD information to BAS must achieve the following criteria:

(1) OUTPUT

The output of drawings printed from CAD files must be consistent across all disciplines for the project.

BAS personnel must be able to print drawings from CAD files that are an exact representation of the project PDF files supplied. The output referred to in this heading is not a style guide or graphical representation which is covered in other parts of this manual but AutoCAD features and settings such as line types, colours, drawing units and scaling that impact on the drawing appearance when plotted.

The project set of drawings containing all discipline drawings must use the same CAD standards contained in this manual across the project. This does not mean that Consultants can not use their layering systems, line types etc. but it does mean that other features and settings contained in this manual such as colours etc. must be used.

(2) FILE STRUCTURE

The file structure should be established to provide flexibility and seamless workflow across disciplines. For this reason, drawing files should be created where content that may be required by another discipline should exist in an AutoCAD model file. This model file should contain only data or information that is relevant for the purpose it was created. A typical example would be a "floor plan" model file. This file should contain grids; walls; doors; windows; built-in joinery; dimensions and shared text notes etc. all relating to a typical architectural floor plan view. Other data such as elevations; sections; construction details should exist in separate model files.

Data that is relevant to the floor plan but is not required by other disciplines such as large volumes of text notes, leaders, lines depicting floor falls, surface finishes etc should be included in the model space of the output sheet.

Using this methodology enables consultants to more seamlessly utilise information to produce their data sets and, at the same time, keep the base information up to date and avoids duplication of data.

Layout Tabs: Refer to **Chapter 8 LAYOUT TABS**

XReferencing: Refer also to **Chapter 7 XREF CONVENTIONS**

Xreferencing plays a significant role in achieving a seamless set of documentation across all disciplines. This manual mandates the use of Xreferencing as a methodology.

A set of model files on a medium building project could include the following:

Model File	Dwgs produced from this file
Site Plan	Base drawing to include but not limited to: Site boundary lines, roadways, paths, fencing, garden outline areas, text indicating significant features, site setout points, building mrp points. <i>(This file would provide the base for the Site Setout Plan, Site Plan, External Works Plan, Fencing Plan and various consultant drawings).</i>
Ground Floor Plan	Base drawing to include but not limited to: Grids, walls, doors; windows; built-in joinery; dimensions, shared text notes (room names, plant equipment etc), roof lines in plan. <i>(This file would provide the base for the Ground Floor Plan; Ground Floor Ceiling Plan, Part Ground Floor Plans and various consultant drawings).</i>
First Floor Plan	Base drawing to include but not limited to: Grids, walls, doors; windows; built-in joinery; dimensions, shared text notes (room names, plant equipment etc), roof lines in plan. <i>(This file would provide the base for the First Floor Plan; First Floor Ceiling Plan, Part First Floor Plans and various consultant drawings).</i>
Elevations and Sections	These drawings can be combined into the one model and to include but not limited to: Grids, reference lines (floors and others), walls, doors; windows; built-in joinery; dimensions, shared text notes (room names, plant equipment etc), roof structures, framing elements, floor slab.

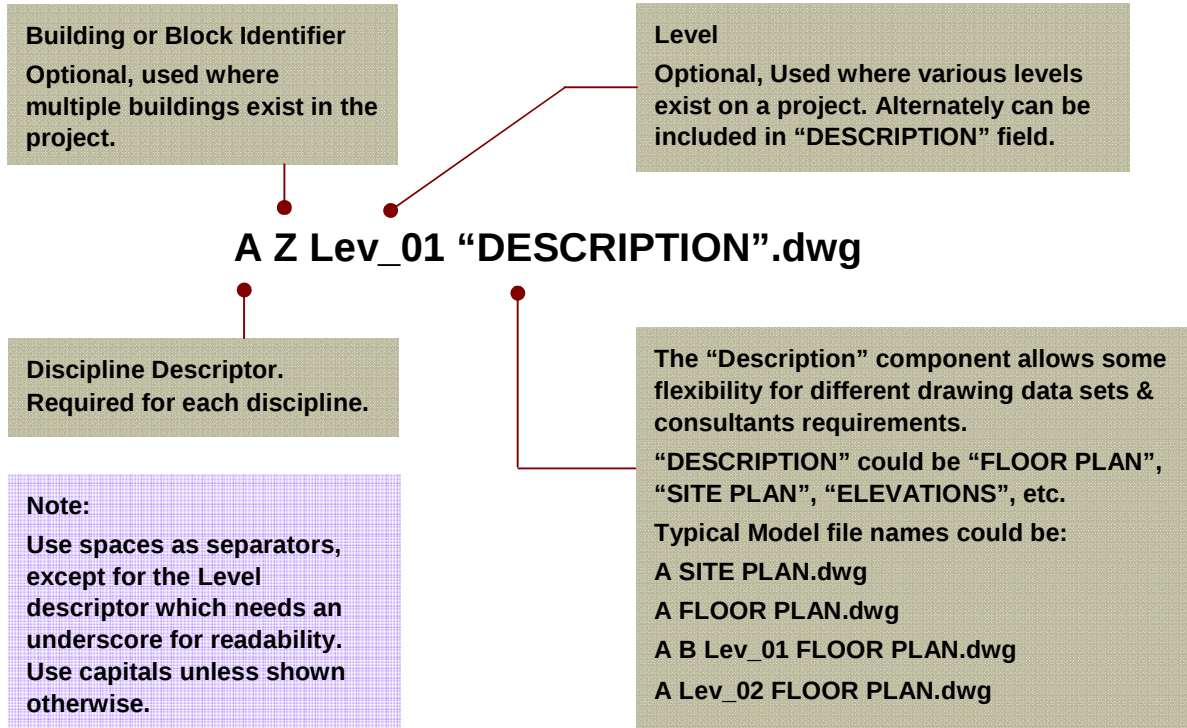
	<i>(This file would provide the base for the Elevations and Sections for the project).</i>
Construction Details	Construction Details at various scales <i>(Generally with these sorts of files the model drawing and the output drawing are the same.).</i>
Windows and Doors	Window and Door Schedule <i>(Generally with these sorts of files the model drawing and the output drawing are the same.).</i>

Note: Better to have more XRefs than too much information in model drawings.

3.3 CAD FILE NAMING

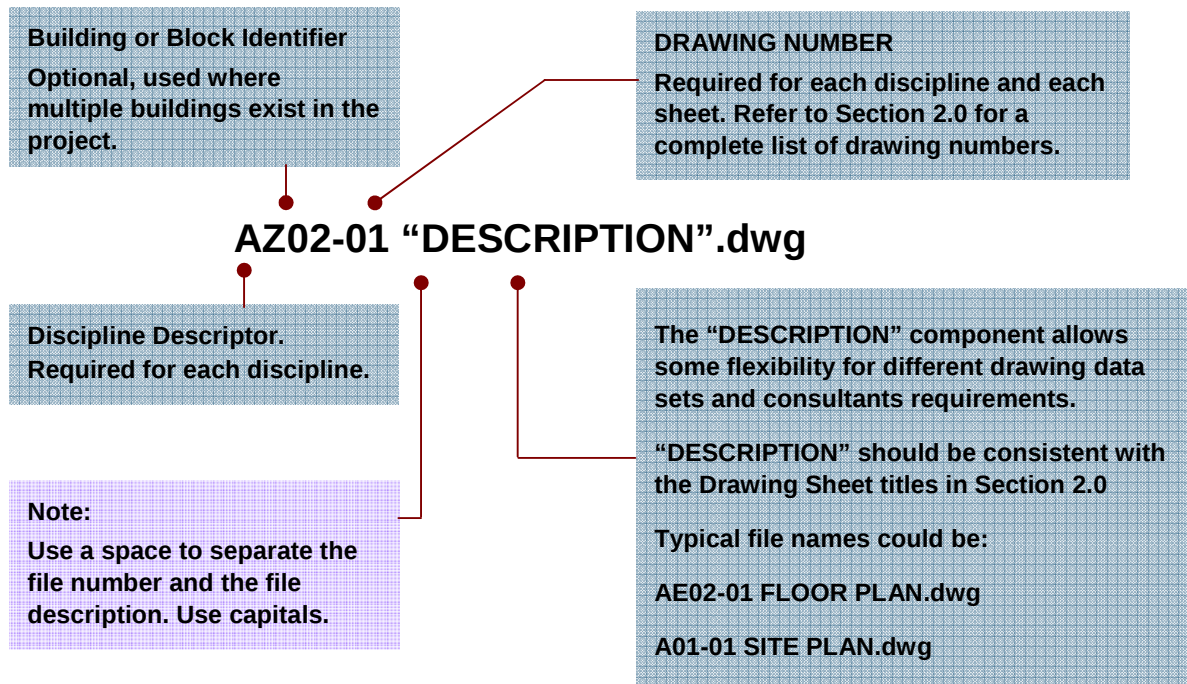
Model File Name Format

The following file naming convention must apply.



Output File Name Format

The following file naming convention must apply.



3.4 COLOURS

All entities on all drawings must have their colour created 'ByLayer' ie the colour is only assigned in the layer, not in an entity's individual properties. Refer to the following Colour to Lineweight Chart for the standard on screen line colour to plotted pen thickness assignments for black and white plotting.

Colour to Lineweight Chart

Plotted Thickness (mm)	0.18	0.35	0.18	0.25	0.70	0.50	0.25	0.13	0.18	0.0	1.0
AutoCAD Colour number	1	2	3	4	5	6	7	8	9	11	30

Plotted Thickness (mm)	0.18	0.35	0.18	0.25	0.70	0.50	0.18					
AutoCAD Colour number - For colour 11 refer above	10 12 13 14 15 16 17 18 19	40 41 42 43 44 45 46 47 48 49	50 51 52 53 54 55 56 57 58 59	80 81 82 83 84 85 86 87 88 89	90 91 92 93 94 95 96 97 98 99	120 121 122 123 124 125 126 127 128 129	130 131 132 133 134 135 136 137 138 139	160 161 162 163 164 165 166 167 168 169	170 171 172 173 174 175 176 177 178 179	200 201 202 203 204 205 206 207 208 209	210 211 212 213 214 215 216 217 218 219	240 241 242 243 244 245 246 247 248 249

By grouping these according to colour, we can more easily identify on the screen which colours denote which thickness.

For example all yellow shades are 0.35mm, and all blue shades are 0.7mm.

So if you don't particularly like pen 5 (blue) for 0.7mm you can use any blue shade from pen 160 to 179 !!!

Shading

AutoCAD Colour number	101	250	251	252	253	254
Density	70%	30%	25%	20%	15%	10%

Note: 1. AutoCAD Colour numbers not assigned on this chart are not to be used.

The use of the above Colour to Lineweight Chart is mandatory for BAS projects.

3.5 TEXT FONTS AND LINETYPES

Text Fonts

The text font to be applied for drawing content text on the contract documentation stage of a project is Arial Narrow (No width factor). Keep text style names simple but descriptive. The font name must appear as part of the style name.

BAS uses Humnst777 BT and CastleT in the standard titleblocks. These are supplied as part of the CAD External Consultants Package.

Linetypes

All entities on all drawings must have their linetypes created bylayer ie the linetype is only assigned in the layer, not in an entity's individual properties. Additional linetype style names must be simple but descriptive.

BAS provides a PS Acad.Lin with linetypes for use, however Consultants will be allowed to use their own custom linetypes provided they meet the following criteria:

- Linetypes must be created using metric units and spacings.

- Linetypes must work with msltscale set to 1; pslltscale set to 1 and ltscale set to 1.
- Embedded text characters are associated with a text style in the drawing. Any text styles associated with a linetype must be created in the drawing before the linetype is loaded to avoid loss of data when CAD files are supplied to BAS.

3.6 LAYERS

This manual does not provide specific layer standards. Consultant firms can use their own layering systems providing that layers are structured and provide sufficient flexibility for the project team to be able to manipulate data efficiently. CAD drawings with minimum unstructured layers such as pen 1; pen 2 etc. will be rejected. Layers need to have meaningful names that give a clear understanding of the data that will reside on that layer.

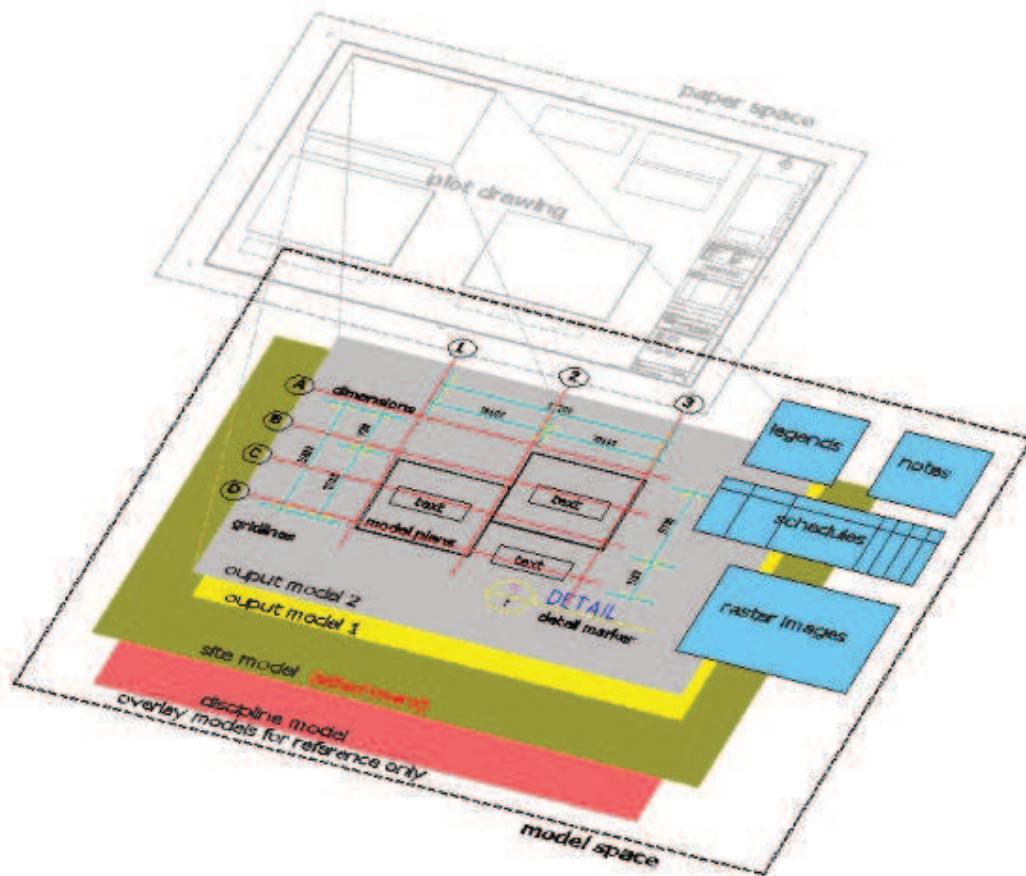
BAS will provide a base AutoCAD template for all disciplines including a layering structure which is preferred however it is not mandatory to use this layering system.

3.7 LOCATION OF DRAWING COMPONENTS WITHIN A DRAWING FILE

Benefits can be gained by locating particular drawing elements in either Paper Space or Model Space.

Model Space:

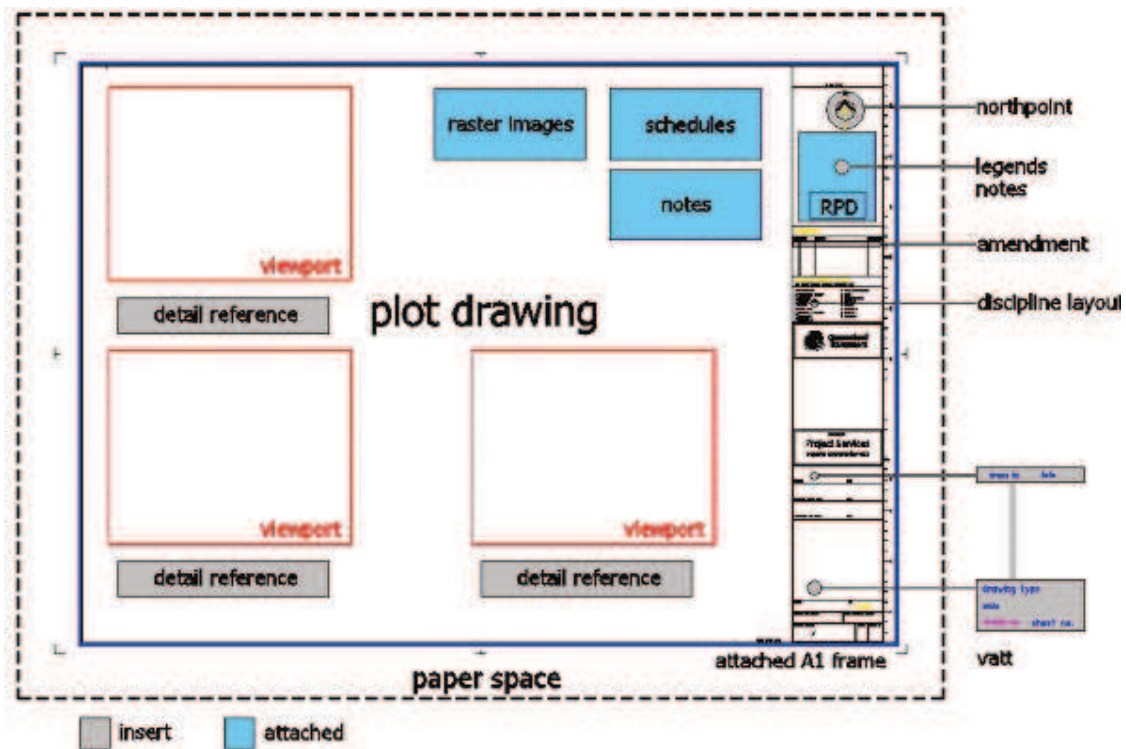
The following elements are to be placed in model space of the model drawing.



Paper Space:

The following elements are to be placed in the Paper Space of the Plot Drawing.

