

Drafting and Design Presentation Standards Manual Volume 1: Chapter 1 – Introduction

December 2021

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Amendment Register

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	Chapter 1.7.1.2	Use of revision identifier inside a triangle positioned next to the revision clouds		
	Chapter 1.7.1.3	Clarification of responsibilities and signature requirements for the factual representation of works constructed statement on As Constructed drawings		
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	Figure 1.6.3.1	Update to Figure 1.6.3.1 - Standard title block signature requirements		

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1 Introduction

1.1 General

This manual provides the drafting and design presentation standards to produce all drawings and project electronic models delivered as outputs of the planning and/or design activity of road infrastructure projects performed for the Department of Transport and Main Roads (department) Queensland.

- Volume 1: *Drafting Design and Presentation Standards* provides general guidance for presentation. It also specifies departmental requirements for civil design drawings.
- Volume 2: *Road Design Development Presentation* details expectations for specific road planning and design drawings.
- Volume 3: *Structural Drafting Standards* stipulates departmental requirements for structural-related drawings. For additional structural requirements, refer to other bridge and structures technical publications.

There is no requirement for projects not performed for the department to adhere to these standards, although designs for such projects within a state-controlled road reserve, would be subject to review for acceptability. Although, the expectation is that the final 'As Constructed' revision of these drawings are to be submitted to the department's Plan Room, where it is required under the *Public Records Act 2002* (Qld), to keep and maintain a true and accurate record of its road assets. This also includes when external parties undertake works on departmental assets, not in conjunction with the department. The drawings will be allocated a departmental drawing number upon submission and will be registered by Plan Room.

For projects performed for the department, it is important to understand that drawings and/or project electronic models, form only a part of the overall project documentation provided to tenderers and constructors of road infrastructure projects. Generally, these instructions comprise:

- engineering drawings and project electronic models
- specifications, including supplementary specifications
- schedules of work to be performed, quantities of materials
- test instructions
- intent of the design, including critical / unusual design issues.
- visualisations for:
 - stakeholder engagement and general communication of project impacts
 - visual checking of the design, and
 - showing the design intent.

The primary purpose of these instructions is to specify 'the design' of the proposed road and to convey the engineering 'requirements for tendering and construction' of road infrastructure.

The content and requirements covered in this chapter apply when presenting the design at any stage of the preconstruction and construction delivery processes, however there is specific focus in this chapter on the production of:

- certified engineering drawings for approval, tendering and construction purposes, and
- project electronic models for approval, tendering and construction purposes.

Where drawings are produced for stakeholder and community display purposes, it is important for them to present the information in a way suitable for the group concerned. In this respect, the drawing would have a focus on clearly showing project intent and impacts rather than design / construction detail.

1.2 Computer software for road design and presentation

The department has adopted 12d Model, AutoCAD and other CADD software as the standard for the delivery of all departmental projects from survey through planning, design, tendering, construction, As Constructed and archival activities.

The primary function of road design and presentation software, is to support the design development process, including the production of:

- geometrics / shapes / profiles
- quantities
- cross drainage design and presentation
- project drawings, and
- the project electronic model.

Production of the project electronic model assists in:

- checking all aspects of the design in a three-dimensional project electronic model
- validation of the design through traffic simulation activities to confirm the required traffic performance outcomes are being achieved
- visualising the proposal in the community engagement process
- verification to confirm design aspects on a progressive basis
- supplying accurate construction information, including electronic information for Global Navigation Satellite System (GNSS) guided road plant
- production of contract drawings, including visualisation
- production of cross sections at any scale, frequency or skew
- integration of design variations during construction, and
- production of As Constructed drawings from the project electronic model.

For straight forward restoration projects with minimal survey input, it may not be appropriate to create a project electronic model.

1.3 Requirements for tendering and construction

A set of project drawings must contain the engineering information that supports the key functions of:

- setting out the works
- ordering material and component parts
- identifying available work areas
- supporting the tendering processes for constructors
- planning construction methods and seeking opportunities to optimise construction activities and processes
- working of materials
- inspecting and controlling construction quality and reliability
- managing traffic during construction as appropriate (on major projects, this will be part of the tendering process)
- determining costs, and
- facilitating construction material quantity calculations.

1.4 Project drawings

The primary purpose of project drawings is to clearly represent the design that is required to be constructed. It is important that the shapes and location of the different materials, together with their interfaces, are clearly articulated. The information shown, must be adequate for the tendering and construction contractor to be able to calculate any construction information from the drawings.

A prerequisite to the tendering and construction stages of project delivery, is that construction companies will have suitable experienced staff with appropriate / modern systems. To avoid costly construction errors, pre-tendering and pre-construction meetings are essential to develop a common understanding of requirements between the client and the contractor.

The project electronic model removes the need for contractors to interpret drawings and to manually transfer data from the drawings to their construction equipment.

It is important at pre-construction meetings to remind the contractor that the As Constructed revision of project drawings, representing final works constructed, are submitted to the client for future asset management.

1.4.1 Drawing responsibilities

While the designer and draftsman are responsible for developing the design and presenting it electronically, ultimately the Registered Professional Engineer Queensland (RPEQ) is responsible for ensuring the design complies with legislative and departmental requirements.

Refer to Appendix 1A for legal obligations for designers and draftspersons, RPEQ engineering certification responsibilities and *Safety in Design* requirements.

1.4.2 Specifying the design

The drawings must precisely detail those parameters that specify the design:

- locating the project job site
- the precise location of the project on the ground
- the road component shapes
- the road structure (materials)
- full details of turnouts, intersections, interchanges and so on
- the type, size, shape and full detail of structures (bridges, retaining walls, culverts), including their precise location within the project, and
- portray a clear visual understanding of the project and its environs.

Satisfying these requirements will allow the constructor to readily generate accurate information from the drawings for setting out and control of the works in their own construction support systems.

1.4.3 Providing tendering and construction information

From the project electronic model, individual constructors can produce a range of information to suit their particular requirements, for example, cross sections from the project electronic model at any chainage, interval, scale (including distorted scales), or at any skew angle, all on command.

There is no requirement to produce cross section drawings for inclusion in scheme documents on the proviso that the design model is supplied, allowing the reproduction of cross sections or any other information they require to suit their own operational processes.

1.4.4 Functional drafting

Functional drafting refers to a technique that eliminates all unnecessary detail while maintaining the full clarity, completeness and accuracy of the finished drawing without being subject to variable interpretation. The use of rectified aerial photography as the backdrop for engineering survey used in the planning and/or design process, is one method of achieving this approach. This is because the impacts of the design process (either immediate or surrounding) are instantly recognisable without the need for further detailing. This manual exploits the functional drafting approach in the text and provides examples of figures / drawings throughout.

Functional drafting should be an output from the project electronic models.

1.4.5 Use of coloured drawings

Coloured drawings may be used where it is necessary to provide improved readability of the drawings. The use of standard line styles and features will, in most cases, avoid the need for colour drawings.

However, in cases of very complex details, the use of colour drawings can be considered as colour significantly enhances features and readability.

Colour is an effective means of directing the reader's attention to important details and provides additional means of separating types of functional detail or objects. Colour, in conjunction with different line weights, assists the reader in distinguishing between materials and elements / shapes. Effective use of colour improves drawing clarity and the reader's understanding of the drawings. Examples of drawings where colour has proved to be very effective in improving drawing readability and clarity, include traffic management plans and construction staging plans.

If colour is used, it must be ensured that the colours used can be reproduced clearly in black and white photocopies and that the intended information on the plans is not lost through this process. This is mandatory for all plans that are required to be submitted to the department's Plan Room for registration.

1.5 Preserving the design intent during construction

The department is tasked with maintaining the integrity of design after financial approval has been provided. Changes can be made to the design, with departmental approval, during construction and maintenance operations for efficiency of those operations. Without approval, changes have the potential to degrade the design intent to an unacceptable level. Ease of construction is not necessarily a valid reason to change the design and especially without reference to the original designer or approved experienced designer.

