



Professional Engineers
Ontario

Preparing As-Built and Record Documents

• March 2020 •

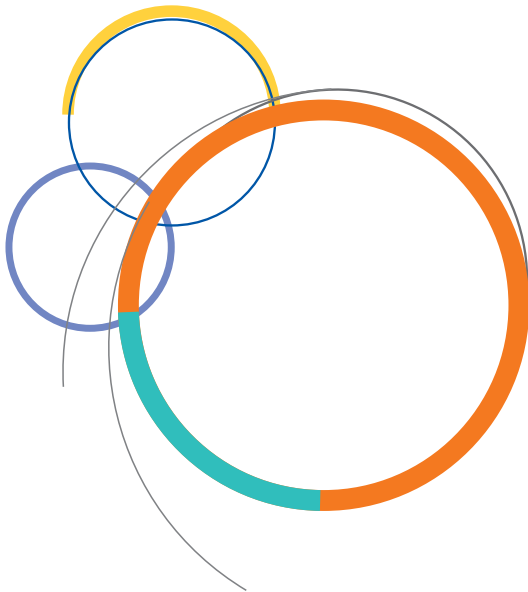
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Preparing As-Built and Record Documents Guideline

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Notice: The Professional Standards Committee has a policy of reviewing guidelines every five years to determine if they are still viable and adequate. However, practice bulletins may be issued from time to time to clarify statements made herein or to add information useful to those professional engineers engaged in this area of practice. Users of this guideline who have questions, comments or suggestions for future amendments and revisions are invited to submit these to PEO using the "Guideline Amendment and Revision" form available at: <https://www.peo.on.ca/sites/default/files/2020-01/Guideline%20Amendment%20and%20Revision%20Form%20%28FINAL%29.pdf>

PURPOSE OF PEO GUIDELINES

Professional Engineers Ontario (PEO) produces guidelines to educate licensees and the public on best practices.

For more information on PEO's guideline and development process, including PEO's standard form for proposing revisions to guidelines, please see the "Guideline Development and Maintenance Processes" document available at: <https://www.peo.on.ca/sites/default/files/2020-03/guideline-dev-maintenance-process.pdf>

For a complete list of PEO's guidelines, visit: <https://www.peo.on.ca/knowledge-centre/practice-advice-resources-and-guidelines>

NOTE: References in this guideline to practitioners apply equally to temporary licence holders, provisional licence holders, limited licence holders or certificate of authorization holders.

ABSTRACT

As-built documents should not be sealed. Information on record documents should be thoroughly reviewed prior to bearing the seal.

PEO produces guidelines to meet the following objectives, which were used to develop the content of this document:

1. Guidelines are intended to aid engineers in performing their engineering role in accordance with the *Professional Engineers Act* and Regulation 941.

PREFACE

This guideline is to offer practitioners guidance on the professionally acceptable manner for preparing record documents.

The recommendations provided in this guideline are considered by PEO to be commensurate with the professional responsibilities of practitioners. This guideline should be used in conjunction (as appropriate) with the *Use of the Professional Engineer's Seal* guideline as that guideline focuses on the proper use of the seal, while this guideline focuses on providing information and best practices regarding record documents, and by inference, as-built documents of completed works.

As-built documents should not be sealed. Information on record documents should be thoroughly reviewed prior to bearing the seal.

This guideline provides some details on the considerations that practitioners need to make to meet the requirements of their clients at reasonable levels of risk to the practitioners. Practitioners are to make adaptations to suit.

For this document, reference will be made to record documents and as-built documents as per the definition in the Appendix¹.

PURPOSE AND SCOPE OF THIS GUIDELINE

The purpose of this guideline is to provide guidance for the preparation of record drawings or documents (collectively called record documents in this guideline) and, by inference, to provide guidance for the preparation of as-built drawings or documents (collectively called as-built documents in this guideline).