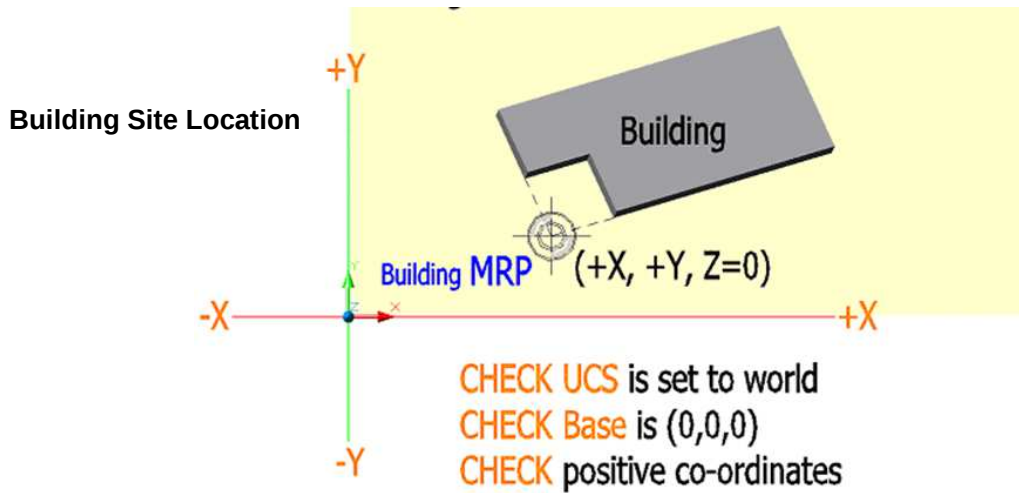
While drawing information can be xreferenced into Model space, it is important that no new information required by other disciplines or drawings be drawn in the model space of plot drawings. All viewports are to be placed on the appropriate non plot layer. Legends, notes and schedules to be placed in paper space generally, but placed in model space when required in more than one drawing.



3.8 Building Site Location and Main Reference Point (MRP)

A MRP shall be included on all site and building setout plan drawings.

All building sites are to be drawn in the positive sector of the Cartesian grid, so that all X and Y coordinates are positive, refer below.



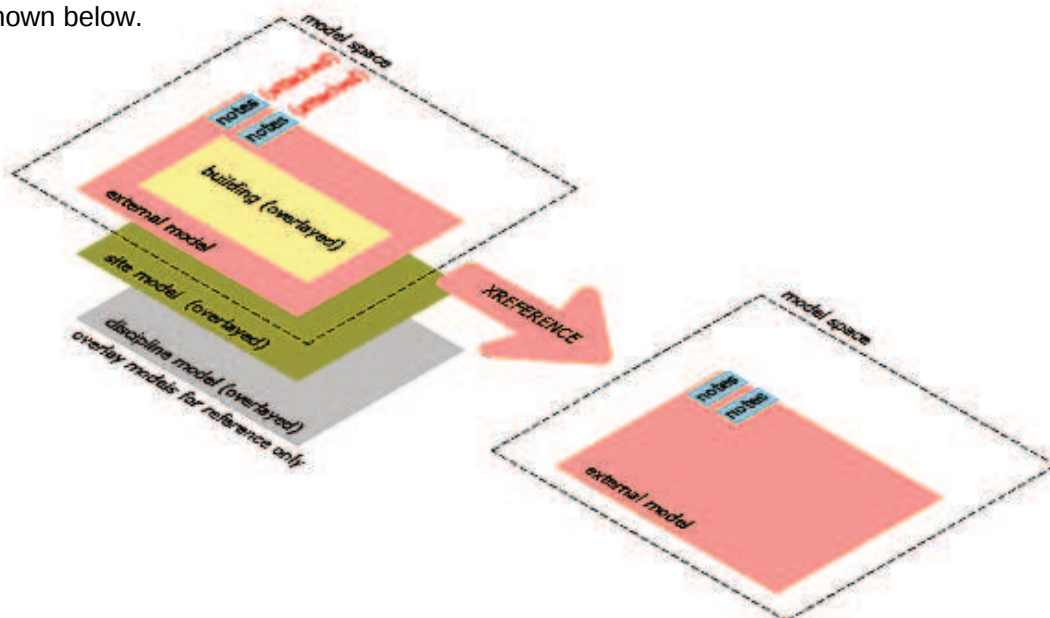
3.9 XREF CONVENTIONS

The method used to arrange Xrefs in a drawing has a significant impact on the accuracy and complication of a drawing file. The following methods are to be applied to all drawing files.

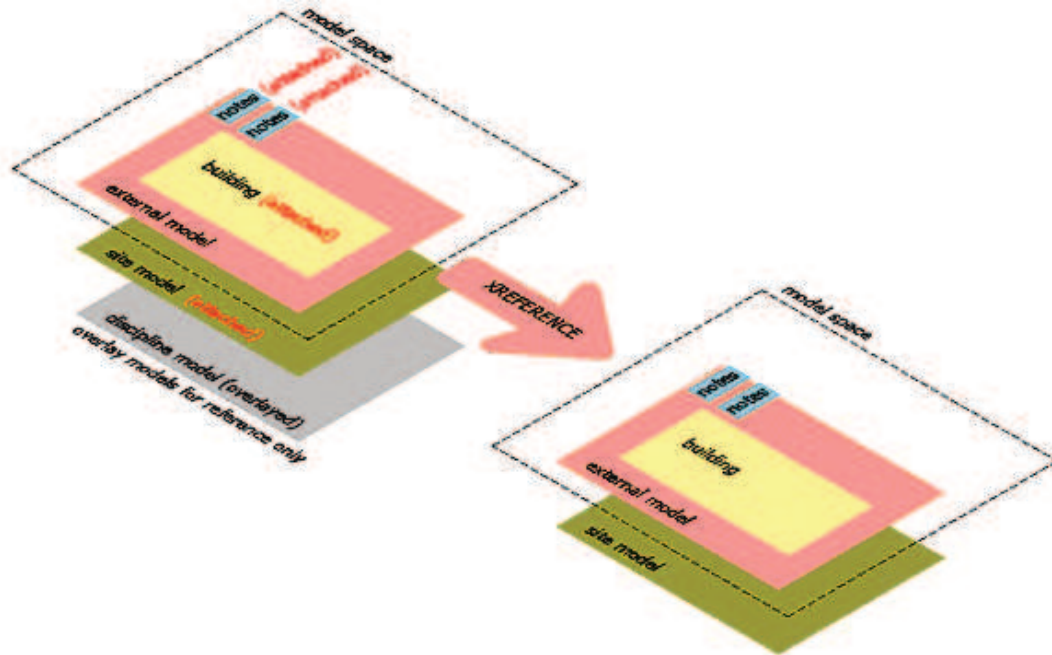
Xrefs are to be used on all projects to avoid the duplication of data.

The UCS of every drawing must be set to world ie no rotation of ucs is permitted.

Xref command – Overlay option – Use this option for xrefs of drawing information being used for coordination or checking purposes. This information is not required as a part of the plot drawing. Xref information set up with the overlay option doesn't flow through to subsequent xref drawings, as shown below.

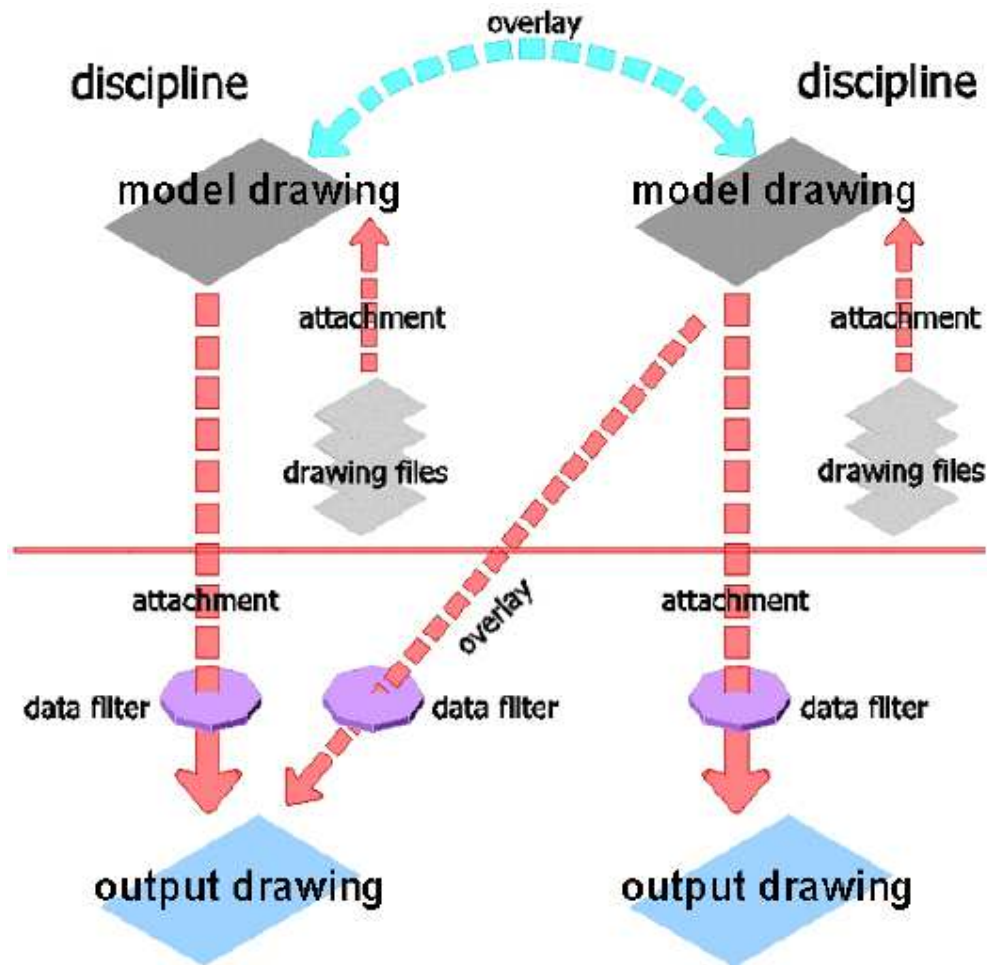


Xref command – Attachment option – Use this option for xrefs that will be required in the final presentation of the plot drawing. Xref information set up with the attachment option always flow through to subsequent xref drawings, as shown below.



Xref Arrangement

Xrefs for every drawing are to be set up as shown below.



All xrefs are to be set up using Relative Path.

Each Xref must be on its own individual standard layer. Layer 0 shall not be used.

The names of all drawings intended to be xrefed shall be kept constant for the course of the project.

The orientation of model drawings shall remain constant for the course of the project.

The number of model drawings is to be kept to a minimum. Entities shall be drawn once only to avoid having duplicate entities on other drawings.

The site plan Main Reference Point (MRP) is to be 0,0.

Insert Xrefs at 0,0.

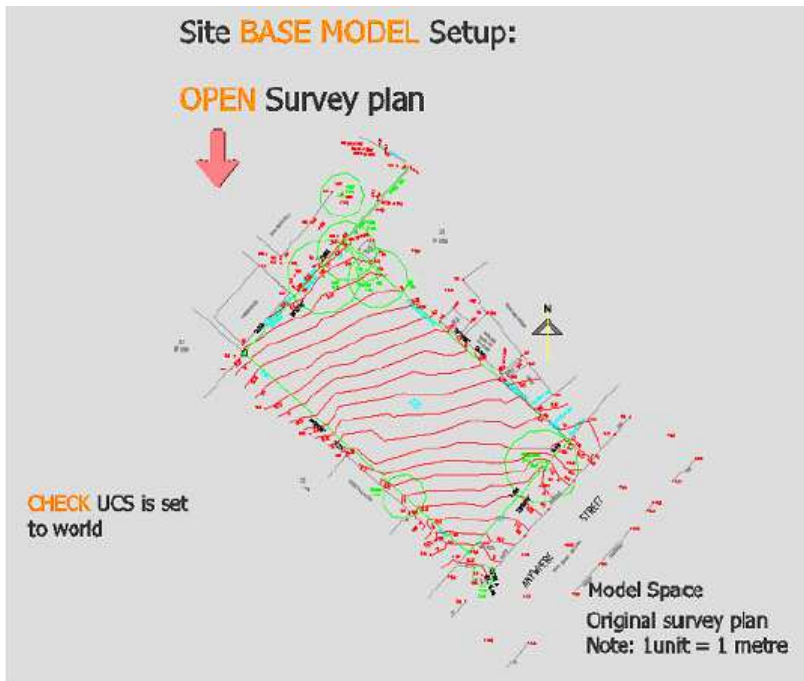
The Base setvar in AutoCAD must always be set to 0,0,0.

Drawings xrefed from disciplines other than your own must only be Xref attached with the OVERLAY option.

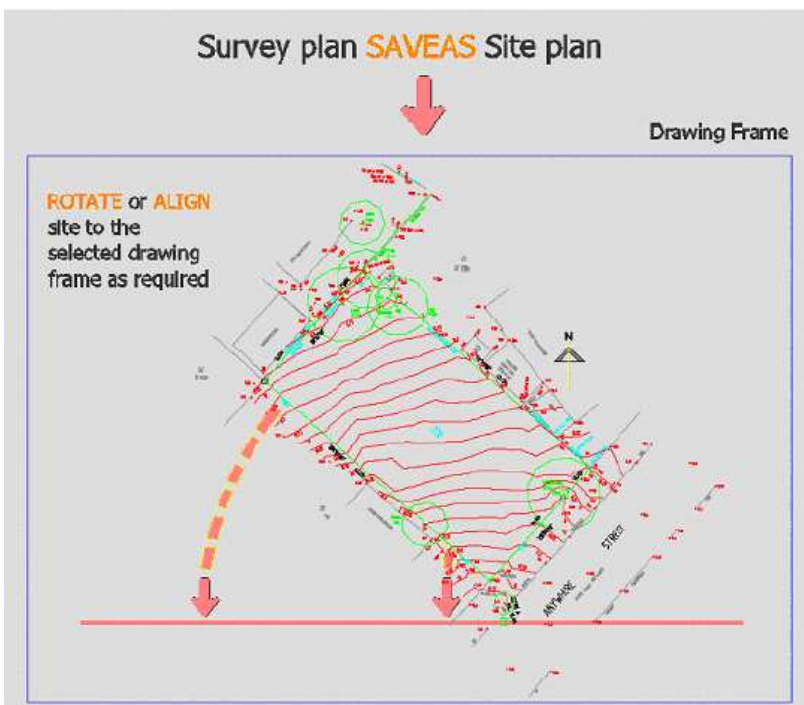
Xref Arrangement – Options 1 and 2

There are 2 acceptable methods that can be applied to Xref arrangements inside AutoCAD drawings. For both options, the following steps must be followed before the chosen option is applied.

Step 1



Step 2

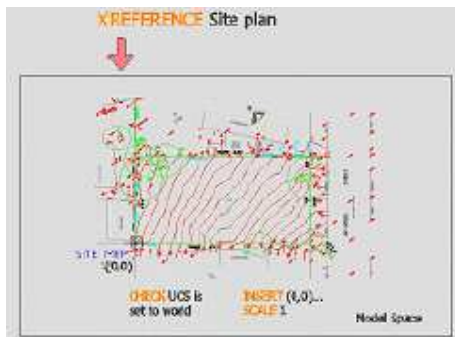


XREF Option 1

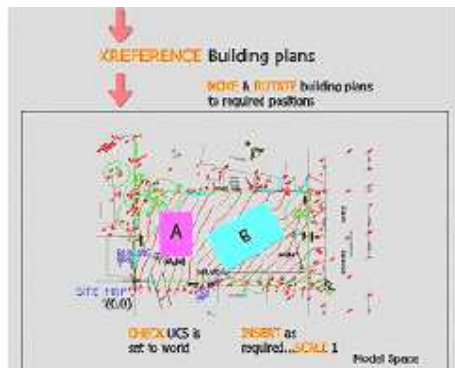
Step 1



Step 2



Step 3



Step 4

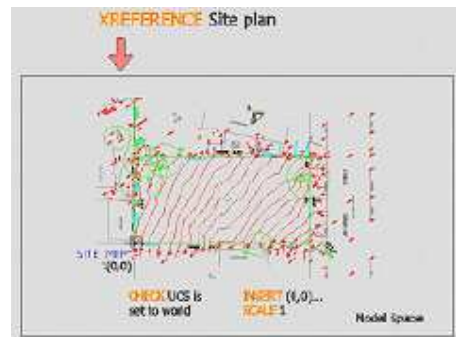


XREF Option 2

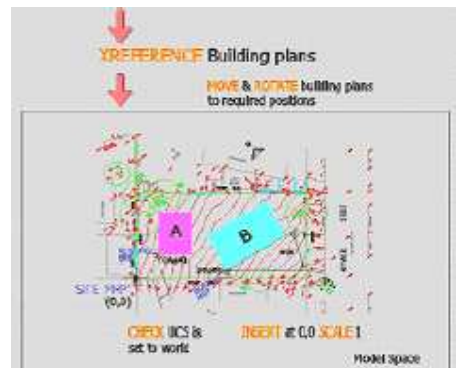
Step 1



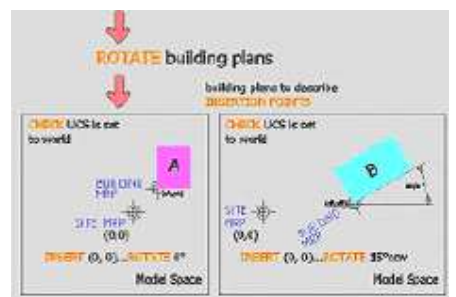
Step 2



Step 3



Step 4

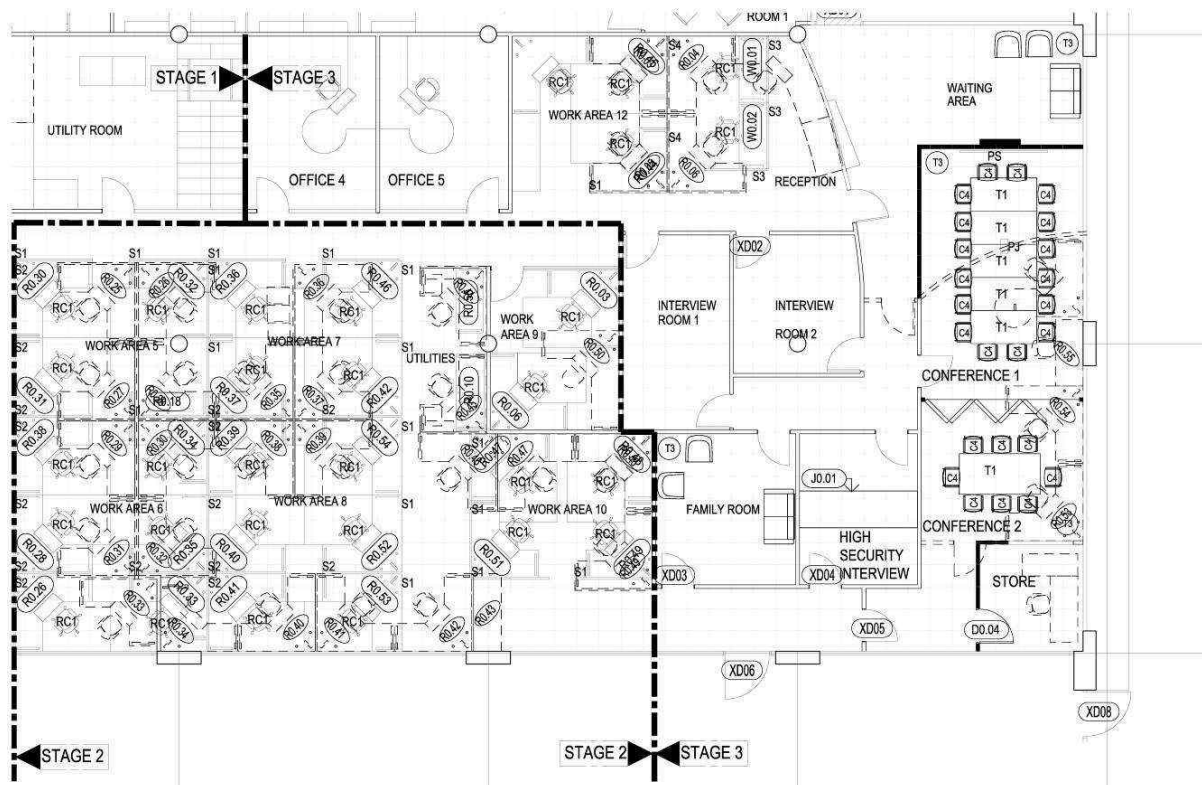


3.10 LAYOUT TABS

Layout tabs are permitted but are not mandatory.