Figures 1.7(a) and 1.7(b) visually illustrate the recommended lifecycle workflow of a Principal Supplied engineering drawing through the Issued For Construction phase to finalisation at the As Constructed phase. The lifecycle details the RPEQ certification requirements for Issued For Construction (including Design Revision versions); the lifecycle also details the drafter / designer verification requirements for Drafting or Design Revisions and for the As Constructed version signoff.

1.5.1 Design changes

Design changes made after the scheme drawings have received financial approval, will require engineering certification by an RPEQ in the revision area located in the bottom left-hand corner of the title block, see Figure 1.6.3.3. This certification must ensure that the original design intent has not been degraded, unless specifically approved otherwise by the client. The RPEQ is fully responsible for the consequences of the design change. See Figures 1.7(a) and 1.7(b).

The process required to create the Design Revision drawings is described in Section 1.7.1.3.

1.5.2 Critical aspects of design

It is very important that all critical aspects of the design are explained to the construction contractor, to avoid compromising the integrity of the design intent during construction. These requirements must be highlighted in the drawings, project electronic model, and/or supplementary specifications and they must be addressed at the pre-tendering and pre-construction meetings so that the contractor clearly understands these issues and requirements. Typical examples of critical aspects of design are:

- on a multi-lane carriageway, the lane crossfall may be different in adjacent lanes, such details must be clearly shown in the drawings, because varying the crossfall of road pavements to manage road surface drainage, may cause potential aquaplaning issues
- product durability
- traffic performance
- safety, and
- functionality.

1.5.3 Design responsibilities and accountability

The overall responsibility for quality of the project design and documentation, lies with the organisation carrying out the design. This responsibility is identified in the submission statement 'Scheme Submitted' on the first drawing of any set of project drawings.

However, the relevant RPEQ remains responsible for the overall provision of engineering services in terms of compliance with the *Professional Engineers Act 2002* (Qld).

Refer to Appendix 1A for legal obligations for designers, RPEQ engineering certification responsibilities and *Safety in Design* requirements.

1.5.4 Project electronic models and engineering drawings

The department is moving towards a mandatory adoption of Building Information Modelling (BIM) progressively into all major state infrastructure projects by 2023. For the department, BIM is the process of digitally creating and managing asset / infrastructure data during its lifecycle. BIM processes use a federated model which consists of an assembly of individual discipline electronic models (such as 3D survey, design and As Constructed models with object-based attributed information) for design, construction, operations and asset management functions. A single federated model is useful for design co-ordination, clash detection and avoidance, approvals processes, design development, estimating and so on.

The attributed project electronic models are becoming a standard method to check the design, together with its interfaces with the site and various design elements and between design disciplines, for example, civil, structural, electrical and so on.

Once the design has been checked via the project electronic model, the projects engineering drawings can then be produced directly from this model. This process is designed to achieve a good engineering output, avoiding errors in the project electronic model and engineering drawings.

Visualisations can also be produced from electronic models, to assist tendering and constructors to identify what they have to build.

The *Guideline for TMR Building Information Modelling (BIM)* provides an overview of the department's plan for implementing BIM processes and methodology in delivering road infrastructure projects. This Guideline and other departmental BIM Design Manuals can be found under the department's Technical Publications website.

1.5.5 Extended Design Domain (EDD) and Design Exception (DE) Reports

The use of Extended Design Domain (EDD) in Transport and Main Roads is considered an acceptable standard, provided that its use and application is properly justified and documented accordingly in an 'EDD Report'. In addition, a Design Exception, using design values below EDD, requires a more thorough risk management approach and more rigorous mitigating treatments supported by well-documented justifications detailed in a 'DE Report'. The application of EDD and DE can only be used with the relevant Transport and Main Roads approval, the process of preparing and approving EDD and DE Reports is covered under the *Road Planning and Design Manual 2nd Edition: Volume 3, Part 1: Objectives of Road Design*. Refer to this document for further detailed information.

The department's Plan Room will register these types of reports with associated drawings. These are linked with the associated 'Issued for Constructed', 'As Constructed' drawings, and where revisions are made to EDD and DE reports and drawings involving design decisions and implementation of design information outside Normal Design Domain (NDD) for each project.

1.6 Departmental requirements

1.6.1 Use of consultant's logo

The consultant responsible for preparing the engineering drawings, shall include their logo on each drawing in the allocated area at the top right-hand corner of the drawing sheet as shown on Figure 1.6.3.3. The T logo should not occupy an area greater than that occupied by the Queensland Government logo.

1.6.2 Signatures and names on scheme drawings

Signatures on scheme drawings play a critical role in the legitimisation of scheme documents and the authorisation for the scheme to progress through the various process steps.

Signatures are required for the following purposes:

- Engineering certification of the concept design and design development, for tender and during construction, including its presentation on drawings for each area of engineering concerned. It also verifies all names and signatures on the drawings relating to engineering matters. This certification also includes the appropriate application of relevant departmental standards, specifications and project supplementary specifications.
- Where a design amendment has been approved after financial approval has been made, then the same certification requirements apply to that design change.

The use of electronic signatures on all engineering drawings is the department's default position unless otherwise approved by the department on a project-by-project basis.

Electronic signature, in this context, translates to signing engineering drawings electronically in the form of text, to certify the design represented by the drawing.

Increasingly, reliance upon hard copy drawings is diminishing as digital drawings, or electronic design models become commonplace. It is now possible for drawings to be digitally developed, amended, and approved with no requirements for hard copy and therefore, no necessity for 'wet ink' signatures.

Using electronic signatures effectively replaces existing wet ink signature requirements on engineering drawings when submitted to the department and will be deemed equivalent to a wet ink signature, provided it meets the criteria stipulated. In the event that electronic signatures are not possible and wet signatures are provided, they are to be in blue or black ink.

While there is no direct legal or regulatory requirement explicitly portraying the use of signatures on engineering drawings or models, common law contemplates that signatures and certifications (including an RPEQ) may be in an electronic format.

Therefore, the department is satisfied that a 'signature' also encompasses an electronic signature and that engineering drawings may therefore be electronically signed.

An electronic signature on an engineering drawing submitted to the department will:

- where required for RPEQ certification purposes, include the signatory's full name to represent their signature, RPEQ number, area of engineering and date
- where RPEQ certification is not required, then the signatory's full name, position title and date will suffice
- be located in the designated spaces on the drawings.

An example of an accepted electronic signature format is the full name, area of engineering, RPEQ number and date (John Smith, Civil, RPEQ #12345, 01/01/2020), located in the allocated area within the title block of a drawing.

1.6.2.1 Signatures of an overall nature

Signatures are required to cover the entire scheme drawings and are included on the first sheet of the drawing set, under a listing of all the drawings appropriately identified (including document version and date). Refer to Figure 1.6.2.3 for the signature box requirements, which includes approvals for:

- Scheme Submitted, and
- Scheme Scope and Financial Approval.

Where the scheme drawings listing requires more than one sheet, the statement will appear only on the first sheet of the drawing listing.

1.6.2.2 Scheme Submitted to the client

The person duly authorised by the service provider (engineering consultant or internal business unit), shall formally (under a covering letter – see below) submit the contract materials (scheme documents) to the client.

The meaning of 'Scheme Submitted' is:

- the scheme satisfies the requirements of the client's brief / functional specification
- the client has been progressively involved in the evolution of the design, including peer review, and
- the engineering design has been certified by the relevant RPEQ(s), and that all signatures in the drawing title block are authentic.

Scheme submission is a commercial response to a brief. The submission is by a single signature under a listing of all scheme drawings on the first drawing of the drawing set. The organisation or internal business unit's approving officer must sign under the words 'Scheme Submitted' and indicate their organisation.

In addition, the submission covering letter shall state that the scheme has been prepared in accordance with the (name of organisation) fully certified quality system and other relevant organisational standard process and practices, and departmental technical requirements published in various departmental documents, including manuals.

1.6.2.3 Scheme scope and financial approval

The Regional Director (or delegate) shall approve a scheme for tendering purposes. Approved means the relevant Regional Director (or delegate) is satisfied that:

- The scheme satisfies departmental priorities in relation to:
 - Investment Strategies
 - Functional Road Hierarchy
 - Traffic Operation Function
 - Corridor Development Plans, and
 - the need to be satisfied by the project.