Clients or regulatory authorities often call upon practitioners to provide records of recently completed works. In many cases, a client may call for an inspection of a particular infrastructure asset.

Inspection consists of visual observation of construction and the equipment and materials used therein to permit the practitioner to prepare the record documents.

Given the inherent limitations of such inspections, the practitioner needs to exercise care in what is included in record documents that shall be sealed, and by inference, what is included in as-built documents.

Sealing a record document is a message to the public that a qualified and experienced person(s) prepared same documents and the information can be relied on. Section 53 of O. Reg. 941 provides that, when affixed to a final engineering document, the seal represents that the practice of professional engineering reflected in the document can be relied on for the document's intended purpose and that the practitioner whose seal is affixed to the document accepts professional liability for the document's engineering content.

Record documents are engineering documents and must be sealed. However, the purpose of record documents is often not well defined and, as such, needs to be carefully considered by the sealing practitioner to ensure that its purpose is clear.

The best time to gather information for either record documents or as-built documents is during construction, manufacturing or product development. Once the work has been covered up or included in assemblies, or product fabricated, it becomes more difficult and, in some cases, impossible to verify the existing conditions.

If the need to provide record documents is known prior to the start of construction/manufacturing and the level of detail (and associated accuracy) is not established in the engineering services

¹ The use of the terms "record drawings/record documents" and "as-built drawings/as-built documents" in this guideline is consistent with other PEO guidelines. Other professions, most notably architecture, use the same (and additional) terms, however, they may not have the same meaning as used in this guideline.

contract, then a typical industry level of accuracy shall be used, unless a level of detail is mutually agreed upon between the owner and the practitioner.

The level of accuracy and scope of inspection required for producing record documents must be documented in writing and agreed to by the practitioner and the owner.

Record documents are prepared based on information that was observed by a practitioner or by someone under the practitioner's supervision. After a practitioner has reviewed the record documents and is satisfied that they are accurate, the practitioner must seal the documents. Normally the record documents are updates to, and contain a similar level of detail to, the design (or fabrication) documents. If a client requires the record documents to contain additional detail, then this should be agreed with the practitioner prior to the construction (or fabrication) work, to allow the practitioner to collect the required information.

It should be noted that the practitioner who seals the record documents may not be the practitioner who sealed the design documents or the practitioner who observed the construction or fabrication. It therefore follows that the practitioner who seals the record documents is only verifying that the record documents are an accurate reflection of what has been constructed or fabricated. Their seal does not mean or imply that they have verified the design or that they have observed the construction or fabrication work for conformance with the design. That responsibility remains with the practitioners who sealed the design documents and who reviewed the construction or fabrication work. To avoid confusion over these responsibilities, "Record Document" or "Record Drawing" should be marked clearly in the revision block or other prominent location before the record document is sealed by the practitioner.

As-built documents are prepared based on information gathered during construction or fabrication by someone other than a practitioner or someone under their supervision. Often, the information is provided by the contractor in the form of red-line mark-ups of the design drawings. If a practitioner then proceeds to revise the design documents to incorporate the red-line mark-ups, these documents should be clearly marked as "As-Built Documents" and not sealed.

INSPECTION

The following are some considerations provided to determine a level of effort for the inspection process to be undertaken by the practitioner:

- 4.1 Purpose of the Inspection
- 4.2 Scope of the Inspection Required
- 4.3 Limitations of the Inspection
- 4.4 Timing of the Inspection
- 4.5 Accuracy Levels Required for the Inspection

4.1 Purpose of the Inspection

For this guideline, inspection is limited to the purpose of preparing record documents and not used as a basis of assessment of a particular item or issue. The purpose of the inspection has a significant bearing on the scope of the work required (see section 4.2 Scope of the Inspection Required). If no known purpose for the use of the data to be collected is available, then it is important to determine with the client exactly which quantitative and/or qualitative data will be collected in the inspection process.