Use layout tabs to create output sheets from data that represents similar building characters. The following graphics represent a single floor level of a building footprint that will produce various output layout sheets.

Note: Model files can contain additional information of the view that will assist in creating layout tabs providing that information is related to the view. An example could be where the floor plan file may include the ceiling grid which would then be used to create a reflected ceiling plan as a layout tab.



: Floor Plan

: Furniture Plan

: Demolition Plan

: Ceiling Grid Layout

Note: This plan could be compiled from a series of XRefs models making the data more useful for Consultants. If graphics exist in one single file a disciplined layering structure needs to be used to allow consultants the flexibility to manipulate data or graphics.



3.11 SOFTWARE VERSIONS

Autocad files supplied to BAS must be in Autocad 2012 format.

The following file names could contain layout tabs for each series of sheets:

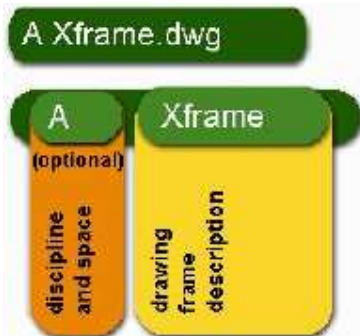
A02_01 Plans

Layout tabs could be included:

A02.01 Ground Floor Plan

A03.01 Ground Floor Ceiling Plan

Drawing Frame File Name Format



The drawing frame for a project is called Xframe.dwg. If a discipline requires a different frame for the same project it is created with the optional discipline character and space in front of 'Xframe'.

Documentation Standard File Format

All CAD documentation made available to other disciplines for project coordination shall be AutoCAD format that conforms to BAS standards. Conversion procedures from other CAD packages are described in Drawing File Compatibility 15.04.

<http://pssbs/cad/CadManual/assets/PDF%20CADManual/page%2045.pdf>

External Consultants Manual



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Building & Asset Services

Introduction

1 Introduction

This document sets out [Project Services](#) requirements for the assembly of [Revit 3D Models and the 2D documentation associated with these models](#).

Integration across differing software platforms and multi-disciplinary consultancies is addressed in this document.

This manual identifies & addresses two [necessary tasks involved in creating a Revit model](#).

1. [Process](#)
2. [Standards](#)

The process component includes the setting up of a project, file naming and modelling requirements. This will continue to be an ongoing and developing process as the software evolves and 3D modellers advance beyond traditional limitations and current barriers.

The Standards have been developed to maintain consistency across Project Services disciplines and particularly recognises the already completed work of the current 2D Cad Reference Manual.

1.1 Accompanying Documents

The following documents and files are required to complete Revit models and documentation to [Project Services](#) standards.

- 2D CAD REFERENCE MANUAL
- Revit Architectural Template
- Revit Structural Template
- Revit MEP (Electrical) Template
- Revit MEP (Mechanical) Template
- Revit MEP (Hydraulics) Template
- Project Services Keynote file
- Project Services Export Layers file
- Project Services BIM Management Plan

Directory Structure

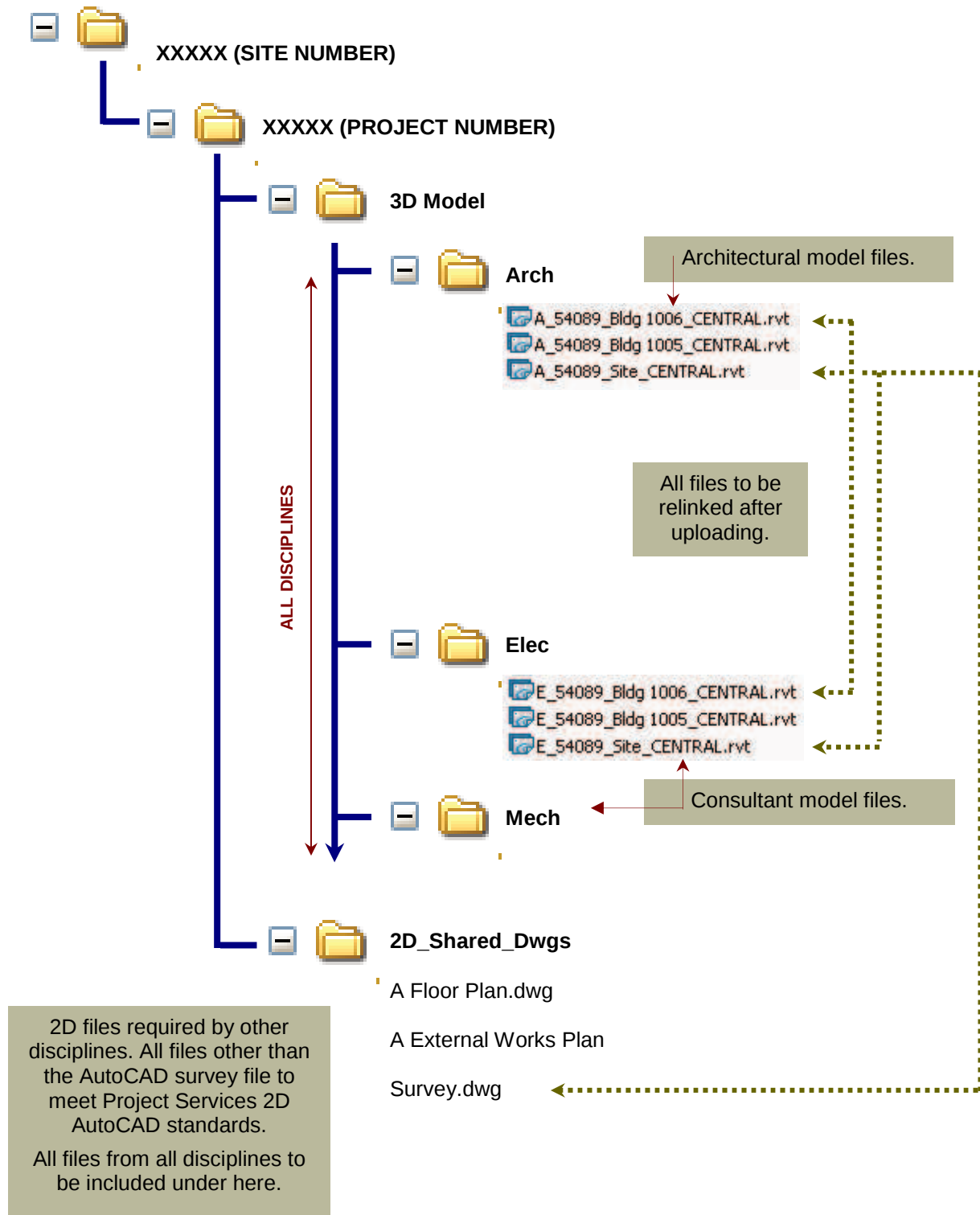
Collaboration

2 Directory Structure

External consultants will have the freedom to use their own internal data network structure.

Project Services will require all models to be supplied using our standard Revit file naming conventions. [Refer to Ch 4. File Naming](#)

Files must be supplied or uploaded to FTP sites using the following directory structure:



2.1 File Requirements

All files supplied to Project Services must:

- Include all related linked files from all models, relinked after being uploaded to remake the original model file,
- Be linked using relative pathing,
- Be Workshared,
- Workshared files must be detached from the original file and recreated as Workshared files when uploaded,
- All file must be purged of extraneous data,
- Include all related linked dwg files. Linked into a single view or views where required. Must not be linked into every view.

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Project Creation

Project Creation

3 Project Creation

3.1 Project Definition

Projects undertaken by the organization vary from relatively simple housing projects to complex BIM models using different software packages and many consultants. Each project requires co-ordination for the construction of the model. [Modelling across all projects remains fundamentally the same, however as the terms of reference for each project vary ie: BIM, 4D etc so does the approach to modelling need to vary to suit required outcomes.](#)

3.1.1 Project Types

The guidelines below categorise projects into standard types. The objective is to provide some guidelines where each project may fit into the modelling process and therefore giving some direction as to how and to what level of detail the model is to be constructed. [Refer to Ch 7 Modelling Systems for details on the level of modelling required for each project type.](#)

Projects fall into the following four (4) types:

- **Small Projects**
These are projects valued to an approx building value of \$3,000,000. Multi-residential Housing projects & Respite Centres would fit this project type.
- **Medium Projects**
These are projects with an estimated building value range between \$3,000,000 and \$20,000,000. Emergency Services, Police & Tafe projects would fall into this category.
- **Large Projects**
Projects with an estimated building value of \$20,000,000 or greater.
Hospitals, Large Commercial Buildings and Special Projects would fall into this category.
- **BIM Projects**
These are projects that:
 - are [heavily influenced by Client agency requirements where the Client agency may require a Building Information Model to undertake Facility Management,](#)
 - the project requires a 4D Construction Program,
 - the project requires a 5D Forecast Construction Cashflow,
 - the model is constructed across different software platforms and multiple consultants,
 - part of the model may be required for direct fabrication of building components from the model elements.

3.2 BIM Management Plan (BMP)

A BMP for every project will be required immediately after engagement, setting out how the digital information for the project will be managed and the agreed outcomes are achieved.

The Project Services master BMP should be used as a guide. Alternately the NATSPEC BIM GUIDE and associated documents will be considered acceptable.

File Naming

**It's called
What!**

4 File Naming

4.1 Methodology

The standard requirement for working in Revit is to create files suitable for working in a shared environment. [This means using a Central file as a means of data storage for the Revit Model](#) and using locally saved user files as the means of creating & expanding the model.

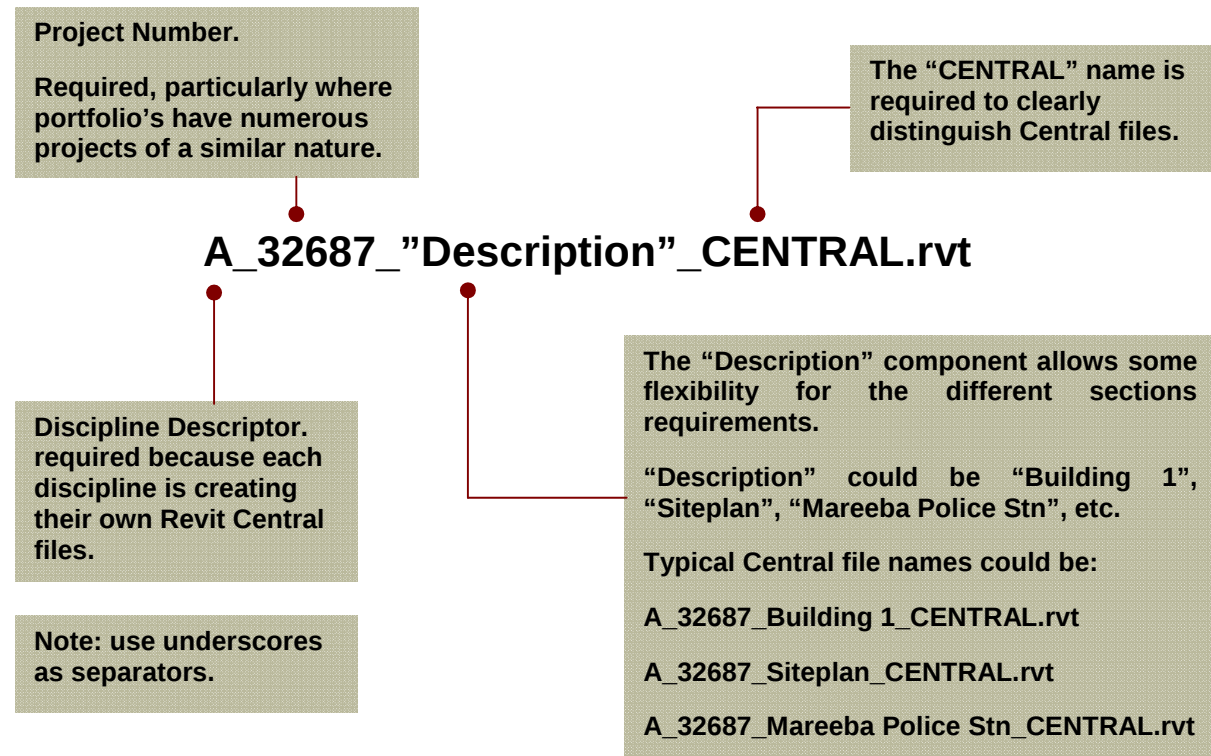
4.2 Project File Structure

Generally the standard file structure is to model each Building Model for the project in a separate Revit file. This allows for greater flexibility, particularly in the reuse of Building Models and where a Building Model may be used a number of times on a site. ([Multi-res Housing, DSQ, projects etc](#)).

4.3 File Naming

The following file naming convention is used for Revit.

- **For Central files:-**



5 Starting Revit

5.1 Templates

Project Services template files for all Revit software have been developed to assist in the quick production of projects. These files have been developed in conjunction with Project Services modellers and include all standard graphical elements necessary for modelling & documentation. Some specific examples are:

- Families such as walls, doors and windows have been modified to reflect project specific standards such as internal and external walls, door widths and heights etc.
- The Arial Narrow font style is used so that we do not have a variance of different fonts across a single set of documents.
- A standard Project Services title block with project parameters has been included.
- Labels & annotations have been adjusted to match Project Services drafting standards.

Templates are available for all disciplines and must be used as the starting point for all projects for the Department.

5.2 Origin

The hard coded Revit origin is defined using reference planes in the plan views. While traditional Revit modelling has ignored the need to know the origin point of content because of the shared co-ordinate system, other packages such as Octaga, IFC transfer etc do not identify Revit's co-ordinate system and use the physical origin point of the model. This origin point should be used when setting out grids or the corner of a building so that the models can be located by their origin points in the above mentioned packages.

5.3 Worksets

Worksets are primarily used to control linked file accessibility, data segregation & managing workflow. [Refer to Ch 7 Modelling Systems for detailed information.](#)

5.4 Project Browser

The Department does not limit the use of Company specific project browser formatting. A standard browser "Project number – Rename" has been set up if required. Alternately the standard Revit browser interface is acceptable.

If use a Company specific browser provide a short explanation of the steps used to create the browser.

6 Site, Project Setout & Co-ordination

6.1 Introduction

The issue of sites is a complex one.

Typical of any Cad software, there are many of ways of achieving a specific result. Creating 2D or 3D Revit sites and topography is no different.

The following methods have been developed to improve the quality of the Revit documentation & building modelling and to provide greater consistency across the three main cad software programs currently being used by Project Services. The early days of modelling in Revit without any reference to location & coordinate systems needed to be addressed to get the best out the Revit model. The process is still being refined, but clearly Project Services is achieving some excellent results.

With reference to Revit sites, this manual does not propagate the theory that the methods outlined are “Best Practice”. They are however tried and tested methods that have produced consistent results over many projects.

6.2 Site Types

Because Project Services work on a wide range of project types, no one method can be considered satisfactory or “Best Practice” for all projects.

6.2.1 Site Type 1

Methodology based on (One Site, One Building):

1. Create a Revit project site file. This can be either a 2D or 3D site as required.
2. Create a separate Revit project building model file.



The site and building model files are linked using Revit's Shared Co-ordinate system.

All 2D output is produced from the building model file.

6.2.2 Site Type 2

Methodology based on (One Site, Many Buildings):

1. Create a Revit project site file. This can be either a 2D or 3D site as required.
2. Create separate Revit project building model files, one file for each building.



The site and building model files are linked using Revit's Shared Co-ordinate system.
Building model 2D output is produced from the building model files. Site 2D output is produced from the site model file.

Site Types 1 & 2 are considered “Better Practice” solutions for creating site & project geometry.

The advantages of using shared coordinates (depending on the base AutoCAD site used) are:

- True Northing & Easting coordinates can be established in a project.
- Exporting of Revit project model files will Xref into the AutoCAD site without any manipulation of the origin point.
- Every Revit project file shares the same coordinate system across the project.

6.3 Site Type 1 - Methodology

This is generally the most common and preferred site option. It is suited to projects that have a single building model on a site and where the total project output is generated from a single Revit file. Using this method, the site is constructed and modelled in a single Revit site

model file. The Revit building model is linked into the site file and positioned (X, Y & Z) and coordinates shared back into the building model file.