- The scheme satisfies the requirements of the Queensland Transport and Roads Investment Program (QTRIP) in terms of:
 - Prioritisation
 - Scope, and
 - Cost.
- The appropriate level and extent of external communication has been undertaken.
- Scheme scope and financial approval is by a single electronic signature under a listing of all scheme drawings on the first drawing of the drawing set. An email confirmation of the scheme scope and financial approval from the Regional Director, or delegated signatory, will be sufficient evidence for the design team to place the electronic signature into the statement box.
- The required scheme submitted, scheme scope and financial approval statements, are to be included on the front sheet of a project set of scheme drawings in accordance with the details shown in Figure 1.6.2.3.
- The 'scheme submitted, scheme scope and financial approval statement' can be inserted as a block from the TMR AutoCAD Customisation.
- The relevant signatory's details (full names, position titles, signed dates and organisation as required) for the scheme scope and approval statement on the Issued For Construction (and subsequent) drawings, are to be typed electronically, either directly into the AutoCAD drawing (DWG) or the drawing PDF. The font for the signature is to be RomanS or Arial Narrow in black (a similar font is also acceptable). A wet ink signature is not required, and the field should be left blank if the signatory's details are already typed electronically (i.e. electronically signed, not digitally signed).

Refer to the following for further details / examples on the production of Drawings:

- Section 1.7.1.1
- Section 1.7.1.3
- Section 1.7.1.4
- Section 1.7.1.6.2, and
- Figure 1.6.3.3.

Figure 1.6.2.3 – Scheme scope and approval statement

<u>SCHEME SUBMITTED</u> (<i>External Consultants or Internal Business Unit</i>):	
This design meets the requirements of all relevant Australian Standards, Austroads Guidelines and Transport and Main Roads – Policies, References, Standards, Planning and Design Instructions, Guidelines and the requirements of the project brief/functional specifications.	
FULL NAME:	DATE:
POSITION TITLE:	ORGANISATION:
SIGNED (IF WET INK):	
<u>SCHEME SCOPE AND FINANCIAL APPROVAL:</u> (<i>Regional Director or Delegate</i>):	
I hereby certify that this scheme complies with the intent of the scope and financial limits of the relevant project on QTRIP and the scheme is approved for release in accordance with that program.	
FULL NAME:	DATE:
POSITION TITLE:	
SIGNED (IF WET INK):	

1.6.3 Other names on drawings and responsibilities

Names, signatures, RPEQ numbers, position titles and dates on engineering drawings play a very important role in the legitimisation of scheme documents.

In this context, each engineering drawing must include the full name, relevant detail (RPEQ number, or position title – refer to Section 1.7.1.5) and date in black text for an acceptable electronic signature, as relevant of the person responsible for:

- producing the engineering drawing
- carrying out the design considering all areas of engineering, and
- certifying the design for each area of engineering, as relevant.

1.6.3.1 Names and signatures in the title block

Every drawing must have a standard departmental title block that requires a range of information, including names and signatures to be applied in order to complete the drawing.

Signatures are to be completed to facilitate identification of original drawings requiring the relevant signatory's names, dates and details as required, to be typed electronically, either directly into the AutoCAD drawing (DWG) or the drawing PDF (i.e. electronically signed, not digitally signed). The font for the signatures is to be RomanS or Arial Narrow in black (a similar font would also be acceptable). This applies to all phases within the lifecycle of a drawing, including the various revisions.

The relevant signatory's details are to satisfy the department's responsibilities in accordance with the *Public Records Act 2002* (Qld) and the *Evidence Act 1977* (Qld).

Refer to the following for further details/examples on the production of Drawings:

- Section 1.7.1.1
- Section 1.7.1.3
- Section 1.7.1.4, and
- Figure 1.6.3.3.

1.6.3.2 Drawn

For drafters, it is expected that reasonable skill, care and diligence has been exercised by the external consultant or internal business unit, in preparing the engineering drawings in accordance with the ethics of the engineering profession and the department's drafting and design presentation standards, which includes:

- the process of structuring the layout of the drawing (drafting and readability)
- the intent of the design is absolutely clear
- the accuracy of the design detail included in the drawing, and
- the appropriateness of the drawing to the users performing the next step in the process, for example, approval, tendering and construction.

1.6.3.3 Designed

For designers, it is expected that reasonable skill, care and diligence has been exercised by the external consultant or internal business unit, in carrying out the design in accordance with the ethics of the engineering profession and the department's suite of road design standards, manuals, guidelines and policies, which includes:

- the appropriateness of the designed components for their intended function
- the design complies with the relevant standards, guides, legislation and codes
- the design has been carried out in accordance with an approved quality system for appropriateness of design inputs, including assumptions, and
- the appropriateness and accuracy of the design calculations.

Depending on the definition and complexity of the design, individuals performing these tasks would be expected to have attained a two- or three-year civil engineering qualification, from a recognised tertiary institution, as a minimum qualification.

It would be expected the designers producing the design, have been directly supervised by an RPEQ in accordance with the *Professional Engineers Act 2002* (Qld).

Figure 1.6.3.3 – Standard title block signature requirements

Department of Transport and Main Roads MRS_Detail (06/19)

LOGO

PRELIMINARY
23 January 2021

Drawing issue identifier not to be used on Issued For Construction, Revisions, nor As Constructed drawings.
Refer Chapter 2

The works shown on this drawing are a factual representation of the works constructed.

Full Name: _____
Position Title: _____
Date: _____
Signed (if wet ink): _____

The works shown on this drawing are a factual representation of the works constructed.

Logo is to be displayed on all consultant produced drawings.
Not required for the Department's internal drawings.

As Constructed drawing statement and signature:
Each As Constructed drawing shall state that "The works shown on this drawing are a factual representation of the works constructed." and be signed by the Contractor's Construction Representative.

When updating marked-up As Constructed drawings, the full name, position title, date and signature by the Contractor's Construction Representative are to be electronically transcribed onto the AutoCAD 'As Constructed' versions.
(type Original Signed on the signature line)

Issued For Construction (Revision A) certification by the relevant engineering area RPEQs, as necessary.

Full name in AutoCAD text of the person certifying the design, as necessary.

RPEQ number.

Date when signed.

Revision identifier: Alphabetical identifier to signify the version of drawing.

- Drafting or Design Revision: brief description of drafting or design content amended.
- As Constructed Process: Where amendments have been made to the 'Issued For Construction' issue of this drawing and no further amendments are going to be made to this drawing, a new version is to be issued and be called "As Constructed", with 'revision clouds' removed.

- Certification: RPEQ full name, engineering area and RPEQ number (electronic signature).

- Verification: Full name and position title (electronic signature).

Date of revision: Actual date when the revision is signed.

Increase size of revisions area to show all revisions/text as required.