Limitations of the inspection are to be discussed and confirmed to ensure that the parties fully understand the feasibility of obtaining information that fits the purpose of the inspection process. Refer to example disclaimers in the Appendix.

Users of record documents may assume that all the information depicts the as-constructed details of the project. However, there may be pre-existing information incorporated in the record documents. Hence, there should be a clear distinction between pre-existing and recently constructed/fabricated information contained in the record documents.

4.2 Scope of the Inspection Required

Record documents of completed works are not to be confused with assessment documents or condition surveys prepared at some time after the work has been constructed. For general guidance regarding assessments refer to the PEO's *Structural Condition Assessments of Existing Buildings and Designated Structures Guideline*.

The scope of inspection required for record documents depends on the level of detail to be included in the record documents. Normally the level of detail required on the record documents would be the same as the level of detail shown on the design drawings. However, if a client requests more detail to be shown on the record documents, this may require an enhanced level of inspection. The level of detail required (and the level of effort that this will involve) should ideally be determined prior to finalization of engineering services contracts.

During construction, manufacturing or product development, observation, and inspection of design or construction work will be helpful

prior to items being concealed. If known prior to the contract being awarded/signed, appropriate inspection hold-points can be specified in the (construction, manufacturing or product development) contract. A pre-determined plan for providing record documents allows practitioners the time, resources and access required throughout manufacturing or construction to compare construction, manufacturing or product development documents with as-constructed, as-manufactured or as-produced conditions, with a level of confidence that comes from the opportunity to effectively inspect/observe the constructing, manufacturing or production process.

The inspection contemplated under this guideline is to satisfy the practitioner that the information presented on the record documents accurately represents the project for which record documents are prepared.

The following should be taken into consideration by the practitioner completing the inspection in preparation for record documents:

- The extent of works to be inspected;
- The level of detail required;
- The required timelines; and
- Other contractual requirements.

4.3 Limitations of the Inspection

Inspection of as-constructed conditions is highly dependent upon visual observations and best completed during construction. Inspection post-construction of as-built details may be difficult [or impossible] even with invasive methods. For example, concealed items behind walls and above ceilings or buried or encased items are not visible and even with invasive methods may not be reliably inspected. In some cases, it is not feasible to inspect without destructing the item/material to be inspected. Samples may be taken to assist in the inspection but may be limited by an acceptable level of destruction/damage.

Photos and/or videos (visual media) may be used to support field observations, however excessive reliance on visual media is not recommended or even acceptable for the purposes of inspection.

Some examples of limitations of inspection are:

- Details are hidden within building envelopes;
- Confirmation of material requiring laboratory testing;
- Strength of material compositions;
- Condition of material or item or equipment or systems; and
- Any particular item, equipment or system that was built as an integral unit would be verified as a package, and not in its separate or individual components.

4.4 Timing of the Inspection

The timing and limitations of inspection of completed works has a direct bearing on the level of effort by the practitioner. Required field visits, construction and document review or revision, etc., should ideally be determined prior to finalization of engineering services contracts.

4.4.1 Inspection During Manufacturing or Construction

During construction, inspection will be helpful prior to items being concealed. Appropriate inspection hold-points should be specified. A pre-determined plan for providing record documents allows practitioners the time, resources and access required throughout manufacturing or construction to inspect existing conditions with a level of confidence that comes with the opportunity to effectively observe the manufacturing or construction process. The plan, therefore allows the practitioner to identify possible changes from the design documents or intent. Having work concealed before required records are made may indicate a failure of planning or execution.

4.4.2 Inspection Post-Manufacturing or Construction

After the manufacturing or construction has been completed and items have been assembled or concealed, inspection required for record documents will have limitations. For example, certain assemblies cannot be disassembled without destruction, or certain details are difficult or impossible to be inspected, such as under-floor plumbing or electrical conduit locations and depths that have been concealed by concrete. Where the information required cannot be obtained by using non-destructive methods, the limitations will need to be identified on the record documents.