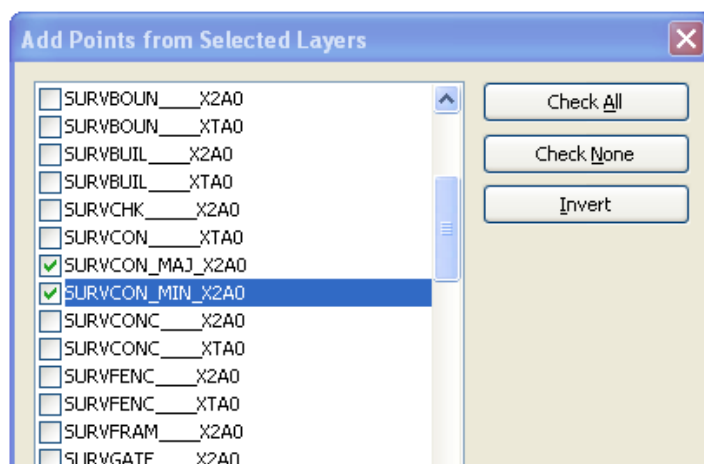
The end result is that the total project model (Site & Building) is available in the one file (the Building model file). This is an excellent method for producing plans, elevations, sections and total 2D output from the one source.

Note: The site is still modelled in a Revit site model file, but is continually uploaded into the Revit Building model file.

When a Revit Architecture project acquires coordinates from a linked DWG file, the World Coordinate System (WCS) of the selected linked DWG file becomes the shared coordinate system of the host Revit Architecture project, based on the location of the linked DWG instance. The Y axis of the DWG becomes True North, and the origin of the DWG becomes the origin of the shared coordinate system of the Revit Architecture project.

This also means that in this file, True North is True North and Project North is the same as True North, because this file was based on the survey file. (They are both the same). At this point in time this file does not know anything about Project North.

When the AutoCAD survey link is selected a list of available AutoCAD layers is displayed. The general practise for a Topography is to select the [Contour Layers](#). These layers should have 3D height (Z Values) associated with them.



There is generally no need for any additional layers.

6.4 Site Type 2 - Methodology

This is a more specific site option. It is suited to projects that have multiple buildings on a site. This option does not easily lend itself to producing output from a single Revit file. Using this method, the site is constructed and modelled in a single Revit site model file. The Revit building models are linked into the site file. Shared coordinates exist across all Revit project files.

The end result is that the total project model (Site & Buildings) is available in separate files (the Site model for site information & the Building model files for the Building information). This seems to be the most acceptable method of documenting these projects without a complicated system of passing information from one file to another.

There are a number of other methods for creating this type of file such as using the Revit "Specify Coordinates" option. Further investigation is needed to determine a consistent approach using these methods.

This type of Site typically applies to Multi-Residential Housing, DSQ projects, Tafe colleges and large Precincts.

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Modelling Systems

Modelling Systems

7 Modelling Systems

7.1 Overview

This chapter deals with issues such as appropriate levels of modelling, project types etc. Not all projects can justify excessive amounts of modelling, whereas dedicated BIM projects require extensive modelling to meet the “Terms of Reference” for that type of project.

The use of the word BIM in the architectural industry has many connotations and means different things to different stakeholders. It is true that every 3D modelled project could be considered a BIM project because every 3D model contains geographical or spatial data and information. For the purpose of this manual every project may be considered part BIM but also gives basic guidelines as to the extent of modelling to meet project time frames and budgets.

The department has worked on a number of dedicated BIM projects. These are projects that have had a specific outcome such as CNC – Fabrication from part of the model such as structural steel or other building elements, balustrades awnings etc. Other models have been created with the intent of having the model as part of the Tender and Construction process.

Still other models have been developed to include information and codes to allow the Quantity Surveyors to develop 4D & 5D processes throughout the lifecycle of the model. To lump every project with these specific requirements would seem unfair. The industry will naturally progress in this direction regardless.

Experience on previous large scale Revit projects confirms that once the file size reaches 200mb, there is a significant loss of performance due to memory errors caused by the processing of large amounts of geometry. The introduction of Revit on a 64bit platform has gone a long way to solving many problems including file size and modelling content.

The guidelines in this section are intended to help the modelling process by clearly defining the type of project and the expected output required from the associated model.

7.2 Model Scale

To help identify appropriate levels of modelling the following term “Model Scale” has been used to help define acceptable levels of modelling.

This concept could best be described as cutting a 1:50 section through the model which would produce a favourable result at 1:50 scale with limited 2D embellishment of construction / model elements.

7.3 Project Definition

Refer to [Section 3 Project Creation](#) for Project Definitions.

7.4 Small Projects

7.4.1 Model Scale

Currently many of our small projects are modelled at 1:50 scale. File sizes range from 30mb to 120mb. Modelling at this scale is a result of a tried and tested process that gives an acceptable balance between modelling & detailing. Small projects use many legends, schedules and standard details to complete documentation. Limited large scale details are taken from the model and generally detail sections are produced at 1:20 scale.

7.4.2 Building Model Content

Small projects should be modelled using the strategy of a single Revit Building Model file for each Building. This Building Model includes the complete building components contained in the building footprint:

- Floors & Footings
- External & Internal Walls
- External & Internal Structural Components
- All Doors & Windows
- Ceilings
- Roof and Structure
- External Fittings; Sun screening, platforms etc.
- Furniture; Loose & Built-in
- Finishes where deemed appropriate to model.

A general rule of thumb is that if the element appears in many views ie: gutters & fascias then it can be considered for modelling. Gutters and fascia's appear in elevations & sections.

Cupboard joinery is modelled as casework, however doors, drawers and handles are not considered necessary for modelling unless they can be consolidated into a library element for multi use. Detail lines can be added to the appropriate elevation views because they appear in only a limited number of views in this case only once at best twice.

Due to the size of small projects it is not necessary to split the building model into separate Revit model files. This creates unnecessary complexity not required for this size of project.

Modelling single building models in one file allows the model to be easily reused on other projects if required. This is a very real possibility on Multi-Residential projects where buildings are very similar in footprint and external appearance.

7.4.3 Site Model

Option A (Small Projects)

Specifically for projects that contain multiple buildings on one site.

The Site is modelled in a single Revit Site file and each Building Model is linked into the Site Model using shared co-ordinates.

This option would be used for Multi-Residential building projects.

Output (Sheet) Drawings) are created in two separate files.

Site Model: *(Typical but not limited too)* **Building Model:** *(Typical but not limited too)*

A01.01 Demolition Plan

A02.01 Building 6 - Ground Floor Plans

A01.02 Site Plan

A04.01 Building 6 - Elevations & sections

A06.03 Weatherhood & Screen Details

A06.01 Building 6 – Wall sections & Details

A13.01 Signage / Location Plan & Details

Option B (Small Projects)

More commonly used on projects that contains a single building on a site.

The Site is modelled in a single Revit Site file and is then linked back into the Building Model using shared co-ordinates.

The Site Model should contain the complete site information ie: Batters, graded regions, retaining walls, driveways, paths etc, associated dimension, labels, spot levels and associated text.

Specific site views can then be created for use in the Building Model file to create Output Drawings.

All Output (Sheet) Drawings for the project are created in the Building Model file.

7.4.4 Utility Buildings

Utility Buildings such as bin storage shelters, carports, msb enclosures are to be modelled in the Site Model file. The exception being possibly a standard carport shelter which could be a

Building & Asset Services

separate model file included as a standard component with associated Output documentation from the library.

7.4.5 Standard Worksets

Worksets are primarily used to control linked file accessibility, data segregation & managing workflow. The Department is still considering a standard for the use of worksets. While it is not necessary to complicate smaller models it is important to recognise that a strategic or limited use of worksets on smaller models will allow a easier transition for staff to work on all projects throughout the office.

Architectural Worksets – Smaller Projects

- 00 Ground Floor
- 01 First Floor
- 02 Second Floor
- 08 Roof
- 10 Site (Linked File)
- 90 Link Elect (Electrical Model) (Typical for Discipline Models if req'd).
- Shared Levels & Grids (Common)

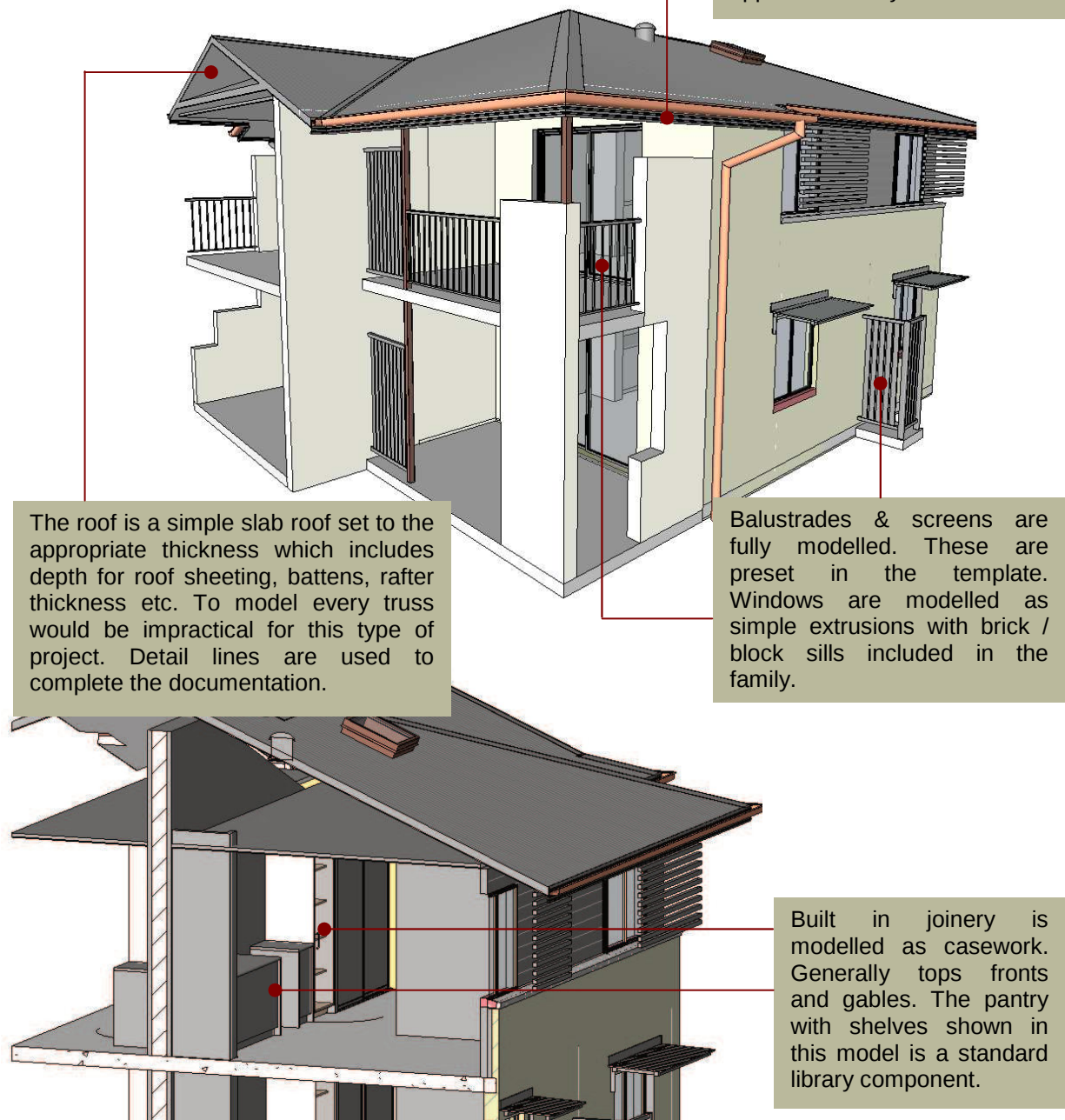
Note: The above list of Worksets is not comprehensive. The (01) prefix is used to determine levels in correct sequence order, ie: 01 = First Floor Level. -1 = Basement level.

Use only the Worksets required for your project. Do not overpopulate the project with Worksets. Limit creating Worksets for visibility control of Revit families and components, use standard Revit commands where possible.

The more complex a project, the more Worksets may be required.

Worked Example

Typical Multi-Residential Building
(Modelled at 1:50 Scale).



7.5 Medium Projects

7.5.1 Model Scale

Medium size projects give us an opportunity to model at a larger scale typically because there is a little more flexibility in the fee structure. Additionally these types of projects generally require more detailed documentation at larger scales. The use of legends & schedules to convey information remains important. These legends & schedules are produced from the live model. Typically medium projects are being modelled at somewhere between 1:20 to 1:10 scale. File sizes increase significantly with this type of modelling and often sit at the higher end limit of acceptable Revit recommendations, (100mb to 200mb).

7.5.2 Building Model Content

Added to the content list for small projects is an increased level of modelling to achieve an output acceptable with the Model Scale for these project types.

- Bathroom & WC areas containing handrails, toilet roll holders etc.
- Walls may be complex or curtain walls.
- Complex balustrades and handrails
- Structural and MEP components and systems are modelled by the correct discipline and integrated into the model as linked files.

Cupboard joinery is modelled as casework. Since many of these projects contain a greater percentage of built-in joinery detailed at larger scales ie: 1:20 it can be beneficial to model more of the components such as gables, toe recess cupboard shelves etc, particularly when the component appears in section views. Handles, Locks etc remain as 2D symbolic lines.

Similar to small projects it probably won't be necessary to split the building model into separate Revit model files. This is not a definitive solution as all projects vary in size and complexity, a medium size project may require the file to be split into two Revit models, particularly where linked Revit consultant files are to be included as part of the model and output.

7.5.3 Site Model

Site modelling remains very much a project by project proposition. At the very least a 2D Revit site file with the linked dwg survey file would be a minimum. A topography based on the contours should be established. Beyond this modelling should be at the discretion of the Model Manager and the perceived benefits to the project team.

7.5.4 Standard Worksets

Additional Worksets may be required. Simply follow the standard method as outlined in Sub-section 7.4.3.

Architectural

- 00 Ground Floor
- 00 Ground Floor Furniture
- 00 Ground Floor Slabs
- 00 Ground Floor Walls External
- 00 Ground Floor Walls Internal
- 01 First Floor
- 01 First Floor Furniture
- 01 First Floor Slabs
- 01 First Floor Walls External
- 01 First Floor Walls Internal
- 02 Second Floor Series (If Applicable)
- 08 Roof
- 10 Site (Linked File)
- 90 Link Elect (Electrical Model) (Typical for Discipline Models if req'd).
- Shared Levels & Grids (Common)

All roof cappings, flashings, gutters fascias and downpipes are fully modelled. **Added: proprietary gutter and downpipe brackets. Complex screens.** Criteria: appears in many views.

Worked Example

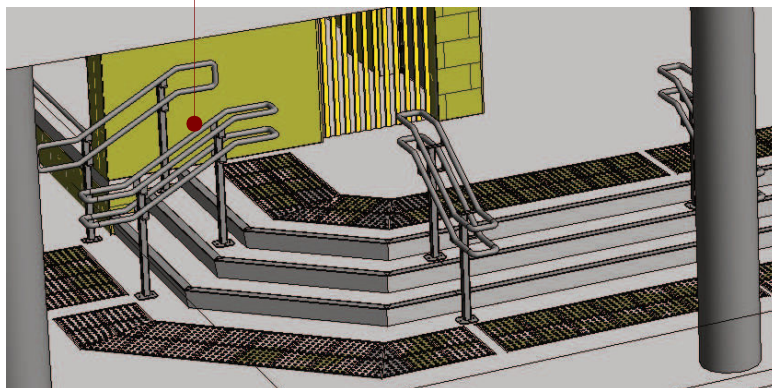
Typical 10 SPACE GLA Education Block
(Modelled at 1:20 Scale).

All roof cappings, flashings, gutters fascias and downpipes are fully modelled. **Added: proprietary gutter and downpipe brackets. Complex screens.** Criteria: appears in many views.



Added: Fully modelled and detailed stairs, handrails, tactiles etc.

Linked structural model included in all views and output.



7.6 Large Projects

7.6.1 Model Scale

The level of modelling needs to be established at the earliest possible opportunity for this type of project. This will determine how the model will be constructed and where logical building model splits will occur. It is impossible to nominate a clearly defined Model Scale for these types of projects.

External Consultants are required to arrange a meeting the Departments representatives to discuss what outcomes are expected.

7.7 BIM Projects

As previously mentioned while all projects could be considered BIM. The projects mentioned in this section may include a specific purpose requiring a higher level of modelling or include some specific function or requirement not typically a requirement of a standard project outsourced by the Department.

External Consultants are required to arrange a meeting the Departments representatives to discuss what outcomes are expected.

7.8 Working with Consultants



Each Consultant should use the appropriate [Project Services](#) Revit template for their discipline to start the project. Each Consultant will be required to model to a similar level of detail as the architectural discipline.

7.8.1 Structural

Structural components should be modelled using Revit Structure, linked to the Architectural model and used throughout the project. The duplicate Architectural model components in the Architectural model such as floors, columns, roof framing etc should be deleted.

The Structural model should be partitioned into logical worksets for maximum flexibility and use by others consultants.

7.8.2 Electrical

Electrical components should be modelled using Revit MEP, linked to the Architectural model and used throughout the project where required.

The Electrical Revit file may not necessarily need to be workshared provided the information is modelled consistently and the other Consultants can manipulate the data as required for their discipline.

7.8.3 Mechanical

Mechanical components should be modelled using Revit MEP, linked to the Architectural model and used throughout the project where required.

The Mechanical Revit file may not necessarily need to be workshared provided the information is modelled consistently and the other Consultants can manipulate the data as required for their discipline.

7.8.4 Hydraulics

Hydraulic components and systems should be modelled using Revit MEP, linked to the Architectural model and used throughout the project where required. Pipework must be modelled on a separate workset for each system.

7.8.5 Other Consultants

Templates are available for other Consultants upon request.

Civil Consultants currently provide dwg file format.

Landscape Consultants currently provide dwg file format.

Families

Families

8 Families

8.1 Concept

Revit families contain parametric component geometry for use in creating models. A family can contain many types or variations from the one element or component, hence the name, Family. Families are a powerful tool for geometry creation, however unless controlled & managed correctly can cause significant problems during the lifespan of a project model, particularly on larger projects and towards the final stages of a project.

Once a family is loaded into a project it remains in the project file unless deleted or modified. It can be edited using the Revit Family Editor, a simple graphical interface that allows users to model, adjust and manipulate the content.