CTL CHAGE		LG ROAD		ROADSECT		TITLE1		TITLE2		TITLE3		ENGINERING CERTIFICATION (RPEQ)		Queensland Government			
Projecting RP	RPC_P	DIST_START	DIST_END	RPC_START	RPC_END	RPC_NEXT	ENCLAREA1	ENCLAREA2	ENCLAREA3	ENCLAREA4	ENCLAREA5	ENCLAREA6	ENCLAREA7	ENCLAREA8	ENCLAREA9	ENCLAREA10	
From end to end of job	From end to end of job	From end to end of job	From end to end of job	From end to end of job	From end to end of job	From end to end of job	From end to end of job	From end to end of job	From end to end of job	From end to end of job	From end to end of job	From end to end of job	From end to end of job	From end to end of job	From end to end of job	From end to end of job	
Municipality Job No.		Survey Data		Scales		ENCLAREA1		ENCLAREA2		ENCLAREA3		ENCLAREA4		ENCLAREA5		ENCLAREA6	
ASSJOB1	ASSJOB2	Horz. Datum	DATUM	Scale	Scale	ENCLAREA1	ENCLAREA2	ENCLAREA3	ENCLAREA4	ENCLAREA5	ENCLAREA6	ENCLAREA7	ENCLAREA8	ENCLAREA9	ENCLAREA10	Job No.	Contract No.
Auxiliary Proj No.	AUXJOB1	Horz. Cont.	HORZDAT	Scale	Scale	ENCLAREA1	ENCLAREA2	ENCLAREA3	ENCLAREA4	ENCLAREA5	ENCLAREA6	ENCLAREA7	ENCLAREA8	ENCLAREA9	ENCLAREA10	JOBNO	MRCNO
Height	AUXJOB2	Horz. Cont.	HORZDAT	Scale	Scale	ENCLAREA1	ENCLAREA2	ENCLAREA3	ENCLAREA4	ENCLAREA5	ENCLAREA6	ENCLAREA7	ENCLAREA8	ENCLAREA9	ENCLAREA10	JOBNO	MRCNO
Scale	AUXJOB3	Horz. Cont.	HORZDAT	Scale	Scale	ENCLAREA1	ENCLAREA2	ENCLAREA3	ENCLAREA4	ENCLAREA5	ENCLAREA6	ENCLAREA7	ENCLAREA8	ENCLAREA9	ENCLAREA10	JOBNO	MRCNO
Book	AUXJOB4	Horz. Cont.	HORZDAT	Scale	Scale	ENCLAREA1	ENCLAREA2	ENCLAREA3	ENCLAREA4	ENCLAREA5	ENCLAREA6	ENCLAREA7	ENCLAREA8	ENCLAREA9	ENCLAREA10	JOBNO	MRCNO
Signature - RPEQ Full Name, Eng Area and RPEQ No. or Date Signature - Full Name and Position Title																	

1.6.3.4 Design certification

The department requires engineering drawings to be certified by an RPEQ.

Where a design drawing contains different areas of engineering, the design responsibility is identified by separate engineering certification. Only an RPEQ, qualified in the area, may certify that relevant part of the design drawing.

- Issued For Construction (Revision A) and Design Revision drawings, the relevant signatory's details (full names, area of engineering, RPEQ number, signed dates as required), either directly into the AutoCAD drawing (DWG) or the drawing PDF. The font for the signature is to be RomanS or Arial Narrow in black (a similar font is also acceptable). A wet ink signature is not required, and the field should be left blank if the signatory's details are already typed electronically (ie. electronically signed, not digitally signed).
- Drawings with revised design content after being issued for construction (Design Revision drawings), must record any engineering changes to the design detail, intent and functionality.
- Each Design Revision must be reissued with the next sequential alphabetical revision identifier.
- It is expected the certification of an As Constructed drawing, following an Issued For Construction, or Drafting or Design Revision drawing, is not required as this final revision only involves design or drafting verification acknowledging that previous certified revisions have been incorporated into the As Constructed version.

Refer to the following for further details/examples on the production of Drawings:

- Section 1.7.1.1
- Section 1.7.1.3
- Section 1.7.1.4
- Section 1.7.1.6.2, and
- Figure 1.6.3.3.

1.6.3.5 Integrity of certification

The department depends upon the integrity of all engineering drawings produced for its infrastructure. Therefore, the requirement to securely track and retain the certification process, related to a drawing, is still valid.

The department will accept electronic signatures, but it is the signatory's responsibility (and the signatory's organisation to which they belong) to embed and use a secure process in the production of engineering drawings, to ensure fraudulent activity is avoided at time of certification, particularly when inserting electronic signatures.

In the event that validity of information received is challenged during the life of the drawing, the signatory (and the organisation to which they belong) is accountable and will be called upon to provide traceability of the issued information.

Under the *Electronic Transactions (Queensland) Act 2001*, production of a document by electronic communication requires a chain of evidence by:

- consenting to the production, by an electronic communication, of an electronic form of the document
- recording the transaction in its original form (originator, date / time sent and received), and
- providing a reliable way of maintaining the integrity of the information contained in the document.

It is the responsibility of both the sender and the receiver for the recording and retention of the transaction information, as well as the documents being transacted.

Electronically signed engineering drawings will be accepted by the department in a Portable Document Format (PDF) via electronic transaction. Examples of the format of these transactions may include the following, in combination with a document transmittal:

- email attachments, or
- document management systems such as SharePoint, TeamBinder and so on, or
- various forms of cloud drives, such as Dropbox, OneDrive and so on.

1.6.3.6 Extended Design Domain (EDD) and Design Exception (DE) Reports

The submission and registration process requirements are as follows:

- a) Each EDD and DE Report requires a unique report number to be registered into GIMS. The report naming / numbering convention format is **EDD-CN12345-00** for extended design domain reports and **DE-CN12345-00** for design exception reports, where:
 - **EDD** or **DE** are to be used according to the type of report.
 - **CN12345** is the Contract Number, where **12345** is the unique contract number issued to each project for every single contract. This unique contract number is generated automatically by 3PCM. It is currently made up of four digits but it is expected to increase up to six digits eventually.
Note: the Contract Number is NOT the same as the 3PCM Project Number.
 - **00** represent two digits, normally 00 (double zero) is to be used for single reports when one report covers the entire project, but if several individual reports have been prepared for the same project then these two digits are to be assigned to each individual report in a numerical order starting from 00, 01, 02, 03, and so on.
- b) The cover of the report needs to list every single applicable drawing that relates to the application of EDD and DE that is being justified on the report which is required in order to be able to link the report to the relevant drawings in GIMS. Similarly, every single relevant drawing needs to have a note on the drawing referring to the relevant EDD and DE report.
- c) EDD and DE Reports are to be submitted in conjunction with the relevant design drawings. These drawings are normally the 'Issued For Construction' drawings being submitted to Plan Room.
- d) If content of EDD and DE Reports and associated drawings are modified since the Issued for Constructed issue of reports and drawings, the reports are to be revised and submitted to Plan Room as the As Constructed issue of reports and drawings.

- e) As Constructed EDD and DE Reports shall be provided (if applicable) to the Administrator as a condition precedent to the issue of the Certificate of Practical Completion.

1.7 Management of project drawings

As part of all transport infrastructure projects undertaken on behalf of the department, design documentation, including drawings, are to be prepared and submitted to the department to provide a record of works between being Issued For Construction to As Constructed (Finalisation).

The department's Plan Room has a process to register drawings and request the department's drawing numbers when drawings are ready for submission (Issued For Construction to As Constructed). Please contact your local district's Plan Room representative for further information.

If there are changes to any drawings that have already been allocated the departmental numbers, the department's Plan Room must be notified for accurate capturing of drawing information.