4.5 Accuracy Levels Required for the Inspection

The accuracy levels required are dependent upon the intended use of the record documents for which the inspection is to be completed. In establishing the accuracy level and required amount of detail with the client, it is prudent that the practitioner considers available standards to confirm the existence of suggested or standardized accuracy levels and the required amount of detail. For example, for underground infrastructure, the applicable CSA standard specifies the positional accuracy of records of the installed utilities in four accuracy levels. If no standards are available, accuracy levels should be discussed at the project outset and confirmed in writing. It should be kept in mind that higher accuracy levels in positioning or dimensioning may require more accurate measuring techniques and/or higher quality devices. It would be prudent to add to the record documents, the accuracy levels used.

Material tests may be required to determine certain characteristics. These should be carefully evaluated prior to the start of construction/manufacturing to ensure that they deliver the required results.

5.

SUMMARY

This guideline provides practitioners guidance on the acceptable manner for preparing record documents and, by inference, as-built documents of completed works. The level of effort needed to produce record documents varies upon the purpose, scope,

limitations, timing and accuracy of inspection. It is not acceptable best practice for practitioners to seal record documents where the information provided on these documents has not been inspected by the practitioner, to the associated level of effort, for the purpose or intended use of these documents. The materials in the appendices are to provide further clarity and are for information only.

6.

APPENDIX

6.1 Definitions

As-built drawing/document: A document created by or based solely on information provided by a third party that reflects the installed, constructed, or commissioned conditions of a device, machine, equipment, apparatus, structure, system, or other outcome of an engineering project. Since the engineer has not reviewed and verified that the information is complete or accurate, as-built drawings must not be sealed.

Assessment: A review of an existing building, structure or fabrication sometime after it has been built, constructed or fabricated for a purpose other than to create an accurate record drawing such as, for example, to assess compliance with the Ontario Building Code or applicable CSA standards. “Assess” has a corresponding meaning.

Industry best practices: Activities or operating procedures considered as an established custom or habit which results in the maximum positive effect for the benefit of all concerned parties.

Infrastructure: Consists of the large-scale public systems, services and facilities that are necessary for economic activity, including power and water supplies, transportation, telecommunications, roads, schools, etc. It is often interpreted to mean the most basic level of organizational structure in a complex body or system that serves as a foundation for the rest.

Inspection: Shall consist of visual observation of construction and the equipment and materials used therein to permit the practitioner to render their professional opinion as to the contractor's conformance with the design professional's recommendations, plans or specifications. Given the inherent limitations of such inspections, they shall not be relied upon by any party as acceptance of the work, nor shall they relieve any party from fulfillment of customary and contractual responsibilities and obligations and Inspect has a corresponding meaning.

Observation: May be made by the professional or someone acting under the professional's direct or indirect supervision and observe has a corresponding meaning.

Practitioner: A holder of a licence, a temporary licence, a provisional licence, a limited licence or a certificate of authorization, as the case requires.

Red-line drawings/documents: Refers to Issued for Construction (IFC) documents that have been marked up during the course of construction (usually by the contractor) to reflect changes made during construction.

Record drawings/documents: Documents created to accurately reflect as-constructed, as-built or as-fabricated conditions and that have been sealed by a professional engineer after verifying that the documents are accurate.

Review: Examination of a record document prepared by a third party to determine whether its content accurately reflects the as-built, as-constructed or as-fabricated conditions.

Verification: The record document has been examined for correctness against as-built, as-constructed or as-fabricated conditions. “Verify” has a corresponding meaning.

6.2 Example Disclaimers and Scope of Limitation Statements

Documents often rely on information provided to the practitioner by others. In these cases, it would be prudent to identify the fact that some information has been provided by others and provide a disclaimer on the documents.

Some owners may note that a third-party disclaimer will not be acceptable. An example of a client contractual statement is as follows:

“Record drawings must be sealed and signed by the practitioner. A “Third Party Disclaimer” will not be accepted, i.e. the data shall be collected by the practitioner who is preparing the record drawings.”