8.2 Design Considerations

This is one of two important steps in creating a Revit family. Even before content & modelling can begin, the following questions need to be asked:

- What size(s) does the family come in?
Is this a custom element (furniture) that comes in one configuration only, or is it a window that is available in several preset sizes? Maybe the family is a work bench that varies in width.
This is an important point to consider before building a family because it will dictate decisions that need to be made in content creation.
- How should the family appear in different views?
Is this an element that should be seen from plan view, elevation view, and/or sectional views? It may be a 2D object that should be seen in plan or elevation. The way the object should appear in views will determine how to define its visibility.
- Does this family require a host?
Is the family typically attached to another design element; a wall, a ceiling? How this family is hosted (or what it does or does not attach too) will determine which template file should be used to start the family.
- How much detail should be modelled?
Is this family an electrical wall outlet that will only be seen in interior elevations from a distance, or is it a door family with raised panels and a sidelight that will be seen in an interior rendering of this project? This determination will help decide the level of detail to provide in the family.
- Where should the origin point be?
For obvious reasons this needs to be considered carefully. Changing the origin of a family at a later stage and reloading into the project will relocate all instances of that family. *This is probably not what you want.*

The other important consideration in creating families is to have a consistent methodology. This should be a written procedure that ensures each family is constructed consistently, methodically and diligently.

8.3 Creating a New Family

There are three types of Revit families:

- System families,
- Standard component families, and

- In-place families.

8.3.1 System Families

System families are defined within Revit and comprise the basic building components such as walls, floors and roofs etc. The structure and properties of system families can be adjusted to suit. New system families can be created by duplicating the original system family and modifying its structure and properties. Modellers can not create new system families.

8.3.2 Standard Component Families

Standard component families are the most common Revit families. They are also the most valuable because they can be created outside of the project and can contain specific organization, manufacturer & construction content. For this reason most of the remaining content of this section will be devoted to these families. Additionally these families make up organization libraries.

8.3.3 In place Families

These are components that are created specifically for the current project. They are created from within the current project, and can not be used in other concurrent or future projects.

8.4 Family Templates

Standard family templates are supplied with Revit. These templates cover a broad range of options for family content creation from 2D annotation objects to 3D window, furniture or detail components. [It is important to choose the correct template for the appropriate component.](#) Templates have been pre-configured to aid in the construction of a specific object/component type. In other words, if creating a window then use a window template because a window template is pre-configured with height & width parameters and appropriate reference planes.

[External consultants are requested to use the correct family template for the geometry being modelled. Limit the use of the Generic Model category to only those items that need the Revit features this category offers.](#)

8.4.1 Naming Conventions

Refer to Ch 11 Library

8.4.2 Sub Categories / Object Styles

Object styles are a necessary tool used to control how the Revit elements appear when displayed on screen or printed on output media. They are also used to control visibility of elements and sub-elements within a Revit category.

Like most things in Revit it is important to not overpopulate the file with unnecessary data. Use digression when creating object styles. The template has been preset with pen weights assigned to object styles.

Within each family template a number of standard subcategories are defined. Project Services library elements utilises these standard categories and subcategories to maximise the efficiency of Revit and to limit the creation of unnecessary sub-categories/object styles.

Be consistent when creating Sub-categories. Check to see if it exists in the project file first and can it be used in your geometry.

Use consistent naming conventions.

2D & 3D PRESENTATION & DOCUMENTATION STANDARDS

Output

9 2D & 3D Presentation & Documentation Standards

9.1 2D CAD Reference Manual

The 2D standards in this section cover only those specific Revit elements needed to allow concurrency with the existing 2D CAD Reference Manual. It does not include documentation & presentation standards already dealt with in the 2D Manual. This section is to be read in conjunction with the 2D CAD Reference Manual. [This Manual should be included as part of the External Consultants package otherwise available on request.](#)

9.2 Line Styles

Revit line styles consist of three elements:

- **Line pattern**

Generally Project Services have duplicated our standard AutoCAD line styles as the basis for Revit line patterns. This means that a CL05 line style in AutoCAD becomes a CL05 line pattern in Revit.

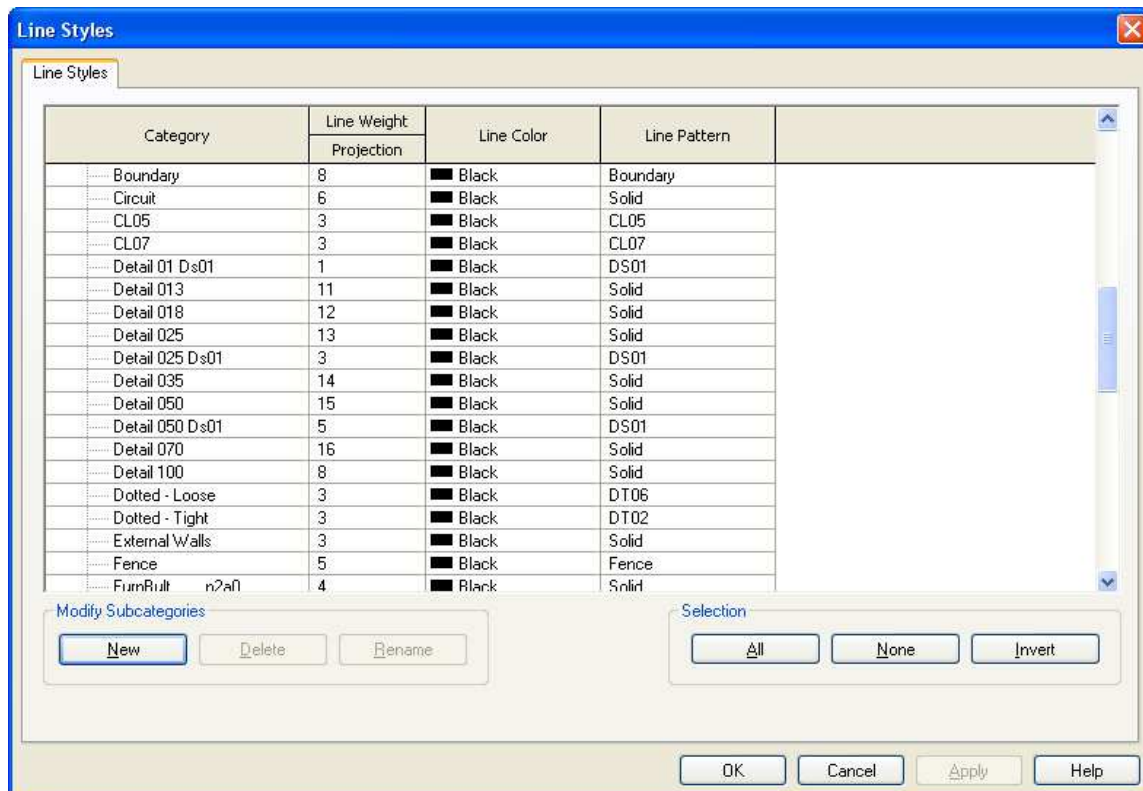
Because of the different nature of lines in Revit, line style names can not be the same as their AutoCAD counterparts. Inherent in Revit is the ability to control the line weight & colour within the line style itself.

- **Projection line weight**

This controls the way the line ([Detail & Model lines](#)) appears in the model & at different view scales at the same time.

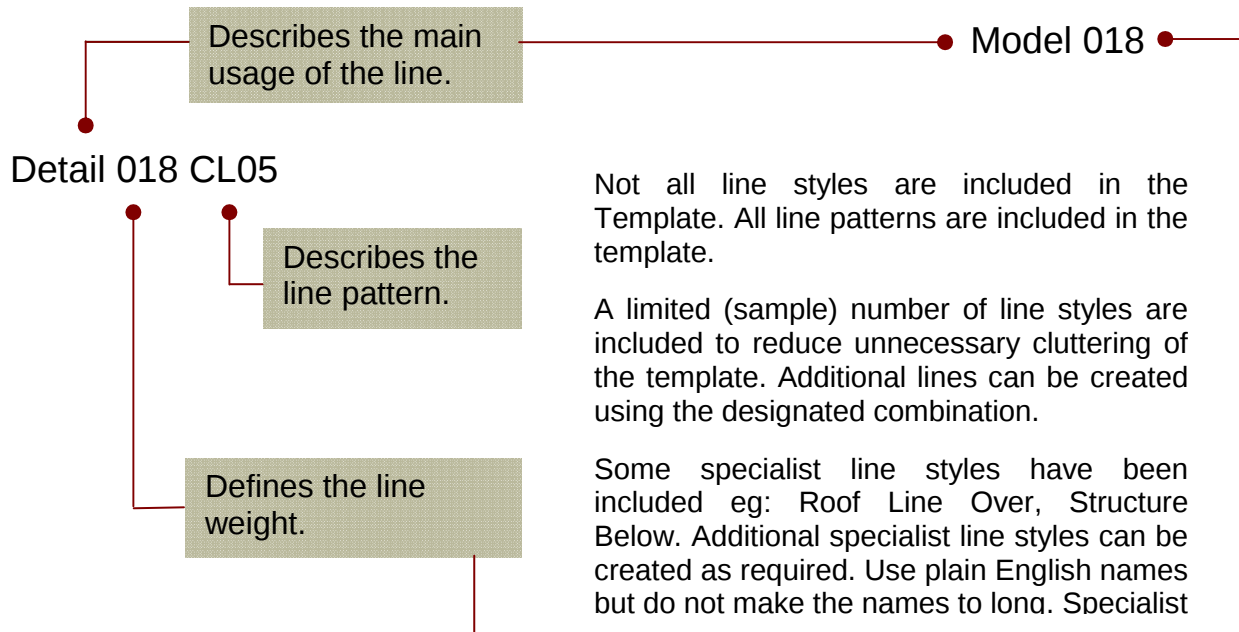
- **Line colour**

Controls the colour of the line.



Line styles cont'd.

Generally Project Services agreed standard is as follows:



9.3 Line Weights

Line weights are as per the following tables. Note: Pens 10 – 16 have been set to remain constant across all scales for detail work.

Line Weights

Model Line Weights | Perspective Line Weights | Annotation Line Weights

Model line weights control line widths for objects like walls and windows in orthographic views. They depend on the scale of the drawing.

There are 16 model line weights. Each can be given a size for each view scale. Click on a cell to change.

	1:2	1:5	1:10	1:20	1:50	1:100	1:200	1:500	1:1000
1	0.1800	0.1800	0.1800	0.1300	0.1000	0.1000	0.1000	0.1000	0.1000 mm
2	0.2500	0.2500	0.2500	0.1800	0.1300	0.1300	0.1300	0.1300	0.1300 mm
3	0.3500	0.3500	0.3500	0.2500	0.1800	0.1800	0.1800	0.1800	0.1800 mm
4	0.5000	0.5000	0.5000	0.3500	0.2500	0.2500	0.2500	0.2500	0.2500 mm
5	0.7000	0.7000	0.7000	0.5000	0.3500	0.3500	0.3500	0.3500	0.3500 mm
6	1.0000	1.0000	1.0000	0.7000	0.5000	0.5000	0.5000	0.5000	0.5000 mm
7	1.2500	1.2500	1.2500	1.0000	0.7000	0.7000	0.7000	0.7000	0.7000 mm
8	1.5000	1.5000	1.5000	1.2500	1.0000	1.0000	1.0000	1.0000	1.0000 mm
9	1.5000	1.5000	1.5000	1.5000	1.2500	1.2500	1.2500	1.2500	1.2500 mm
10	0.0800	0.0800	0.0800	0.0800	0.0800	0.0800	0.0800	0.0800	0.0800 mm
11	0.1300	0.1300	0.1300	0.1300	0.1300	0.1300	0.1300	0.1300	0.1300 mm
12	0.1800	0.1800	0.1800	0.1800	0.1800	0.1800	0.1800	0.1800	0.1800 mm
13	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500 mm
14	0.3500	0.3500	0.3500	0.3500	0.3500	0.3500	0.3500	0.3500	0.3500 mm
15	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000 mm
16	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000 mm

Model Line Weights:

Model line weights adjust through the different scales.

Note: changing this table will cause inconsistencies with other Project Services Revit files & projects.

Line Weights

Model Line Weights | Perspective Line Weights | Annotation Line Weights

Perspective model line weights control line widths

There are 16 model line weights. Click on a cell to change.

1	0.0750 mm
2	0.1000 mm
3	0.1300 mm
4	0.1800 mm
5	0.2500 mm
6	0.3500 mm
7	0.5000 mm
8	0.7000 mm
9	1.0000 mm
10	2.0000 mm
11	0.1300 mm
12	0.1800 mm
13	0.2500 mm
14	0.3500 mm
15	0.5000 mm
16	0.7000 mm

Perspective Line Weights:

Perspective line weights control how the model appears in perspective view in hidden line mode.

Line Weights

Model Line Weights | Perspective Line Weights | Annotation Line Weights

Annotation line weights control line widths for objects like sections and dimer and projection method.

There are 16 annotation line weights. Click on a cell to change.

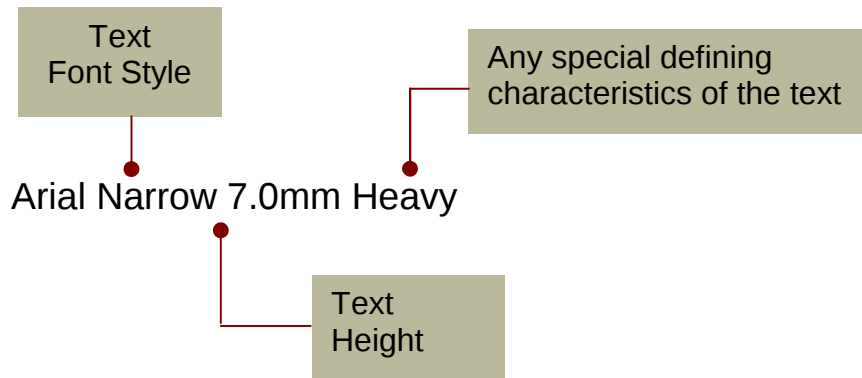
1	0.0750 mm
2	0.1000 mm
3	0.1300 mm
4	0.1800 mm
5	0.2500 mm
6	0.3500 mm
7	0.5000 mm
8	0.7000 mm
9	1.0000 mm
10	2.0000 mm
11	0.1300 mm
12	0.1800 mm
13	0.2500 mm
14	0.3500 mm
15	0.5000 mm
16	0.7000 mm

Annotation line weights control how annotation & symbol linework appear through the project.

9.4 Text styles

Arial Narrow (True type font) with the width factor set to 1.0 is the preferred text style for documentation. Isopeur (True type font) is allowed in Revit where the documentation needs to match AutoCAD documentation. The Isopeur font closely resembles the Iso3098b font style required for AutoCAD drawings.

The syntax of the font is as follows:-



Note: The standard display for text will be with a transparent background. The special defining characteristics should define any variance to the standard font syntax ie: heavier text, opaque, different arrows etc.

9.5 Object Styles

The Object Styles dialogue box controls how Revit elements are displayed in both the model & 2D output. Object styles also control how elements display in both projection output (elevations, roof plans etc) & cut (plans & sections). Separate line weights & colours can be assigned to both. **! Remember model element display will adjust when viewed across separate scales. This is a powerful feature of Revit.**



The standard templates have been adjusted to generally match current 2D Standards. Care should be exercised when changing these styles as output quality may vary if multiple Revit files are used across a project.

9.6 View Properties

The View Properties dialogue box controls how Revit displays a view. The view properties controls options such as wireframe, scale, detail level, underlays & view range.

By far the most confusing of these settings is the View Range option. This option controls how much of the model is displayed when looking down in a plan view etc. There is a bottom plane, an upper plane and a cut plane which can all be set independently. **The template sets standard view ranges consistent with standard architectural practice.** These options can be adjusted as required. They are view dependent and do not impact on other views or Revit files.

9.7 Course, Medium and Fine

Do not use the Course view detail level setting for output unless there is a specific need. The Course view provides some interesting features in Revit such as providing default overrides in System families such as walls which can forced to display differently in Course detail view.

Project Services also uses the Course view setting in some families such as doors to show access (PWD) footprints etc. Structural families show analytical lines in course view. **Setting a finished view to Course detail level may not give you the desired output.**

9.8 Key Notes

Keynoting allows abbreviations to be placed on elements etc for output. The 2D CAD Reference Manual lists approved discipline abbreviations. The architectural template includes a standard Keynote file containing a complete list of these abbreviations for use on projects.

External consultants should produce Legends from Project Services standard Keynote file where ever possible.

[This standard keynote text file is included as part of the External Consultants package otherwise available on request.](#)

Keynoting is encouraged with the Keynote Legend set to read Keynotes by sheet.

Exporting

Exporting

10 Exporting

10.1 Exporting to Autocad

The translation of Revit data to AutoCAD is necessary for use by internal & external consultants.

Where possible the translation should aim to replicate Project Services AutoCAD standard of using “clean skin” base drawings. This process in fact helps the translation, because it means fewer Revit elements need to be exported to AutoCAD.

Clean skin drawings generally include walls, doors, windows, roofs, sanitary plumbing equipment and other elements required for use by consultants. Unnecessary linework and labelling doesn't need to be exported. To achieve this “clean skin” export from Revit, specific views are established by duplicating the view.

The timing of this action depends on the need of the consultants to access the information. The important consideration is to include the necessary information to allow the consultants to complete their work.

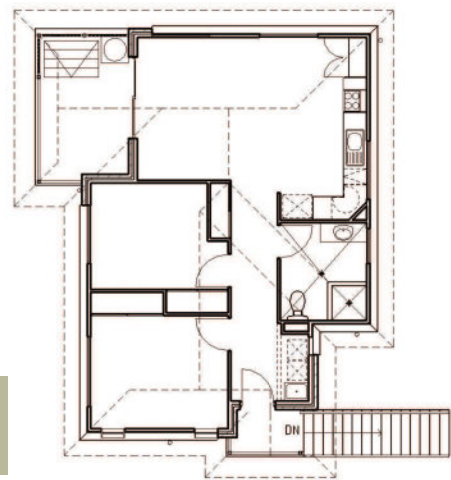
The view used for exporting should have the word “Export” appended to clearly indicate which views are being used for exporting.



Eg: A view of the First Floor Plan for export would be called : **Export First Floor Plan**

(Note: The full word must be used. Do not shorten to “E” for obvious reasons).

Typical “clean skin” first floor export view.



10.1.1 Mapping Tables

Clean mapping tables are supplied as part of the External Consultants package.

Note: It is important to copy this file at the start of each project to the Revit Project Library. Every time a translation occurs the translation table is updated with any additional Revit geometry in the project.



The original file is set to “Read Only” to stop Cad Managers from accidentally writing to this file.

10.2 Exporting to IFC

Exporting to IFC is necessary to provide geometry and data to ArchiCAD and other software packages. IFC data is required by Project Services ArchiCAD disciplines.