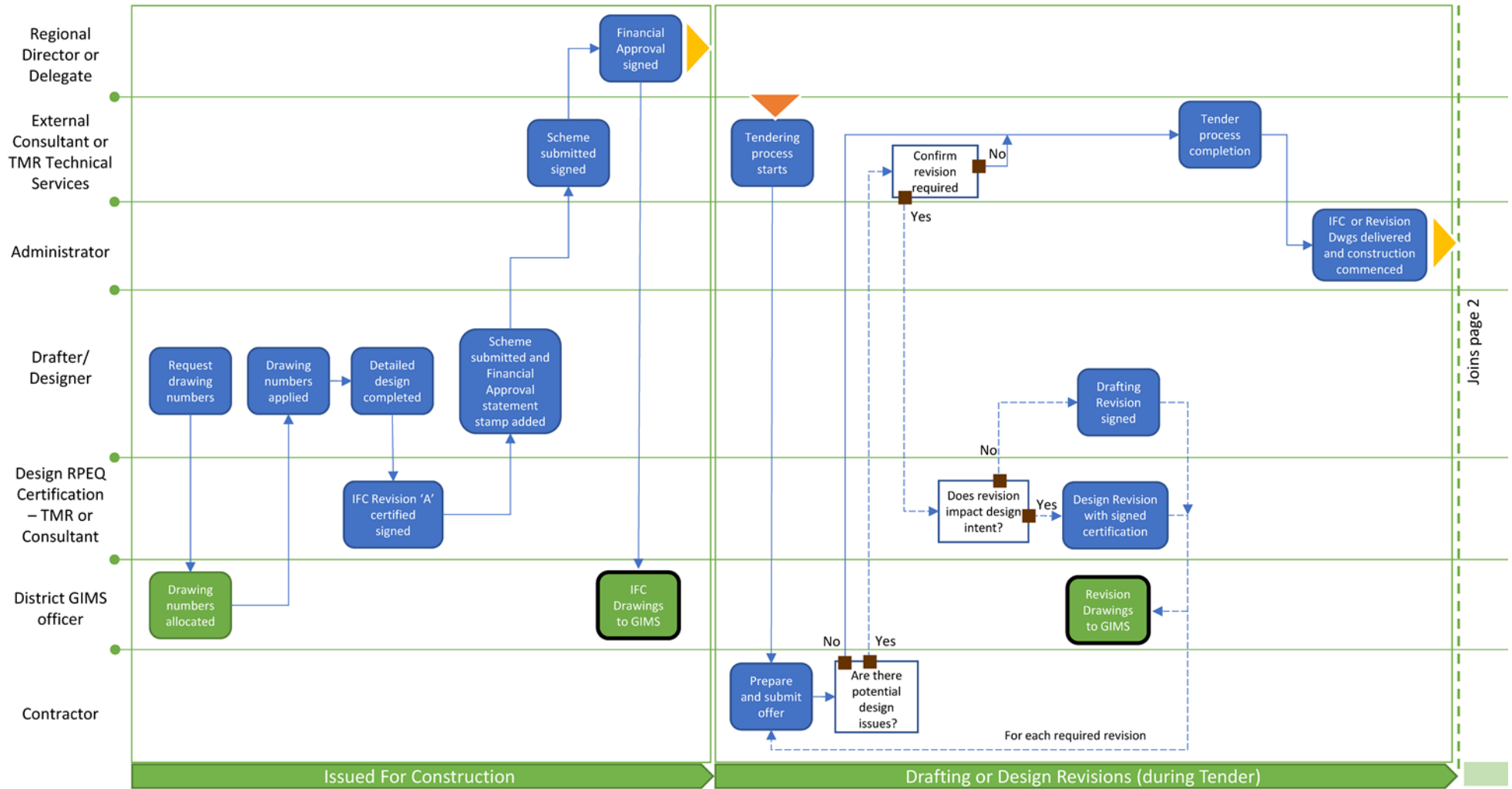
The need for capture, storage and retention of information is driven by statutory requirements, it is the department's responsibility (the custodian), to ensure that the integrity of the received documentation is retained using records management processes that are in accordance with:

- *Public Records Act 2002 (Qld)*
- *Electronic Transactions (Queensland) Act 2001*
- Queensland Disposal Authority Number 474 (QDAN 474), which sets out the retention period of service function records, such as drawings, and
- various internal policies:
 - the department's Records Management Policy
 - Electronic Signature Policy for Engineering Drawings
 - Digitisation and Disposal Policy
 - Digital Recordings and Images Policy, and
 - Information Asset Custodianship Policy.

Each of these statutes and policies support different objectives. To satisfy these requirements, all engineering drawings are required to be captured using records management procedures as part of the construction drawing development process. All Issued For Construction, Drafting or Design Revision, and As Constructed engineering drawing metadata and digital images are loaded to the department's asset management application GIMS. Figures 1.7(a) and 1.7(b) show the recommended Lifecycle for Principal Supplied Engineering Drawings, indicating when drawings should be certified, amended, registered and by whom.

Figure 1.7(a) – Principal Supplied Engineering Drawings – Lifecycle Part 1

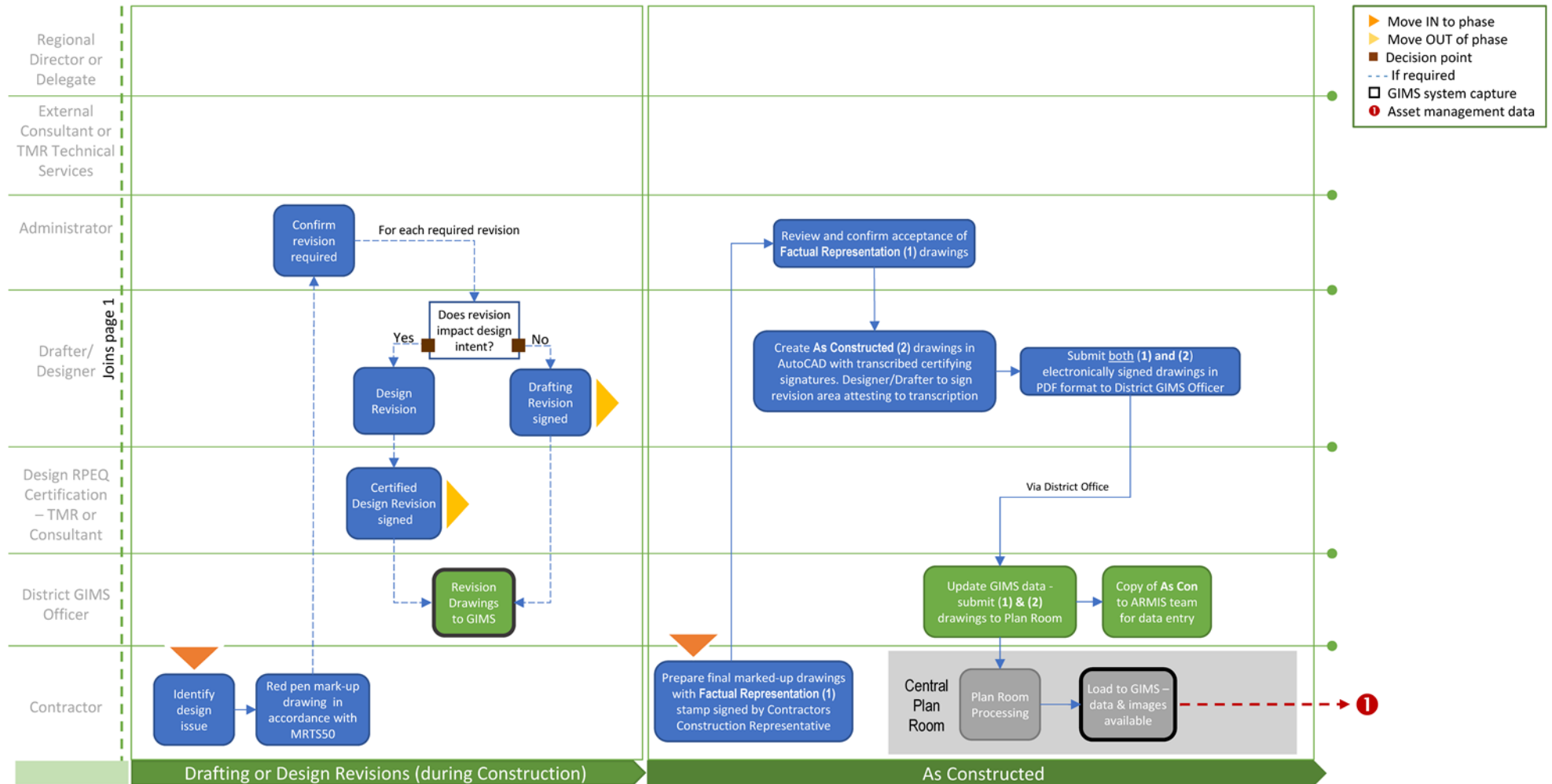
Recommended Lifecycle for Principal Supplied Engineering Drawings – Issued For Construction to As Constructed phases



This flowchart does not cover all scenarios, e.g. TIC Design and Construct (TIC-DC) contracts. Some responsibilities and procedures can differ but IFC and As Constructed drawings are still required to be submitted.

Figure 1.7(b) – Principal Supplied Engineering Drawings – Lifecycle Part 2

Recommended Lifecycle for Principal Supplied Engineering Drawings – Issued For Construction to As Constructed phases



This flowchart does not cover all scenarios, e.g. TIC Design and Construct (TIC-DC) contracts. Some responsibilities and procedures can differ but IFC and As Constructed drawings are still required to be submitted.