Practitioners should be aware of such [contractual] statements and the liability that they may confer on the practitioner. It is worth mentioning that this requirement does not rule out including a statement within record documents, in which the practitioner confirms that they are relying, without independent verification, on information provided by the owner or one or more third parties.

Following are some examples of disclaimers or scope of limitation statements that may be used.

6.2.1 Record Document Example Disclaimers or Scope of Limitation Statements (seal to be applied)

Some of these disclaimers have their origin in very specific circumstances and should be adapted by the practitioner to suit the circumstances and the record documentation being completed.

1. *“The issuance of this record document is a representation by the practitioner that this document is a reflection of the completed work to the level of accuracy and purpose set out in the [Engineering Services Agreement or Technical Reference Standard (as*

applicable)]. It is not a representation that the completed work is in conformity with the design, even if such information is represented on this document.”

The following is an option where changes or variations may occur immediately after issuance of record documents. This type of change occurs subtly in process related designs.

2. *These record documents have been prepared for the purposes of documenting the completed [or existing] works of [description of works constructed, fabricated, installed, etc.] between [start date] and [completion date]. [Company or Practitioner] assumes no responsibility for any changes made after the date of these record documents or for any items denoted on these documents that were not accessible to be inspected at the time these record documents were prepared. Those relying on these record documents are advised to confirm that these record documents are a current reflection of the existing work prior to use of this information.*

6.2.2 As-Built Document Example Scope of Limitation Statements (no seal to be applied):

Some of these scope of limitation statements have their origin in very specific circumstances and should be adapted by the practitioner to suit the circumstances and the as-built documentation being completed.

1. *This as-built document has been prepared based on information provided by others. The practitioner has not inspected the accuracy and/or the completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result.*
2. *This as-built document has been prepared, in part, based upon information furnished by others. While this information is believed to be reliable, the practitioner assumes no responsibility for the accuracy of this as-built document or for any errors or omissions that may have been incorporated into it as a result of incorrect information provided to the practitioner. Those relying on these as-built documents are advised to confirm that these as-built documents are a current reflection of the existing work prior to use of this information.*

6.3 Frequently Asked Questions

The following questions from professional engineers and answers from PEO are intended to demonstrate how the principles outlined in this guideline can be applied to specific situations.

- Q1:** Should the original design engineer’s seal be removed from the design documents when preparing record documents?
- A1:** For record documents, the original design practitioner’s seal should be removed. Practitioners preparing record documents must apply their seal.
- Q2:** Should the original design engineer’s seal be removed from the design documents when preparing as-built documents?
- A2:** As-built documents shall not be sealed. The original design engineer’s seal must be removed when preparing as-built documents.