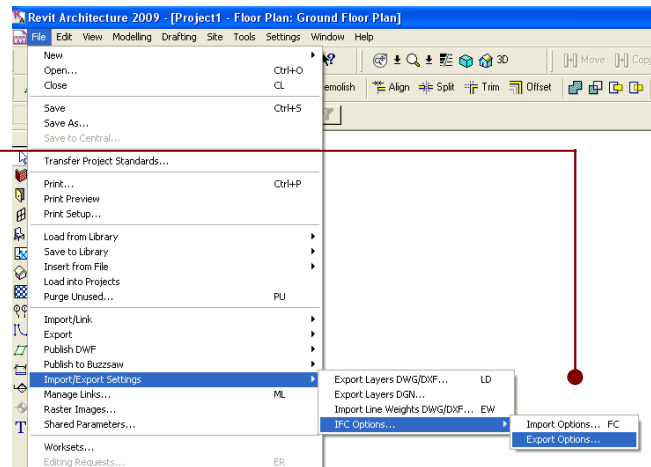
Office Interiors and Landscape Architects are 100% ArchiCAD based and on larger projects there is a continuous cycle of information flow between the two packages. Unlike AutoCAD, ArchiCAD requires 3D geometry. This can only be achieved using IFC exporting at this time. Similar to AutoCAD a selection set of geometry needs to be identified. The most useful way of achieving content selection is to use Revit's 3D view. Identify what geometry needs to be translated, turn off what is not required and export from the 3D view.

10.2.1 Worked Example

Ensure the correct mapping table is used. If there is no specific file loaded a default IFC mapping table text file will be used. A standard Project Services, Revit to ArchiCAD IFC mapping table text file is available on request.

Load the standard IFC mapping table text file using the Import/Export settings option. This populates the mapping table with new Project Services mapping data.

Category	IFC Class Name
Stringers	{ IfcStair }
Stringers Beyond Cut Line	{ IfcStair }
Up Arrow	{ IfcStair }
UP Text	{ IfcStair }
Structural Area Reinforcement	IfcBuildingElementProxy
Boundary	{ IfcBuildingElementProxy }
Structural Beam Systems	IfcBuildingElementProxy
Hidden Lines	{ IfcBuildingElementProxy }
Structural Column Tags	IfcBuildingElementProxy
Structural Columns	IfcColumn
Analytical Model	{ IfcColumn }
Hidden Faces	{ IfcColumn }
Hidden Lines	{ IfcColumn }
Rigid Links	{ IfcColumn }
Stick Symbols	{ IfcColumn }

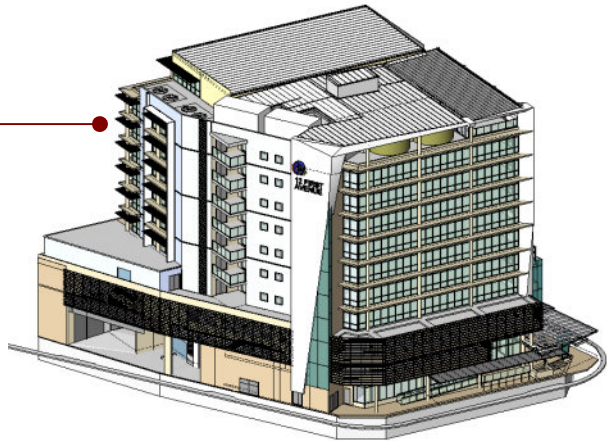


Next, go to the Revit view which best suits the required export. Most times this will be the 3D view. This allows the whole model to be exported in one export while allowing control over geometry not required for exporting. Views such as Floor Plan views do not always allow control over elements not seen in the view and not required for exporting.

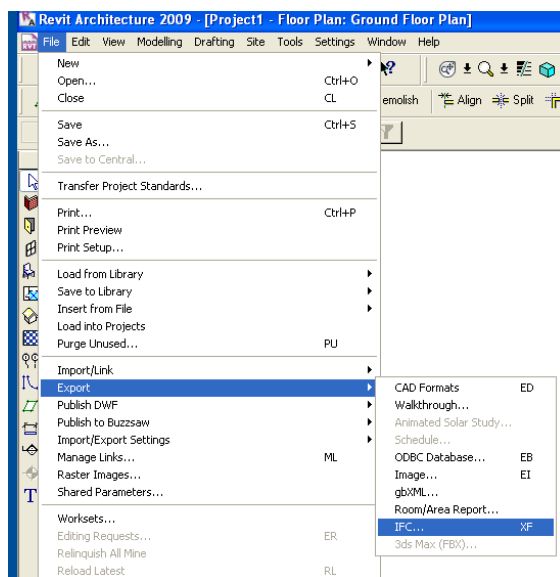
Once in the 3D View turn off elements not required for export using one of Revit's visibility settings. (They all work).

Use VV or Hide in View to turn off elements or categories not required for IFC exporting.

Providing the export settings are correct Revit will not export elements not visible in this view.



You are now ready to export.

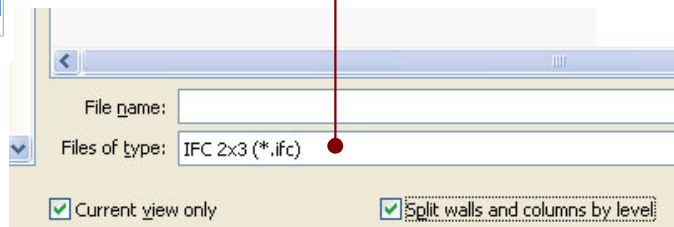


Go to File, Export, IFC. Ensure the export file option is set to IFC 2x3 (*.ifc)

Tick both the “Current view only” and the “Split walls and columns by level” check boxes.

Ticking the “Current view only” check box ensures the visibility settings applied to the view are carried out in the IFC export.

Ticking the “Split walls and columns by level” reproduces the floor levels in the IFC export which are carried through to ArchiCAD.



10.3 Exporting to DWF

Exporting to DWF is necessary to provide geometry and data to other software packages. DWF data is required by Project Services Quantity Surveyors for use with CostX software.

Libraries

Content

11 Libraries

11.1 Overview

As with any Cad package, the storing & re-using of Content is the key to productivity and efficiency.

Project Services stores Content in four Library locations.

11.1.1 psRevitLibrary

This is the master Project Services Library location. All Content stored in this library goes through a predetermined checking process prior to inclusion.

11.1.2 Development Library

This is a storage location for Content created or transferred from projects and is considered worthy for inclusion in the master psLibrary. Library Content can be located in this Library by Revit modellers.

11.1.3 OOTB Library

The Out Of The Box library is where Content from the original package is stored. This library recognises the reality that Content stored here may be overwritten on installation of new releases. Since the AutoDESK software is released every 12 months Content potentially can be overwritten each time.

11.1.4 Project Library

Project Libraries are created for each project under the 3D Model directory. The purpose of this Library is to define a location where Revit modellers working on the current project can create & modify Content specific to the current project. After the completion of the project, content can be reviewed and transferred to the Development Library for inclusion in the psLibrary.

11.2 Revit Library Naming Conventions

Finding data quickly & efficiently go hand in hand with productivity.

The following convention consists of a hierarchal structure. The Primary Identifier will successively be downgraded or removed as the naming of the element within the Revit structure progresses further down the Library (naming) tree.

Note: Revit elements & families are to be named according to their ARCHITECTURAL identity/category rather than their REVIT category. (Refer to the Revit Family naming and Category mapping table in this section.)

Generally both Revit & Architectural categories are similar, in other words, a door in Revit is a door in the Architectural world. Where confusion will occur, is when Revit categories such as annotations, generic models, etc are used to define an architectural element. [In this case the above mentioned logic should apply.](#) An example could be where a structural or architectural element has been modelled from a generic model template. It will receive an Architectural name as a Primary Identifier not the Revit "Generic Model" category identifier.

System Families:

System Families are, as the name suggests, families that are part of the Revit system or package. They generally come with predefined parameters & settings for immediate use. Examples include walls, ceilings, slabs, stairs etc. These families can be copied or modified in the template or project, but can not be exported or loaded in as a separate Revit family.

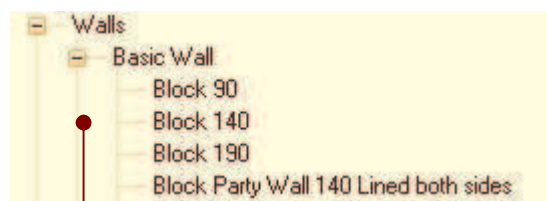
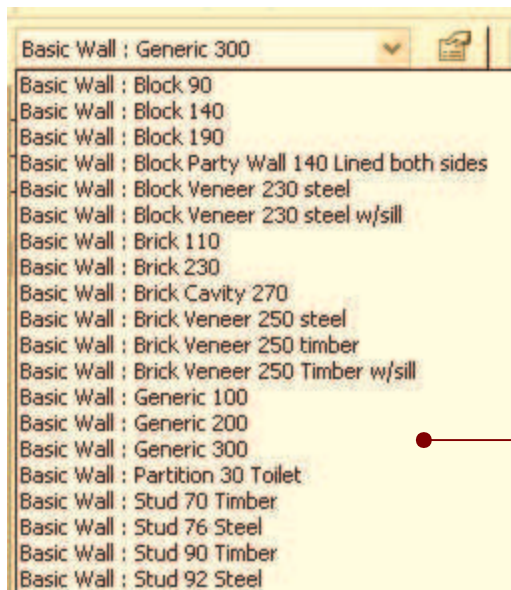
Primary Identifier	Secondary Identifier	Size Identifier	Additional Identifier
When the Revit family is a system family, the Primary Identifier will be the default system family name. (This is automatic). Note this shows differently between the Project Browser view and the Design Bar view.	The Secondary Identifier should identify the next most significant element in the family construction. This will typically be the most commonly used search field, so it is important to get this right.	This may not be required in every instance.	The Additional Identifiers should identify extra information that is needed to clearly separate similar families but with either extra information or variations to the master.

Basic Wall:	Block	190	
Basic Wall:	Block Veneer	230	Steel w/sill
Basic Wall:	Stud	76	Steel

Basic Roof:	Metal Frame		Tile
Basic Roof:	Timber Truss		Metal

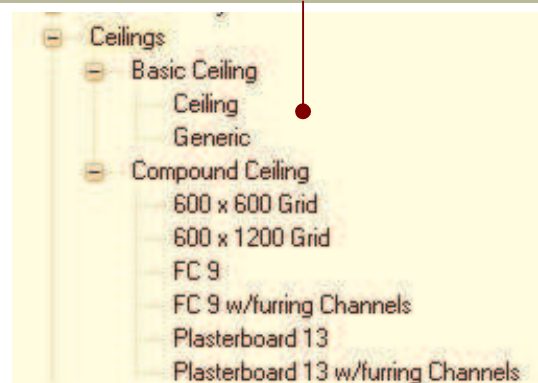
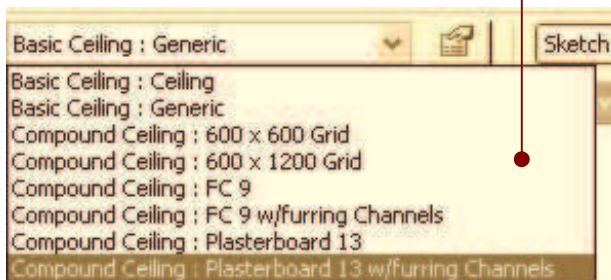
Floor:	Concrete	100	
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System Families - Worked Examples



The illustration on the left is the Revit “Design Bar” display. Notice that the Basic Wall: name is added to the system family name, whereas the illustration at the top is the “Project Browser” family view. The Basic Wall name is shown as a sub-level display.

Generally system families will be selected from the “Design Bar”, whereas project families are more commonly selected from the “Project Browser” view.



RULES:

Use spaces to separate all identifiers after the system family name. Use sentence case except when starting with a joining word such as: (and, for or with etc). Do not add mm (Units). Use “Generic” for a simple or sample type that can be easily modified.

11.2.1 Project Families:

Project Families are any Revit families other than System families. They can be project families which have been modified and exported to a Library or a new family created from a family template & saved into a Library.

Typically many of these families are Component Families and can appear in the Design Bar under the Component category or can appear in the Project Browser, which may contain many architectural components under the Component category heading.

Either way, the naming of these items is critical for ease of locating and using.

[For more information on family Content creation refer to Chapter 8 Families.](#)

Primary Identifier	Secondary Identifier	Size Identifier	Additional Identifier
With project families, the Primary Identifier becomes the main architectural element name. In most cases, the Revit Family Category will be the same as the corresponding architectural element and is sufficient to identify and locate the family, but not always.	The Secondary Identifier should identify the next most significant element in the family construction. This will typically be the most commonly used search field, so it is important to get this right.	This may not be required in every instance.	The Additional Identifiers should identify extra information that is needed to clearly separate similar families but with either extra information or variations to the master.

Door Families

Door	Double		Steel Frame Wrap 1428-2
Door	Single		Steel Frame Inside 1428-2
Door	Sliding		Aluminium 2 Panel

Entourage Families

Entourage	Ambulance		
Entourage	Car		03
Entourage	Truck		Delivery 01

Generic Models

The Primary Identifier for these families will take on the highest Architectural category name. This is to avoid duplicate families being created in the project. In other words, all sanitary equipment such as soap dispensers, tap ware, mirrors etc should be included with a Primary Identifier of Sanitary. This will group like elements together and make them easier to locate and identify.

Note: The Generic Model category is not a free for all to create geometry. Every consideration should be given to creating geometry in its correct Revit category. This is particularly important for BIM models, where programs such as IFC exports, CostX and Navisworks can not correctly identify geometry created in these families.

Art Built	Entry Feature		
-----------	---------------	--	--

Awning			w/angle Supports
Floor	Mat		at Entrance
Floor	Sump		
Sanitary	Soap		Dispenser
Sanitary	Toilet Roll		Holder
Site	Fence		Chain Wire w/posts & Rails

Windows

Note: Window sizes as Types.

Window	Sliding		Alum
Window	Casement		Timber
Window	Double Hung		Timber

RULES:

Use spaces to separate all identifiers after the Project family name. Use sentence case except when starting with a joining word such as: (and, for or with etc). Do not add mm (Units). Use "Generic" for a simple or sample type that can be easily modified.

11.2.2 Project Families – Worked Examples

Doors:

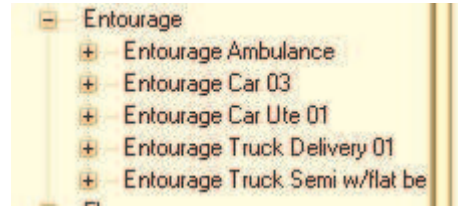
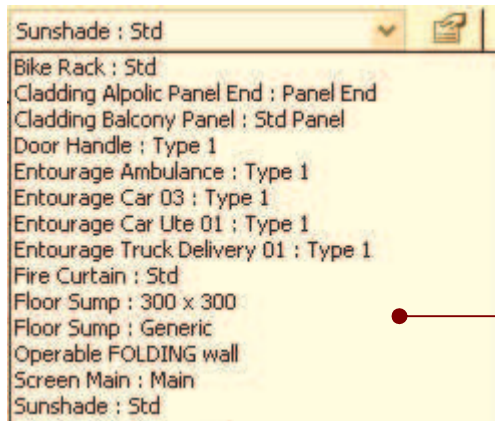
The screenshot displays the Revit interface for managing door families. On the left, the Design Bar shows a list of door types, including 'Door Sliding Aluminium 2 Panel : 1810'. On the right, the Project Browser shows a hierarchical view of the 'Doors' category, listing various door types such as 'Door Single Toilet Partition', 'Door Bi-Fold Centre Pivot', and 'Door Double Robe Aluminium'. A red dot in the Design Bar points to the 'Door Sliding Aluminium 2 Panel' entry, and a red dot in the Project Browser points to the 'Doors' category.

Design Bar view.

Project Browser view.

Building & Asset Services

Entourage:



In this illustration in the Design Bar view the Entourage categories are interspersed with other Component families such as Generic Models. This is one reason to correctly name geometry.

Generic Models:



Remember:

Revit will place the Family correctly in the Project file. What is important is locating Content from the Library and avoiding duplication in Project files because the Family is not obvious or correctly named.

Revit Family naming and Category mapping table

Families that are named and categorized according to standard Revit Template Categories and Revit System Family names.

Building Component (real world name)	System Family	Project Family	Revit Family Category	Revit Family Naming Primary Identifier
Casework		✓	Casework	Casework
Ceiling	✓		Default System	Secondary Identifier
Columns		✓	Columns	Column
Column (Structural)		✓	Structural Column	Struct Col
Curtain Wall	✓		Default System	Secondary Identifier
Door		✓	Door	Door
Door – Curtain Wall		✓	Door – Curtain Wall	Door_Curt Panel
Electrical Equipment		✓	Electrical Equipment	Elec Equip
Electrical Fixture		✓	Electrical Fixture	Elec Fixt
Entourage		✓	Entourage	Entourage
Floor	✓		Default System	Secondary Identifier
Foundations/Footings		✓	Structural Foundation	Struct.Foun
Furniture System		✓	Furniture System	Furn Sys
Furniture		✓	Furniture	Furn
Lighting Fixture		✓	Lighting Fixture	Light Fixt
Linear Lighting		✓	Linear Lighting	Light Lin
Spot Lighting		✓	Spot Lighting Fixture	Light_Spot
Mass	✓	✓	Mass	Mass
Mechanical Equipment		✓	Mechanical Equipment	Mech Equip
Parking		✓	Parking	Parking
Planting		✓	Planting	Planting
Plumbing Fixture		✓	Plumbing Fixture	Plumbing
Railing	✓		Default System	Secondary Identifier
Railing – Baluster		✓	Baluster	Baluster
Ramp	✓		Default System	Secondary Identifier
Roof	✓		Default System	Secondary Identifier
Site		✓	Site	Site
Speciality Equipment		✓	Speciality Equipment	Spec Equip
Stairs	✓		Default System	Secondary Identifier
Structural Framing		✓	Structural Framing – Beams and Braces	Struct Fram
Structural Framing (Complex & Trusses)		✓	Structural Framing – Complex and Trusses	Struct. Fram
Wall	✓		Default System	Secondary Identifier
Window		✓	Window	Window_

Window – Curtain Wall		✓	Window – Curtain Wall	Window_Curt Panel
-----------------------	--	---	-----------------------	-------------------

Custom created Families – Families that do not have an available Family Category Template which describes its real world composition

This list is not exhaustive. There are endless types of building components which can be used within a project. The table is a guideline to the recommended assigned Category and Naming of building project families.