1.7.1 Construction Drawings development process

Project drawings will often require a number of versions to accurately document the construction of transport infrastructure projects.

For version of drawings at pre-construction phases (that is, concept, planning, preliminary and detailed design), the department recommends using a numerical revision identifier to document the version of each drawing, the initial version is to be labelled '1' and any subsequent revisions are to be continued progressively in numerical order (that is, '2', '3', '4', '5' and so on).

Once issued for construction, the department uses an alphabetical revision identifier to document the version of each drawing, the initial version is to be labelled 'A' and any subsequent revisions are to be continued progressively in alphabetical order (that is, 'B', 'C', 'D', 'E' and so on). These versions include:

- Issued For Construction (mandatory – Revision A).
- Drafting or Design Revision (subsequent alphabetical revisions, as required during construction).
- As Constructed (mandatory – final subsequent alphabetical revision).

These versions of the project drawings and the procedure for their creation are explained in the following sections of this manual.

1.7.1.1 Issued For Construction drawings

Issued For Construction is the term given to the first project drawings officially approved and produced as a complete set of detailed design drawings ready to be constructed and which are released for inclusion in the scheme. These drawings are the 'A' revision drawings initially issued for construction. These drawings must have all appropriate signatures for engineering certification (RPEQ), scheme scope and financial approval. These signatures are required prior to the drawings being placed in the documentation for project construction (refer to Section 1.6.3.4 for RPEQ certification requirements).

1.7.1.2 Extended Design Domain (EDD) and Design Exception (DE) Reports

The implementation of registering EDD and DE Reports into GIMS will provide Transport and Main Roads personnel an easy access to these reports for future reference, record keeping purposes and ongoing monitoring of projects and locations where EDD or DE has been used. It will also enable users to access associated iMaps data through a GIMS layer.

The registration into GIMS applies to existing EDD and DE Reports previously received in the past by the various Transport and Main Roads District Offices. It is a requirement that these reports are submitted to Plan Room. The registration also applies to all new and future reports whenever EDD and DE Reports are submitted for any project.

1.7.1.3 Drafting or Design Revision drawings

Drafting or Design Revision is the term used when a project drawing has drafting, or design content amended, after it has been issued for construction and during construction. Each area in the drawing, where the drafting or design content has been amended, must be shown with a revision cloud around the amendments and be labelled with the current alphabetical revision identifier, inside a triangle, positioned next to the revision clouds. The revision area and revision identifier located in the title block, are required to be updated to reflect the current revision of the drawing, as shown in Figure 1.6.3.3. Where subsequent drafting or design revisions are required, the revision clouds from the previous revision are to be removed. For certification or verification requirements of Drafting or Design Revision drawings refer to Section 1.7.1.5.

1.7.1.4 As Constructed drawings

The term As Constructed is acknowledged within industry as a method to record the final construction of a transport infrastructure project. As Constructed drawings are those drawings that record what was physically constructed and therefore are a factual representation of the asset. They represent and incorporate progressive design revisions certified by an RPEQ and drafting revisions in accordance with the design dimensions, specifications and all other construction details and design variations.

A signed statement is required on each drawing, prior to being submitted to designers or drafters to update the drawing in AutoCAD, stating that 'the Works shown on the drawing are a factual representation of works constructed'. The signatory of this statement shall be the Contractor's Construction Representative. For further details on conformance, responsibilities and specific requirements of As Constructed drawings for various delivery methods and contract types, refer to specification MRTS50 *Specific Quality System Requirements*.

Designers or drafters are required to create As Constructed revisions in AutoCAD. Revision clouds shall not be shown on As Constructed drawings, as any previous amendment should already be accounted for in previous revisions of the drawing. The Drawing Index must also be updated to reflect the As Constructed drawing revisions. The revision area and alphabetical revision identifier, located in the title block, are required to be updated to reflect and verify that the drawings are the As Constructed version of the drawing. This update does not certify or confirm what has been constructed. Any required certification will have been undertaken in previous revisions as described in Section 1.7.1.5 and the Contractor's factual representation signatory will have, in effect, verified this by confirming the constructed representation. Figure 1.6.3.3 shows an acceptable As Constructed drawing statement (that is, factual representation of the works constructed statement).

When updating the drawings to the AutoCAD As Constructed versions, the factual representation statement and signature by the Contractor's Construction Representative, are to be electronically transcribed. It is then expected that As Constructed drawings, produced as a factual representation, require no further revision and are therefore subsequently saved to a PDF, produced from AutoCAD. These files are to be submitted to the department via electronic transaction for registration by Plan Room, refer to Section 1.7.1.6 for specific requirements when submitting drawings for registration.

The final payment certificate certifies that the road infrastructure has been built in accordance with project drawings and specifications.

It is not intended for As Constructed drawings to be represented by detailed site survey measurements, except for changes to new or relocated underground services, drainage, foundations and other subsurface infrastructure which must be established before backfilling occurs (or for piles as driving or drilling is completed). As Constructed drawings are a separate deliverable item from the 'As Constructed Survey'.

1.7.1.5 Drawing certification and verification on Revision drawings

Certification, where RPEQ sign off is required in the revision area located in the title block when amendments have been made to the 'Issued For Construction' version of the project drawings where:

- The principal has supplied the Issued For Construction drawings, this will typically be the Principal's RPEQ design engineer, or the Contractor's RPEQ design engineer.
- The amendment would affect the engineering intent or functionality, the Design Revision shall be certified by the relevant RPEQ design engineer/s.
- The relevant signatory's details (full names, area of engineering, RPEQ number, signed dates as required) for the Design Revision drawings, are to be typed electronically, either directly into the AutoCAD drawing (DWG) or the drawing PDF. The font for the signature is to be RomanS or Arial Narrow in black (a similar font is also acceptable). A wet ink signature is not required, and the field should be left blank if the signatory's details are already typed electronically (ie. electronically signed, not digitally signed).
- Each Design Revision must be reissued with the next sequential alphabetical revision identifier.
- It is expected the certification of an As Constructed drawing, following an Issued For Construction, or Drafting or Design Revision drawing, is not required as this final revision only involves design or drafting verification acknowledging that previous certified revisions have been incorporated into the As Constructed version.

Refer to the following for further details / examples on the production of Drawings:

- Section 1.7.1.1
- Section 1.7.1.3
- Section 1.7.1.4
- Section 1.7.1.6.2, and
- Figure 1.6.3.3.

Verification sign off in the revision area located in the title block is required where amendments have been made to the Issued For Construction version of the project drawings and the changes do not affect the engineering intent or functionality.

- Such drawings are not required to be certified by an RPEQ, but are to be verified by the appropriate person. This will typically be a draftsman or designer. Examples of where verification (non RPEQ) is sufficient include:
 - issuing a Drafting Revision drawing, due to a service being located in a different position

- issuing an As Constructed drawing, which is the final revision following a Drafting or Design Revision drawing. This only involves the removal of revision clouds and does not certify or confirm what has been constructed.
- The relevant signatory's details (full names, position titles, signed dates and organisation as required) for the Design Revision or As Constructed drawings, are to be typed electronically, either directly into the AutoCAD drawing (DWG) or the drawing. The font for the signature is to be RomanS or Arial Narrow in black (a similar font is also acceptable). A wet ink signature is not required, and the field should be left blank if the signatory's details are already typed electronically (ie. electronically signed, not digitally signed).
- Each Design Revision and As Constructed drawing must be reissued with the next sequential alphabetical revision identifier.

Refer to the following for further details/examples on the production of Drawings:

- Section 1.7.1.1
- Section 1.7.1.3
- Section 1.7.1.4
- Section 1.7.1.6.2, and
- Figure 1.6.3.3.

1.7.1.6 Submission of drawings for registration

As a public record, the expectation is that presentation of detailed design drawings complies with the department's *Drafting and Design Presentation Standards Manual* (Volume 1 and Volume 2). Bridges and other structures drawings are to be presented in accordance with Volume 3: *Structural Drafting Standards*.

It is mandatory that all versions of drawings produced for construction purposes, including As Constructed drawings must:

- be allocated a departmental drawing number
- comply with presentation standards described in the department's *Drafting and Design Presentation Standards Manual*, and
- be submitted for digitising and registration by the department.