- Q3:** Can a record document rely on material provided by others (e.g. surveyor)?
- A3:** A record document can incorporate limited information provided by others; this means not provided by the practitioner or their direct supervised staff. It would be up to the practitioner to determine what amount of information provided by others is acceptable. However, this information should be clearly identified as such (e.g. in a disclaimer), and it is imperative not to accept ownership of the data provided by others.
- Q4:** What disclaimers should record drawings have?
- A4:** Please refer to the Example Disclaimers or Scope of Limitation Statements in section 6.2.1 in this guideline.
- Q5:** Can an engineer seal a record drawing without going on-site for inspection?
- A5:** Record documents are those prepared by a practitioner after inspecting in detail the actual conditions of the completed project. For some projects, this inspection may require frequent or continuous presence on site. However, based on the practitioner's experience and the detail of the inspection required, a competent individual supervised by the practitioner can provide partial inspection on the practitioner's behalf.
- Q6:** If an engineer cannot seal as-built drawings, is there another stamp or disclaimer that should be used?
- A6:** Yes, the practitioner could use a disclaimer to describe the scope of work. Please refer to Example Scope of Limitation Statements in section 6.2.2 in this guideline.
- Q7:** Can a practitioner seal a multi-discipline record document?
- A7:** Yes, for a project covering work within several engineering disciplines, a record document could be sealed by a practitioner who is taking responsibility for the record document. Likewise, multiple practitioners representing individual disciplines may jointly seal a record document.
- Q8:** What is the expectation on the amount or detail of inspection/review for an engineer to be able to seal a record document?
- A8:** The amount or detail of inspection will depend on the practitioner's professional judgment, based on their experience and knowledge.
- Q9:** Can a client require all drawings to be record drawings [documents]? Are there limitations to what is considered practical?
- A9:** Principally, the practitioner and client should determine what is an acceptable level of effort for the agreed upon information to be gathered and compiled in record documents. It is up to the practitioner to negotiate with the client what is reasonable to provide as a record document and advise the client to what extent their services would be required to perform satisfactory inspection for preparation of such record documents.
- Q10:** In sealing a record document, may the professional rely on site mark-up drawings, quality/test reports and other site work from competent site staff?
- A10:** If the competent site staff are practitioners, they should seal the record documents. If not, then the practitioner responsible for the direct supervision should seal the record documents. The supervising practitioner is to determine the level of supervision. For more information, refer to the Assuming Responsibility and Supervising Engineering Work practice guideline.
- Q11:** In some cases, the responsible engineer has never met the site staff. How does the engineer ensure that the delegate has the necessary level of confidence/competence?
- A11:** The responsible practitioner should be familiar with the site staff, their capabilities, and determine the level of supervision required.
- Q12:** For work pursuits, some request for proposals stipulate delivery of record drawings at project completion, but do not allow for an allotted time during construction for discipline practitioners to inspect as-built conditions. What minimum level of effort should be included in a bid by all parties that will continue to present a fair and competitive bid?
- A12:** For a fair and competitive bidding process, the practitioner should submit a Request for Information to the entity requesting the proposal to inquire and clarify regarding this matter. It is up to the practitioner to determine and negotiate during the bid process what is the reasonable level of effort to perform satisfactory inspection for preparation of such record documents.
- Q13:** Construction or installation work is near completion when the project manager realizes delivery of record drawings are a contract requirement. The project manager requests for sealed as-built drawings to be inspected based on photographs, data provided by others, and one (1) site visit at near completion phase. Should the practitioner seal these drawings?
- A13:** Only record documents must be sealed. Refer to section 4 of this guideline for general inspection requirements that would allow for sealing record documents.
- Q14:** Given the amount of total engineering work that is related to construction under the Ontario Building Code, is this guideline used in relation to the Professional Engineers Providing General Review of Construction as Required by the Ontario Building Code guideline?
- A14:** No, the obligations of engineers to prepare as-built and record documents is independent of the obligations that are outlined in the Professional Engineers Providing General Review of Construction as Required by the Ontario Building Code guideline.

NOTE: A practitioner who is not engaged to provide general review services should advise their client that they are not in a position to prepare record drawings since they will not be aware of all changes during construction.

Q15: There is often a need to determine the preexisting conditions of previously completed works. For example, it may be required to determine the locations and sizing of existing infrastructure in a municipal right-of-way to allow for the construction of additional infrastructure. The ASCE has published a guideline, ASCE 38-02: Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data. In many cases, practitioners that collect information using this guideline will seal the final drawings compiled using this process. When preparing drawings based on such an industry accepted standard or guideline, should the practitioner seal such drawings?