Building Component (real world name)	System Family	Project Family	Revit Family Category	Revit Family Naming Primary Identifier
Awnings		✓	Generic Model	Awning
Art Built-in		✓	Generic Model	Art Built
Bathroom Accessories		✓	Plumbing Fixture	Plumbing
Cupboards (Built-in)		✓	Casework	Casework
Floor Fixtures/Accessory		✓	Generic Model floor based	Floor
Furniture (Loose)		✓	Furniture	Furn
Furniture (Built-in)		✓	Casework	Casework
Ladders		✓	Generic Model	Ladder
Machinery (Misc)		✓	Specialty Equipment	Spec Equip
Railing (Custom Model)		✓	Generic Model	Baluster
Roof Fixtures/Accessory		✓	Generic Model roof based	Roof
Screening		✓	Generic Model	Screen
Site Accessory		✓	Site	Site
Sunhood		✓	Generic Model	Sunhood
Skylight		✓	Window	Window
Signage		✓	Generic Model	Sign
Sundries (Misc)		✓	Generic Model	Descriptor
Wall Fixtures/Accessory		✓	Generic Model wall based	Wall
Vehicles/People		✓	Entourage	Entourage

Annotations:

Annotations generally follow the same conventions as Project Families however the need to identify Annotations Families by their category is unnecessary because the family description should be adequate to identify that it is an Annotation Family. Primary Identifiers are still used to separate or group like elements.

Tag	Keynote	2.5	Transparent
Symbol	Arrow		Step
Symbol	Mrp		

Annotations:



11.2.3 Profiles

The same progressively filtered structure will apply to profiles. Profiles however, will be used across all Revit categories and architectural components. The need for a clear structured strategy is essential.

Primary Identifier	Secondary Identifier	Size Identifier (If Required)	Additional Identifier
Profile	CHS	75Dx4	
Profile	Col	75Dx6	
Profile	Fascia	185	Steel Novaline
Profile	Gutter	125	Quad
Profile	Rail	60	
Profile	RHS	75x75x4	

RULES:

Use spaces to separate all identifiers after the Profile name. Use sentence case expect when starting with a joining word such as: (and, for or with etc). Use Capitals for industry standard conventions such as structural steel profiles. Do not add mm (Units). Use D for Depth, H for Height and W for Width when needed to identify a direction.

- Profile Gutter Quad 115 125 150 175 - Gutter - Quad - Profile Handrail Circular 25 38 - Profile Handrail Webforge 42 + Profile Mullion 475-J101 M Gjames_n + Profile Mullion 475-M101 Gjames_n + Profile Mullion 475-S101 Gjames_n - Profile Mullion 475-T102 Gjames_n - Type 1	- Profile Roof Flashings - Barge - Barge-Square - Barge-Top - Hip - Ridge - Upstand - Valley - Profile Toeboard Rail Webforge - Type 1
---	--

11.2.4 Family Types:

Family Types need to be kept simple and as short as possible. Project Services strategy is to group similar elements where practical in one family and then identified and used as Family Types.

All families must identify at least one Type.

The following Family Types are acceptable but not limited too:

Std (A standard type such as a Company standard for that component or a standard component that is used regularly).

Type 1 (Where a name is not necessarily required to identify what the element is, but there must be a Type name.)

920 PWD (Clearly identified a size and a function. In the case the function is given as part of the type because not all type perform this function).

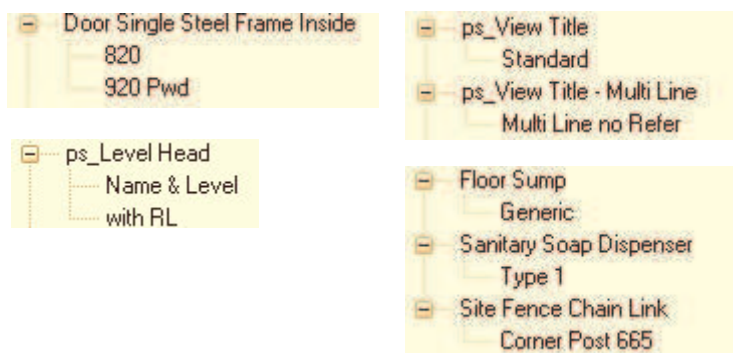
820 (Clearly identified a size).

with RL

Name and Level

System Tag

11.2.5 Family Types – Worked examples



11.2.6 Object Styles:

Object Styles are used to control the display of 3D geometry & 2D output of the primary Revit category and sub elements (sub categories) in the project. Sub categories are generally created in the family prior to loading into the main project.

Object Styles are especially useful in controlling the display of geometry sub categories in all views. In particular complex geometry can be displayed at a high level of detail in a large scale whereas in smaller scales sub elements can be turned off in these views.

Object styles are used in conjunction with view templates and together form a powerful tool for repetitive types of views.

The naming of Object Styles (like many Revit features) has the potential to create a long list of names (identifiers) that can cause problems for modellers, particularly on large projects. Additionally, because consultants may need to use the same Object Styles in a shared environment it can be tedious identifying geometry.

Phases

Working with Phases

12 Working with Phases

12.1 Overview

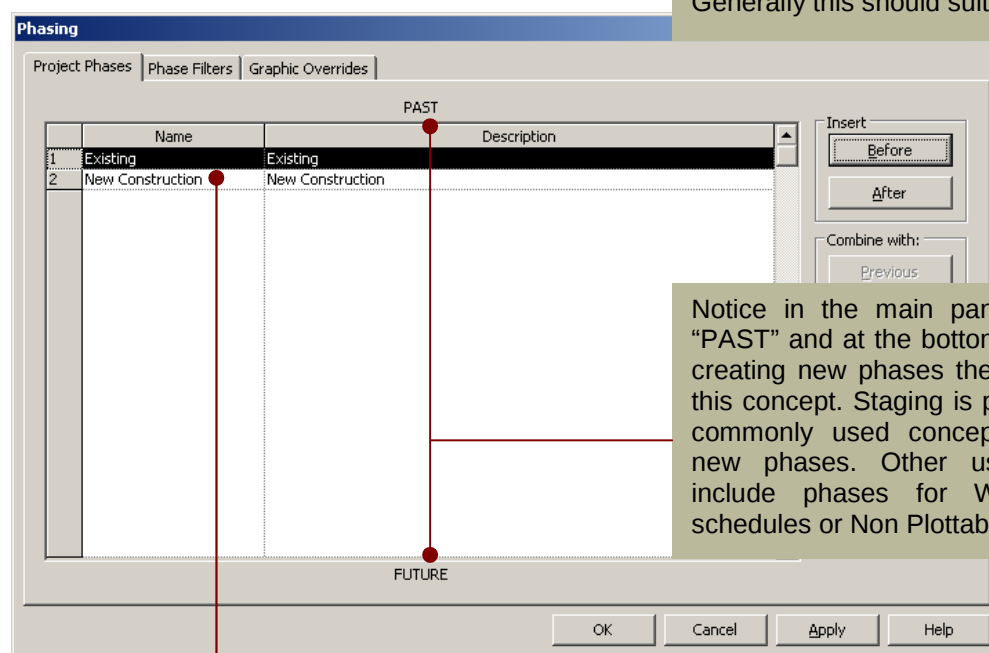
Phasing in Revit is intended to represent the three major construction stages; Existing, Demolished and New.

It is generally not necessary to create additional phases for standard workflow. Revit provides two standard phases; Existing and New. Any combination of construction work, output and scheduling can be controlled using these two phases in conjunction with phase filters & phase overrides. [Phase filters & associated overrides are the critical part of using phases.](#)

New phases can be created for staging, timeline construction history and various non essential control of geometry, but have reduced interaction with the standard phases, phase filters and overrides. In other words; output, either in the form of a 3D model or 2D documentation may not be able to be controlled using standard phase settings and may need to be controlled using other Revit features if new phases are added.

Phasing can become a complicated concept if the process is not understood properly. Project Services templates are configured to produce output consistent with what would be expected from the construction sequence and standard 2D output. As previously mentioned, new phases can be created but changes will need to be added for integration with the standard template configuration.

12.2 Phasing



This is the standard phase window. Generally this should suit most projects.

Notice in the main panel at the top is "PAST" and at the bottom is "FUTURE". If creating new phases they must fit in with this concept. Staging is probably the most commonly used concept when creating new phases. Other uses for phasing include phases for Window & Door schedules or Non Plottable elements.

Two phases only are provided.

12.2.1 Phase Filters

Phase Filters are used to control the display of geometry in a view, in line with construction sequencing or staging (if phases have been created for staging).

	Filter Name	New	Existing	Demolished	Temporary
1	Show All	By Category	Overridden	Overridden	Overridden
2	Show Complete	By Category	Overridden	Not Displayed	Not Displayed
3	Show Demo + New	By Category	Not Displayed	Overridden	Overridden
4	Show Existing	Not Displayed	By Category	By Category	Not Displayed
5	Show Existing + Demo	Not Displayed	By Category	Overridden	Not Displayed
6	Show Existing + New	By Category	Overridden	Not Displayed	Not Displayed
7	Show Extg + Demo + Ne	By Category	Overridden	Overridden	Not Displayed
8	Show New	By Category	Not Displayed	Not Displayed	Not Displayed

The Filter Names indicate the construction combination appropriate for the required display.

Notice the Show All filter can not be changed. It is a system Filter and does not need to be changed.

Output display is controlled by Graphic Overrides. These are assigned to geometry against the appropriate filter.

Notice that even though the title bar indicates a Demolished phase there is, in fact, no Demolished phase assigned in the Template.

The demolition is controlled by a special Revit feature (Demolish Tool). This geometry can then be used in association with the above Filters & Graphic Overrides.

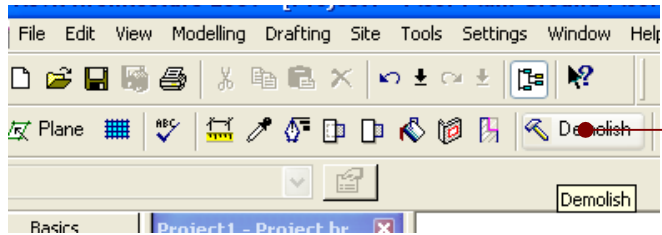
12.2.2 Graphic Overrides

Phase Graphic Overrides give complete control of model component graphical output according to their applied construction phase, i.e. line weight, line colour, line pattern etc. Graphic Overrides enable the application of custom graphical output settings outside the default 'Object Styles'. Graphic Overrides are only applied to model components if the Graphic Override has been assigned to a phase filter.

Note: Graphic Overrides properties may vary for individual disciplines according to their desired drawing graphical output and drafting standards. An example would be where existing components for Architectural are displayed as grey whereas existing components for consultants may be displayed as black dashed.

Phase Status	Projection/Surface		Cut		Halftone	Material
	Lines	Patterns	Lines	Patterns		
Existing					☐	
Demolished				Hidden	☐	Phase-Demo
New					☐	
Temporary				Hidden	☐	Phase-Temp

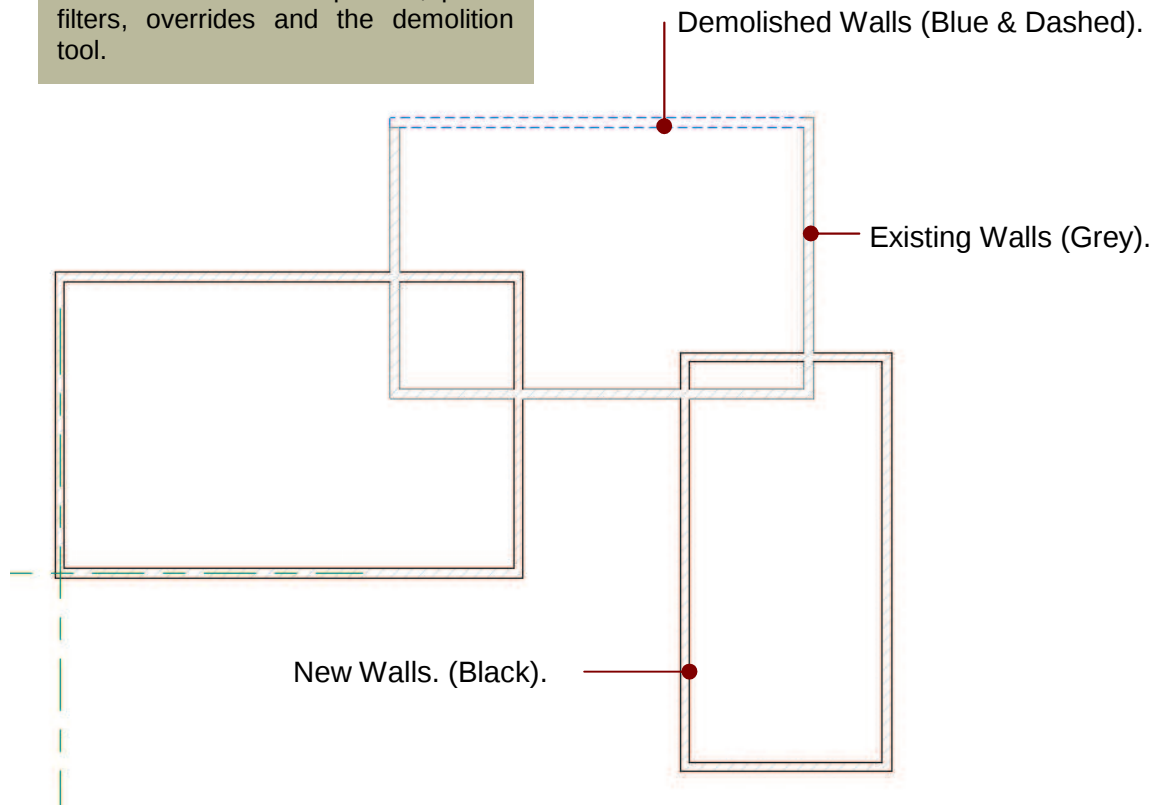
Graphic Overrides from the master Architectural Template. These can be adjusted to suit output requirements.



The Demolish tool performs a special function in that it will demolish existing walls and display correctly in the standard view.

Note: for this to work correctly the existing geometry needs to be created on the existing phase.

Notice the three different outputs created from the two phases, phase filters, overrides and the demolition tool.



If specific phases are required for the project, an Appendix must be added to the BMP outlining the Phase Methodology and the override controls.

Working with Consultants

**Why should I
care.**

13 Working with Consultants

13.1 Overview

Working collaboratively in 3D is an evolving process yet to be fully explored and developed.

Currently there is no “One” best practice method for establishing and coordinating information exchange. By default the Architectural model often becomes the coordination model by linking in the consultants models for reference, coordination and clash detection.

Industry seems to be heading towards sharing information using Revit's linked file association as a “Best Practise”. This has many benefits but also has some significant limitations.

Project Services have been experimenting with modelling both the Architectural & Structural geometry in the one model. Working in one model is yet to be fully explored, however the initial attempt on a large project proved successful, given the early limitations on the software and hardware.

13.2 Ownership

The BMP includes a table to be completed by the BIM manager for the project which gives some guidelines to the ownership of elements and where they transition to other consultants. This can only be considered as a rough guide but it is useful indicator that building geometry will transition across disciplines at various stages throughout the life of the model.

13.3 Directory Structure

Refer to Chapter 2 Directory Structure.

13.4 Guidelines for Collaboration

The following dot points are topics for consideration when working in a collaborative work environment:

- Model Manager. ([Refer to the BMP](#)).
- Cad Project Start-up Meeting. ([Refer to the BMP](#)).
- File Linking. ([Link Central files only](#)).

Currently across the Industry, file linking seems to be the preferred method of Collaboration.

Linking allows use of “Copy / Monitor” to alert team members that a one of these items has been amended by another team member.

Each team is in control of their own part of the Model.

- Keep naming conventions consistent. ([Refer to Ch 4 File Naming](#)).
- Changing names frustrates people and causes unnecessary tension. File naming should be identified and agreed at the Project CAD startup meeting.
- Use Shared coordinates. ([Refer Ch 6 Site, Project Setout and Coordination](#)). Also refer to Revit Tip No.7 on the Cad Intranet site.
- Use the same version.

This is an item that is often overlooked. Obviously using the same version ie Revit 2010 is essential, but even using the same Build Number (Latest Update) is important. Some updates fix problems in previous versions which could lead to problems for Revit modellers using earlier versions where a fix has not been applied.

Using the same operating system & hardware is equally important. It no good one Revit modeller working on a large project on a high end computer and another Revit modeller trying to access the same model on a low end computer.

- What do Consultants require?
What do Consultants require and how can we best provide them with the information.
- View Templates
Use View Templates to help control how models appear in views. This will only work if the views from the linked files ID doesn't change.
- Consultant Views
Provide a process that allows consultants linked files to easily identify views from linked files required to complete documentation.

13.5 Navisworks

Navisworks is a software that was developed for design review, 4D modelling & publishing the design intent to clients, contractors & other stakeholders.

The software allows easy navigating & exploring the design to improve quality and assist the review process.

Navisworks provides Clash Detection tools which are useful for identifying element clashes. Tolerances can be set for Hard & Soft clashes.

13.6 Clash Detection

Clash detection is mandatory. Complete the entries in the BMP. Clash detection must be carried out prior to all milestones and submission to the Department.

Revit Support

Revit Support

14 Revit Contacts and Support

Revit Software Support

Walter Kite

Phone: 3234 1487

Responsibilities: Revit Architectural software development and support.

BAS PROJECTS - DRAWING SHEET NUMBERING

Purpose/Scope

The following outlines our drawing sheet numbering convention for all BAS projects and project phases. As a minimum all documents must include company name, project number, date and file/path reference.