Drawings other than engineering drawings depicting project information that informs the final design, for example, Geotechnical Investigations, Resumptions, Native Title and so on that require registered departmental drawing numbers, also need to be submitted to the department's Plan Room.

Planning drawings, or those drawings prepared during project development prior to Issued For Construction, are not required to be submitted for public record to the department's Plan Room. It is expected that Regional / District offices and contractors, engaged in the production of such drawings, will maintain their own system for identification and records management of these drawings.

Detailed As Constructed design drawings, including the drawing containing the updated 'Drawing Index', are required to be submitted by the Superintendent or the Principal's Construction Administrator to the department's Plan Room for digitisation and registration.

The Superintendent or the Principal's Construction Administrator is also responsible to supply a copy of the complete set of As Constructed drawings to the corresponding Regional ARMIS Section of the department for updating of the ARMIS database.

Where bridges and/or other structures are part of the project design, an additional copy of the bridges / structures drawings and their related reports, are to be supplied to the department's Structures Branch for updating bridges / structures design records.

1.7.1.6.1 Registration of drawings

For registration purposes, drawing numbers obtained from the local district's Plan Room representative or the department's Plan Room, are to be placed on the appropriate standard departmental title block for all departmental project drawings produced and released for inclusion in the scheme under any contract type.

Management of drawings for registration is the responsibility as below:

- 'Issued For Construction' and 'Drafting or Design Revision' drawings are to be managed by the local district's Plan Room representative.
- 'As Constructed' drawings are to be managed by the department's Plan Room.
- All multi-district's project drawings (Issued For Construction to As Constructed) are to be managed by the department's Plan Room.

1.7.1.6.2 Acceptable format of submitted registered drawings

The use of electronic signatures on all engineering drawings, is the department's default position unless otherwise approved by the department on a project-by-project basis

Electronically signed drawings – the department will accept drawings in PDF format. All drawings must be able to be reproduced in black / white without loss of information. The preferred PDF format is vector-based, as a direct output of design authoring software. Refer to Table 1.7.1.6.2(a) for acceptable PDF specifications.

Table 1.7.1.6.2(a) – Departmental accepted PDF specifications for electronically signed drawings

Source Record	Min Resolution	Bit Depth	Format	Size	Compression
Electronically signed drawings with discrete colour used in text or diagrams	Vector / 600 DPI (Raster)	8 Bit Colour	PDF	A3 standard	Lossless Compression

Electronically signed drawings are to be submitted to the department via electronic transaction for registration. Please contact your local district's Plan Room representative, or the department's Plan Room for further information on workable electronic transaction methods based on the number of drawings, acceptable electronic platforms and so on.

Wet signed drawings – If drawings are agreed to be wet signed (blue or black ink), then original hard copy drawings must be sent to the department for registration. All drawings must be able to be reproduced in black / white without loss of information. Refer to Table 1.7.1.6.2(b) for temporary drawing or permanent drawing paper specifications.

Hard copy wet signed drawings are to be submitted to your local district's Plan Room representative, or the department's Plan Room via courier or internal mail services.

Table 1.7.1.6.2(b) – Departmental accepted paper specifications for wet signed drawings

Source Record	Minimum Source Resolution	Minimum Bit Depth	Paper Type	Size
Physically wet signed drawings with discrete colour used in text or diagrams	600 DPI	8 Bit Colour	<ul style="list-style-type: none"> Temporary* drawing Standard white 80 gsm paper Permanent* drawing: White permanent 100 mic– 135 mic thickness paper 	A3 standard
* For definitions of Temporary and Permanent drawings and their legislative archive requirements, contact the local district's Plan Room representative or the department's Plan Room.				

1.7.1.7 Asset documents

There should be no construction notes on the asset documents. Where emergency work has been performed, asset drawings must be developed from actual construction work details and recorded on new drawings or by updating existing asset drawings.

1.7.2 Drawing management costs

1.7.2.1 Project cost amount for management and registration of drawings

The Principal shall pay the costs associated with management of all project drawings including digitisation, registration and storage at state archives where appropriate.

1.7.2.2 Cost of approved design change

The organisation responsible for providing the Issued For Construction drawings, is responsible for amending the relevant drawings.

The practice of handwritten notes on the last drawing issued, is not acceptable. All project drawings must be issued, conforming to departmental standards of drafting and design presentation and produced in CADD format.

1.8 Drawing documentation

Drawing documentation provides the basic elements for tenderers and construction personnel to carry out their respective activities.

1.8.1 Standard drawings

Standard drawings have been developed to reduce the number of details shown in the project drawings.

These standard drawings are provided in the department's *Standard Drawings Roads* and are updated on a regular basis and can be referenced in the design documentation.

These drawings provide standardised construction details for selected road related structures including drainage, retaining structures and protective treatments, general earthworks, road furniture, noise barriers, road lighting, traffic signals and bridges.

1.8.2 Design presentation drawings

1.8.2.1 Road infrastructure design

Road infrastructure design drawings diagrammatically show the actual extent and types of treatment necessary to provide for both horizontal and vertical alignments of specific road infrastructure profiles.

1.8.2.2 Bridges

Bridge design drawings show the general layout of the bridge, profiles and structural details. Bridges are typically built over streams, railways or other roads.

The structural details include reinforcement details, as well as stressing and welding symbols. They also specify the exposure classifications for durability. In complex structures, there may also be construction sequence drawings to ensure that the imposed design loads are the same as the designer assumed.

1.8.2.3 Retaining walls

There is a large range of types of retaining wall. The choice of retaining wall may depend on appearance, environment, construction restraints and structural action. Care should be made in the correct choice of system for the project. In urban situations, the job restraints may impact severely on the choice of system.

1.8.2.4 Noise barriers

Noise barrier walls and earth mounds are a very effective means of reducing road traffic noise if designed and constructed to the requirements of the *Transport Noise Management Code of Practice*.

Noise barrier drawings are to depict construction detail and consider all design elements of the proposed noise barrier, including location, height and length, as determined from an approved noise assessment report.

These drawings are to refer to other relevant Standard Drawings and *Transport and Main Roads Specifications* as they relate to the project specific requirements.

1.8.2.5 Drainage infrastructure

'Drainage devices' are components of a project that are designed and constructed for the purpose of controlling runoff and form part of a 'drainage system'. A drainage system is a system of natural and constructed pathways that are used to convey runoff through a project site to its receiving waters.

Examples of drainage devices are: culverts, gully inlets, pipes, drainage system, overland flow paths, open channels, energy dissipaters, kerb and channel, sedimentation traps and retention and detention basins.

Water flows as a result of fall in the ground, that is, a negative level difference between two points. Therefore, with regard to drainage devices, the most important details that have to be shown in design drawings are the heights to which the devices are to be constructed.

Other details that are required are:

- plan views to clearly show location and orientation of devices and the linkage between them, for example, the outlet of a culvert linking to a diversion channel then to a retention basin

- drainage cross sections to clearly show the position and design details of cross drainage (culverts)
- longitudinal sections to clearly show the position and design details of underground piped systems, in conjunction with gully inlets and pits
- construction details (dimensions and so on) for drainage devices which cannot be simply purchased and have to be built, for example, open channels, scour protection and drop inlets, and
- a complete project electronic model will provide all of the details necessary to tender and construct the drainage structure concerned.

1.8.2.6 Urban design

Urban design promotes an integrated relationship between the road user, roads and the environment (location, function and character), through which they pass. The functional, architectural and aesthetic forms and treatments for selected road related structures and elements, demonstrate this integration.

Urban design documentation is typically associated with structures, including bridges, retaining walls, and noise barriers, but may be delivered by various design disciplines including landscape architects, engineers and architects.

1.8.2.7 Environmental design

The environmental design drawings are divided into two phases:

- the planning phase, and
- the development phase.

The drawings in each phase contain the information relevant for that stage of the project.

1.8.2.7.1 Environmental features and management drawings

Environmental features and management drawings show the existing environmental features and the recommended management of these features to ensure compliance with legislation.

These drawings are on large-scale and/or complex projects.