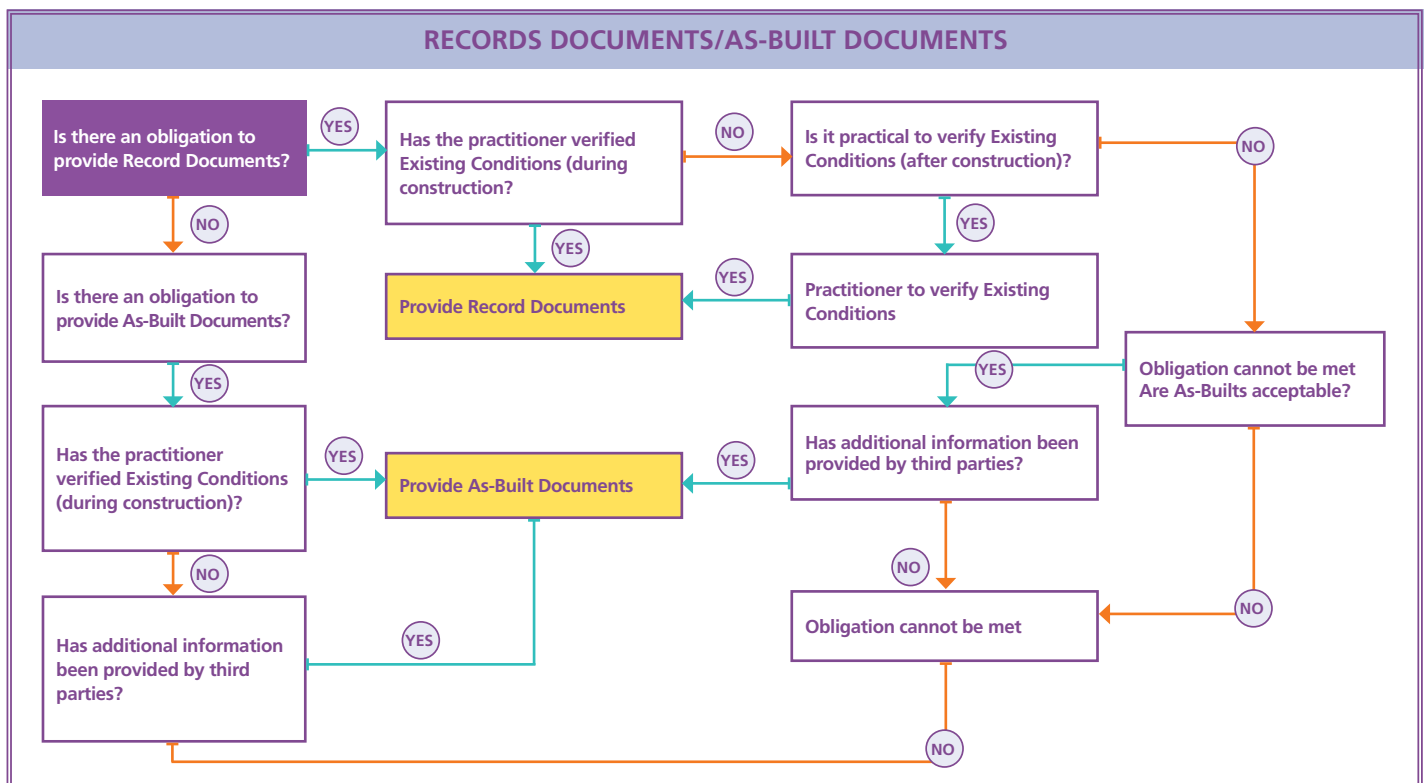
A15: Yes, in such cases the seal indicates that the guideline or industry accepted standard was followed to a level expected from a practitioner. In this context, the processes that were followed will determine the accuracy.

Q16: Sometimes architects and clients use different or not well-defined terminology for documentation pertaining to as-built and/or record documents. How should requirements for these documents be determined? What is the appropriate process that should be followed in this scenario?

A16: It is the responsibility of the practitioner to clarify which definitions from this guideline will be used.

6.4 Flow Chart

6.4.1 Preparing Record/As-Built Documents



6.4.2 Steps to Prepare Record Documents

One or more steps, except for verification, maybe omitted depending on the circumstances of the project.





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