Procedure

Numbering Convention

1.	2.	3.	4.	5.	6.	7.
Job Number	Project Phase	Discipline	Building Reference	Drawing Series	Sheet Number	Issue
BAS0101	_ CD	_ A	C	02	- 00	_ A

Example: **BAS0101_CD_A02-00_A**

DRAWING NUMBER	ISSUE
BAS0101 / CD / A02-00	A

1. Job Number

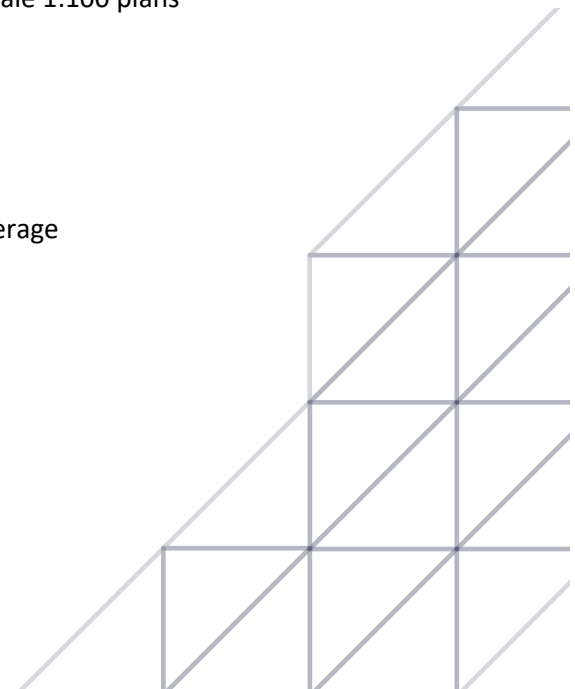
The complete job number. For State Government projects use the *Client Reference* number obtained from the relevant Department.

2. Project Phase

PD	Preliminary Design	<i>BAS A3 title block, scale 1:200 plans</i>
SD	Schematic Design	<i>BAS A3 title block, scale 1:200 plans</i>
DD	Developed Design	<i>BAS A1 title block, scale 1:100 plans</i>
CD	Contract Documents	<i>BAS A1 title block, scale 1:100 plans</i>
CN	Construction Documents	<i>BAS A1 title block, scale 1:100 plans</i>

3. Discipline

A	Architectural	H	Hydraulics
C	Civil	L	Landscape
S	Structural	FB	Food and Beverage
E	Electrical	SU	Survey
M	Mechanical		



4. **Building Reference (Only When Applicable)**

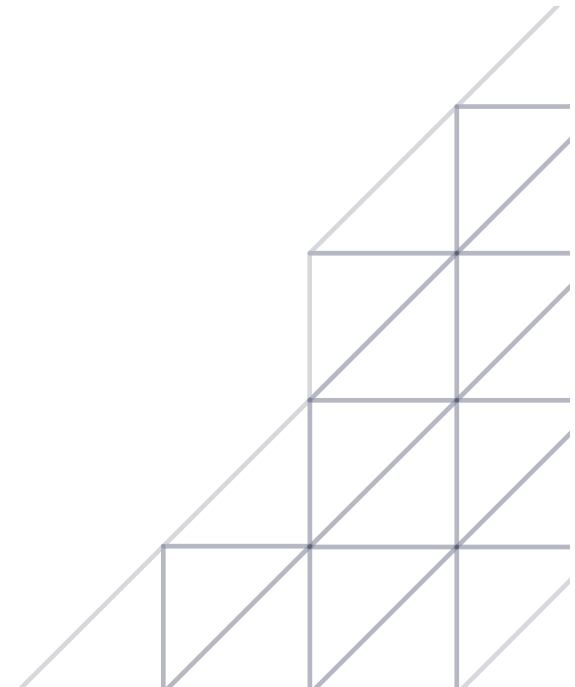
In the case of a large project with multiple buildings a building letter or number may be assigned for example Building A or Building 1 etc. Leave blank if the building reference is not relevant.

For multiple building projects;

- A Block A
- 1 Building 1
- 0 Site (Site plans relevant to the multiple buildings where applicable)
- Details (Project details typical to the project. Should contain details from multiple buildings where applicable).

5. **Drawing Series**

- 00** Cover Sheet/Drawing Schedule
- 01** Site Plans
- 02** Floor/Roof Plans
- 03** Ceiling Plans
- 04** Elevations
- 05** Sections
- 06** Detail Sections
- 07** Details
- 08** Window Details
- 09** Door Details
- 10** Stair/Walkway Details
- 11** Metal Work Details
- 12** Fitout Details
- 13** Graphics Details
- 14** Schedules
- 15** External Works Details
- 16** BIM (3D Models)



6. Sheet Number

Number sequentially as required. The sheet number has a level of flexibility based on project type, size and its requirements. However, the drawing series and sheet description should be adhered to where possible.

NUMBER	SHEET DESCRIPTION	SCALE	TYPICAL CONTENT
00	Cover Sheet/Drawing Schedule		
00-00	Cover Sheet	NTS	Project title Drawing sheet schedule Perspective views
00-01	General Notes	NTS	Project specific notes and legends
01	Site Plans		
01-00	Master Site/Location Plan	1:500/1000	Urban location / context Legend, keynotes, notes
01-10	Site Setout Plan	1:250/500	Building setout from boundary or known point Grids, legend, keynote legend
01-20	External Works Plan	1:250	Overall external works extents View of external hardscape, paths, parking etc.
01-21	External Works Part Plan	1:100	Callout views from 01-20 series
02	Floor/Roof Plans		
02-00	Floor Plan Roof Plan Demolition Plan	1:100	Grids Room tags Door and window tags Legend, keynotes Detail plan callouts
02-10	Slab Plan	1:100	Dimensioned from grids for: Slab set downs and penetrations Structural columns Structural walls Hydraulic fixture slab penetrations / location
02-20	Framing Plan	1:100	Grids Dimension partitions, windows, doors Partition wall type tags / keynotes
02-30	Area Plan	1:100/250	GFA – schedules to be displayed on plans if possible Lettable operational usage Function
03	Ceiling Plans		
03-00	Ceiling Plan	1:100	Grids
04	Elevations		
04-00	External Elevations	1:100/250	Full building extents
04-10	External Perspectives	NTS	Full external building perspectives

NUMBER	SHEET DESCRIPTION	SCALE	TYPICAL CONTENT
04-20	Tilt-up wall Elevations	1:50/100	
05	Sections		
05-00	Building Sections	1:100	Building extents
05-10	Site Sections	1:100/250	Site extents
06	Detail Sections		
06-00	Wall Sections	1:25/50	Part building section and callouts combined on the single page for small projects
07	Details		
07-00	Construction Details	1:2/5/10	Callout from 06 Series e.g. wall junctions
08	Window Details		
08-00	Window Schedules	1:50	Complete schedules, window type legend and notes
09	Door Details		
09-00	Door Schedules	1:50	Complete schedule, door panel style legend and notes
10	Stair/Walkway Details		
10-00	Stair – Plans	1:50	Plan callout from 02-01 series
10-10	Stair - Sections and Details	1:50/25/10/5	Part sections / details
11	Metal Work Details		
11-00	Metal Work Details	1:25/10/5	Sun screening, balustrades, handrails, gates
12	Fitout Details		
12-00	Fitout Plans and Elevations	1:50	Furniture arrangement Floor finish types & extents Signage locations Plan callouts from 02-01 series All associated views generated from within these callouts
12-10	Internal Elevations	1:50	Internal elevations e.g. common area, corridor walls etc.
12-20	Joinery Details	1:2/5/10/25	Joinery plans, elevations, sections and details Callouts from 12-01 series
13	Graphics Details		
13-00	Signage - Site Plan	1:500/250	Way finding throughout the site
13-10	Signage - Part Plan	1:100	Only if required to be separate from 13-01
13-20	Signage - Elevations & Details	1:50/20/10/5	

NUMBER	SHEET DESCRIPTION	SCALE	TYPICAL CONTENT
14	Specification/Schedules		
14-00	Specification	NTS	
14-01	Room Data Sheets	NTS	
14-02	Description of Works	NTS	
14-10	External Finishes	NTS	
14-11	Internal Finishes	NTS	
14-12	Joinery Finishes	NTS	
14-20	Sanitary Fixtures	NTS	
14-30	Furniture, Fitting, Equipment	NTS	
14-40	Lighting	NTS	
14-50	Food & Beverage Services	NTS	
14-60	Door Hardware	NTS	
14-61	Miscellaneous Hardware	NTS	
14-70	External Signage	NTS	
14-71	Internal Signage	NTS	
14-80	Colour Board	NTS	
14-90	Others	NTS	
15	External Works Details		
15-00	External Works - Elevations and Details	1:50/20/10/5	
16	BIM (3D Models)		
16-00	3D Models exported for collaboration		

7. Issue

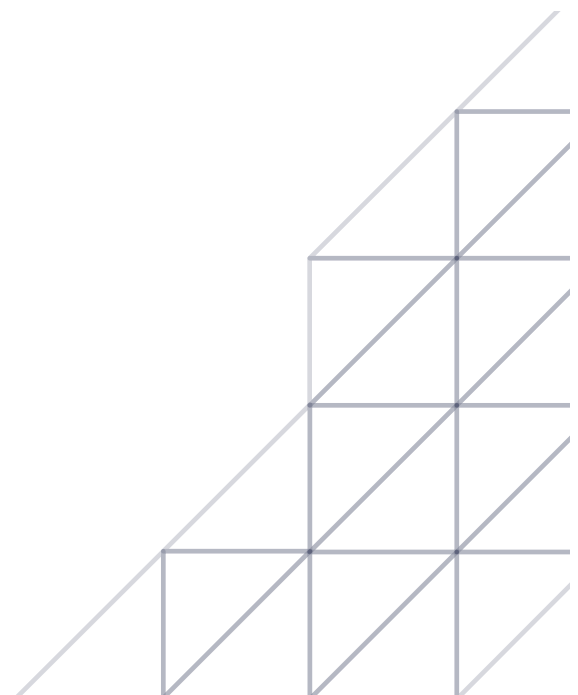
Number sequentially as required. Superseded drawings must be filed as such.

A, B, C etc

Alphabetical for all PD, SD, DD and CD issues leading up to the Construction (CN) issue.

1, 2, 3 etc

Numerical for all issues following and including the Construction (CN) issue.



BAS PROJECTS – PDF AND CAD FILE NAMING

Purpose/Scope

The following outlines our naming convention for all drawings published to PDF or CAD formats.

Procedure

Numbering Convention

1. Job Number	2. Project Stage	3. Discipline	4. Building Reference	5. Drawing Series	6. Sheet Number	7. Issue	8. Description
BAS0101	_ CD	_ A	C	02	- 00	_ A	_ FLOOR PLAN

Examples: **BAS0101_CD_A02-00_A_GROUND FLOOR PLAN.pdf**
BAS0101_CD_FB02-01_A_LEVEL 1 KITCHEN PLAN.dwg

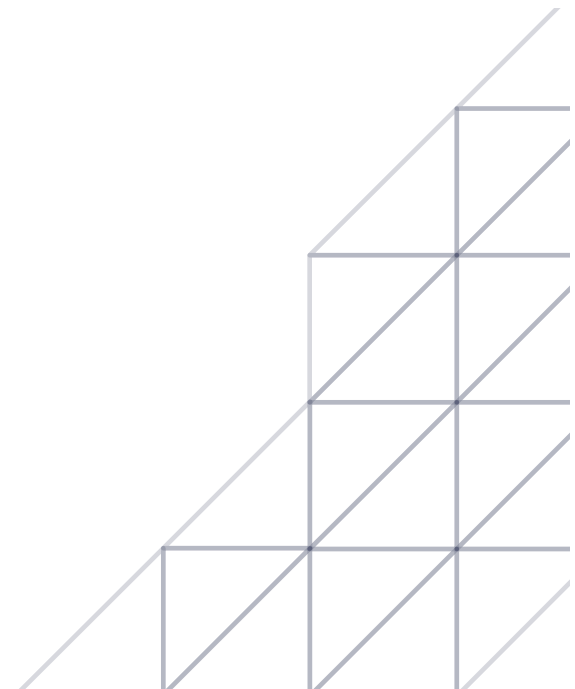
1. to 7. Refer to *BAS Projects Drawing Sheet Numbering – BMS-FRM-003-001-05*.

8. Description

A brief description to help identify the type of drawing. Description to match wording of drawing title, in *UPPERCASE* and separated from the drawing number with an underscore (_).

The following abbreviations may be used;

Floor	<i>FLR</i>
Level	<i>LVL</i>
and	<i>&</i>
Plan	<i>PLN</i>
Section	<i>SCTN</i>
Elevation	<i>ELEV</i>
Detail	<i>DTL</i>
Ceiling	<i>CLNG</i>



BAS PROJECTS – REVIT FILE NAMING

Purpose/Scope

The following outlines our naming convention for Revit project files.

Procedure

Numbering Convention

1. Discipline	2. Job Number	3. Description	4. File Type
A	– BAS0101	– BUILDING	– CENTRAL

Examples: **A_BAS0101_BUILDING_CENTRAL.rvt**
 A_BAS0101_SITE_CENTRAL.rvt

1. Discipline

A	Architectural
C	Civil
S	Structural
E	Electrical
M	Mechanical
H	Hydraulics
L	Landscape
K	Food and Beverage
SU	Survey

2. Job Number

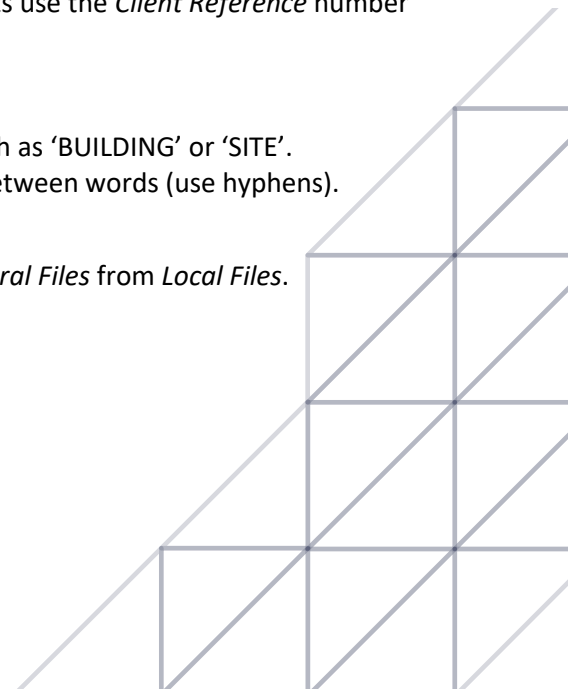
The complete job number. For State Government projects use the *Client Reference* number obtained from the relevant Department.

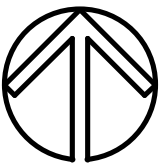
3. Description

A brief description to help identify the type of model such as 'BUILDING' or 'SITE'.
Description to be typed in *UPPER CASE* with no spaces between words (use hyphens).

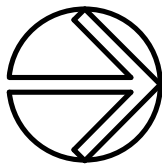
4. File Type

The CENTRAL suffix is required to clearly distinguish *Central Files* from *Local Files*.





NORTH



PROJECT NORTH

BARCODE

PROJECT NAME

BUILDING NAME

CLIENT NAME

PROJECT ADDRESS



FORM BPRS F101A

DRAWINGS INDEXING SYSTEM
FOR PROJECT SERVICES, PLANS AND RECORDS USE ONLY

- ☐ CEILING PLANS
- ☐ CONSTRUCTION DETAILS
- ☐ ELEVATIONS
- ☐ EXTERNAL WORKS
- ☐ FITOUTS
- ☐ FLOOR PLAN
- ☐ FURNITURE & EQUIPMENT
- ☐ HYDRAULICS
- ☐ MASTER PLAN

☐ MISCELLANEOUS DETAILS☐ OTHER☐ PLAY STRUCTURES☐ ROOF PLAN☐ SECTIONS☐ SETOUT PLAN☐ SITE PLAN☐ STANDARDS

AMENDMENTS

ISSUE	DATE	SUBJECT	AUTHORISED
1	00/00/00	DESCRIPTION	XXX



Queensland
Government

Department of **Education**

CONSTRUCTION ISSUE

XXX
DRAWN

DATE

XXX
DISCIPLINE TEAM LEADER

00/00/00
DATE

XXX
AUTHORISED FOR ISSUE

RPEQ No.
if Engineer

DATE



Paynters

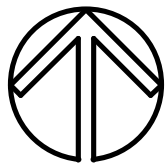
QBCC 63889 ABN 32 060 951 162 paynters.com.au

CLIENT NAME

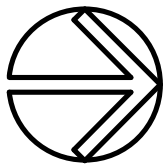
PROJECT ADDRESS

SHEET NAME

SCALE		AT	
MASTER SITE NUMBER		CLIENT REFERENCE NUMBER	
00000		00000	
DRAWING NUMBER		ISSUE	SHEET NO
00000/ XX /A00-00		1	



NORTH



PROJECT NORTH

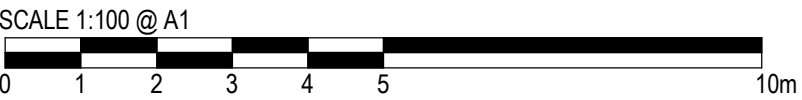
PROJECT NAME

BUILDING NAME

CLIENT NAME

PROJECT ADDRESS

5/09/2018 1:22:26 PM



AMENDMENTS

ISSUE	DATE	SUBJECT	AUTHORISED
1	00/00/00	DESCRIPTION	XXX

DRAWINGS INDEXING SYSTEM

FOR BUILDING AND ASSET SERVICES - LOGISTICS USE ONLY

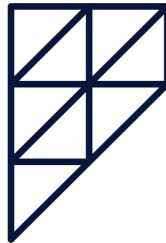
- ☐ CEILING PLANS
- ☐ CONSTRUCTION DETAILS
- ☐ ELEVATIONS
- ☐ EXTERNAL WORKS
- ☐ FITOUTS
- ☐ FLOOR PLAN
- ☐ FURNITURE & EQUIPMENT
- ☐ HYDRAULICS
- ☐ MASTER PLAN

☐ MISCELLANEOUS DETAILS☐ OTHER☐ PLAY STRUCTURES☐ ROOF PLAN☐ SECTIONS☐ SETOUT PLAN☐ SITE PLAN☐ STANDARDS

Queensland
Government

Department of Education

CONSTRUCTION ISSUE



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XXX

DISCIPLINE TEAM LEADER DATE

00/00/00

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AUTHORISED FOR ISSUE DATE

PROJECT NAME

PROJECT ADDRESS

SHEET NAME

SCALE AT A1 SIZE

MASTER SITE NUMBER CLIENT REFERENCE NUMBER

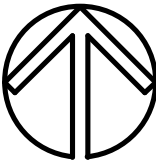
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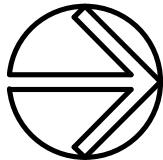
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NORTH



PROJECT NORTH

SCALE 1:200 @ A1



FORM BPRS F101A

AMENDMENTS					XXX			CLIENT NAME PROJECT ADDRESS		SCALE AT																		
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