These drawings are a diagrammatic representation of the environmental assessment taken from such documents as an Environmental Impact Statement (EIS), Environmental Approval Report (EAR) and/or an Environmental Management Plan (EMP).

1.8.2.7.2 Soil suitability drawings

Soil suitability drawings show the suitability of a site soil for use as planting media and for the construction of drainage devices.

The drawings diagrammatically show the extent and types of soil along a road alignment and relate to the Planting Media Management Plan.

1.8.2.7.3 Erosion and sediment control plan drawings

An erosion and sediment control plan drawing shows a possible approach for sediment and erosion management.

The drawing is included in contract documentation, so that tenderers can use it as a basis for pricing. After the contract has been awarded, the contractors can choose to adopt the drawing/s or develop their own:

- Environmental Management Plan (Construction) Drawings, and
- Environmental Management Plan (Construction) Drawing shows the environmental risks associated with the construction of a project.

The Environmental Management Plan (Construction) sets out what must be contained on the drawings, but allows the option that information is shown on drawings and diagrams, as opposed to just text. EMP(C) drawings are not intended to replace a text-based document, but to provide an efficient means of conveying information.

1.8.2.7.4 Landscape and revegetation drawings

Landscape and revegetation drawings show the scope and extent of landscape and revegetation works.

The scope may be as simple as the grassing and turfing of batters and table drains, or as complex as the revegetation of environmentally sensitive areas, or the more horticulturally-based landscape projects that are typical of the major urban roadways.

It should be noted, that the planting material used for these projects may impact on civil engineering components of the design, for example, clear zones, sight distance, or structural components, for example, retaining walls, tunnel portals and so on.

These drawings will require RPEQ certification from the area of engineering that may be affected by landscape treatments.

1.8.2.7.5 Compensatory revegetation drawings

Compensatory revegetation drawings show the scope and extent of landscape and revegetation works specifically intended as compensatory plantings beyond the limit of clearing. They are separate, but complementary to the landscape and revegetation works that typically include the vegetation of areas within the limit of clearing.

The planting areas typically fall within the road reserve but may, in some instances where local landowners and/or the community are involved, extend into adjoining properties. The works may be contracted separately to the associated road contract and start during the pre-construction phase of a project and continue after final inspection into the maintenance activities.

1.9 Survey drafting presentation

Survey information forms the base data for the design process but can also be used for drafting and design presentation purposes. Survey products include aerial imagery, photogrammetric data, topographic and feature information, digital surface data, as well as the digital cadastre. These products may be used to enhance the presentation of a design, for public information and consultation purposes. The department maintains a large library of aerial imagery and other digital survey information that is available for use. Contact local departmental survey offices to gain access to this existing information, or procurement of new survey information.

All survey features and modelling must be presented in accordance with the department's current standards as set out in *TMR Surveying Standards*. No variations will be allowed to the codes, symbols, line styles or designated models.

1.9.1 Use of GDA2020 datum on departmental project drawings

For design projects where the GDA2020 datum has been used, corresponding title block entries representing the datum and the coordinate information are required. The following text is to be used in the top two boxes of the survey data of the standard title block:

- Horizontal Datum – GDA2020
- Horizontal Grid – GDA2020 MGA Zone 56

It is acknowledged that the entry 'GDA2020' is contained and repeated in both title block fields, as shown in Figure 1.9.2. This is to maintain consistent naming with internationally-published coordinate system definitions (EPSG nomenclature) and other departmental spatial systems.

Figure 1.9.2 – GDA2020 horizontal datum and horizontal grid in the standard title block

Associated Job Nos	Survey Data		Scale
	Horiz. Datum	GDA2020	
Auxiliary Drg Nos	Horiz. Grid	GDA2020 MGA Zone 56	
	Height Datum		
	Survey Books		Dimensions shown in except where shown

As per current business practice, engineers, designers and project managers are first directed to contact the District Principal Surveyor or Principal Advisor (Geospatial Information) regarding any questions about project datum. For further information about the appropriate use of GDA2020 datum on departmental project drawings, send an email to gda2020@tmr.qld.gov.au.

1.10 References

- *Professional Engineers Act 2002* (Qld), together with the Code of Practice
- *Work Health and Safety Act 2011* (Qld), together with amendments
- *Transport Infrastructure Act 1994* (Qld), together with amendments
- *Public Records Act 2002* (Qld), together with amendments
- *Electronic Transactions (Queensland) Act 2001*, together with amendments, and
- *Evidence Act 1997* (Qld), together with amendments.

Appendix 1A: Engineering certification and safety in design

Road design is becoming an increasingly complex process with significant Legislative and departmental requirements to be satisfied.

The legal requirements emanate from:

- the *Professional Engineers Act 2002* (Qld), together with the Code of Practice, and
- the *Work Health and Safety Act 2011* (Qld), together with amendments.

Professional Engineers Act 2002 (Qld)

The Act regulates undertaking professional engineering services in Queensland. 'Professional engineering services' is defined as meaning:

'An engineering service that requires, or is based on, the application of engineering principles and data to a design, or to a construction or production activity, relating to engineering, and does not include an engineering service that is provided only in accordance with a prescriptive standard'.

Specifically, the responsibilities of RPEQ are set out both within the Act, and its accompanying Code of Practice (Code).

The Code has many similarities to other Codes of Ethics, but it has the force of law in Queensland. It includes the following definition of engineering:

'Engineering is a creative process of synthesising and implementing the knowledge and experience of humanity to enhance the welfare, health, and safety of all members of the community, with due regard to the environment in which they live and the sustainability of the resources employed. Engineering professionals must display detailed technical and professional understanding and the wise application of that understanding'.

Key requirements of the Act and the Code, are as follows:

- An RPEQ can practise only within their engineering competency.
- The relevant Code must be complied with when carrying out professional engineering services.
- Compliance with all government legislation is mandatory (for example, *Work Health and Safety Act 2011* (Qld), and
- All engineering design work must be performed by, or under the direct supervision of an RPEQ, with such design work being in accordance with Australian standards and the department's codes, manuals and guidelines.

The Board of Professional Engineers accepts an RPEQ may delegate the carrying out of professional engineering services to a non-RPEQ, but that work must be performed under the direct supervision of the RPEQ.

Ultimately, RPEQ(s) must exercise their judgment to determine if the delegate is competent to undertake the work (includes design and inspection), as the RPEQ will retain responsibility for work performed.

Work Health and Safety Act 2011 (Qld)

Legal obligations for designers of road infrastructure were introduced in Queensland on 1 January 2012 under amendments to the *Work Health and Safety Act 2011 (Qld)*.

Under this legislation, a person conducting a business or undertaking, that designs a structure that will be used, or could reasonably be expected to be used as a workplace, must ensure, so far as is reasonably practicable, that the structure is without risks to health and safety.

The *Work Health and Safety Act 2011 (Qld)* includes designers as one of the several duty holders for health and safety in the workplace.

A designer is a person conducting a business or undertaking whose profession, trade or business involves them in:

- preparing sketches, plans or drawings for a structure, including variations to a plan or changes to a structure, and
- making decisions for incorporation into a design that may affect the health or safety of persons who construct, use or carry out other activities in relation to the structure.

They include:

- architects, building designers, engineers, building surveyors, interior designers, landscape architects, town planners and all other design practitioners contributing to, or having overall responsibility for, any part of the design (for example, drainage engineers designing the drain for a new development),
- building service designers, engineering firms or others designing services that are part of the structure such as ventilation, electrical systems and permanent fire extinguisher installations,
- contractors carrying out design work as part of their contribution to a project (for example, an engineering contractor providing design, procurement and construction management services),
- temporary works engineers, including those designing formwork, falsework, scaffolding and sheet piling, and
- persons who specify how structural alteration, demolition or dismantling work is to be carried out.

A person conducting a business or undertaking who alters or modifies a design without consulting the original or subsequent designer, will assume the duties of a designer. Any changes to the design of a structure, may affect the health and safety of those who work on or use the structure and must be considered by the person altering or modifying a design.

Complying with these responsibilities is part of the designer obligations under law.

