Nationwide House Energy Rating Scheme (NatHERS)

NatHERS Software Accreditation Protocol - Whole of Home 2022

VERSION: 20220901

Please note that parts of this document may be revised and updated over

time.

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Direct any enquiries about the protocol and the accreditation process to:

NatHERS Administrator

Email: admin@nathers.gov.au

Version (YYYYMMDD)	Amendments / actions
20220715	Draft issue – prototype sent to committee. Ongoing review by Software Providers.
20220901	Stakeholder feedback incorporated. Published for NCC 2022. Appendices removed and referenced as separate stand-alone documents.

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1. Introduction

The Nationwide House Energy Rating Scheme (NatHERS) Software Accreditation Protocol (SAP) is a series of documents that provide the necessary requirements for software tools to model energy ratings and obtain accreditation under NatHERS. Software Providers must comply with these.

There are three SAP streams (Figure 1) and Software Providers may seek accreditation in one or more of these:

1   **Thermal**— focusses on the software tool requirements to generate an energy rating based on the thermal shell of a dwelling and the estimated energy use for heating and cooling.
2   **Whole of Home** (WoH) — this document — builds on the Thermal SAP and focuses on the software tool requirements to generate an energy rating for the appliances (heating, cooling, hot water systems, lighting, pool/spa pumps, on-site energy generation and storage, cooking and plug-in appliances combined with the thermal shell.
3   **Existing/In-home** — builds on the Thermal and WoH SAP as well as the National Scorecard Tool, and details the requirements to generate an energy rating using an in home assessment process for existing homes where house plans do not exist. This consists of an assessment of the thermal shell and WoH performance.

Figure 1 — NatHERS SAP streams

This document must be read in conjunction with:

- all governance and technical documents referred to in Section 5 of this document and
- any additional information specified by the NatHERS Administrator (Administrator).

1.1. NatHERS software for WoH performance energy rating

NatHERS accredited software tools produce an energy rating report in the form of a NatHERS Certificate or rating report that can be used to:

- ensure the residential dwelling meets the mandatory energy efficiency requirements for new homes and major renovations required under the National Construction Code (NCC)
- compare the energy efficiency of various home designs
- advise prospective home buyers about the thermal performance of a home.

NatHERS is being expanded to provide WoH energy assessments and ratings. The WoH rating will continue to provide information and a star rating of a home's thermal performance (from 0 to 10 stars), but it will also provide information about the energy performance of the following appliances:

- heating and cooling appliances
- hot water systems
- lighting
- pool/spa pumps (and heating in the future)
- on-site energy generation and storage
- cooking and plug-in appliances

The WoH elements of the SAP are considered in addition to the Thermal accreditation requirements (refer to SAP — Thermal). There is no requirement that tools seeking only Thermal accreditation have to meet WoH provisions. There is a requirement that tools seeking WoH accreditation either:

- have or are undertaking NatHERS Thermal accreditation or
- have agreed access rights with a software tool that has existing NatHERS accreditation.

CSIRO's Chenath Engine is the underpinning calculation engine that NatHERS accredited software tools link to or need to align with. If a Software Provider plans on not using Chenath, they must first contact the Administrator to discuss their proposal. Only engines based on thermal building physics for air, moisture and heat transfer calculations will be considered.

Should a software tool not incorporate the Chenath Engine, several clauses in this Protocol may not apply. Alternative accreditation methodologies would need to be developed and approved by the NatHERS Steering Committee (Steering Committee).

1.2. Using this document

This document is for those seeking WoH software accreditation, reaccreditation or implementing updates under NatHERS WoH stream.

The WoH accreditation pathways operate in the same way as the thermal accreditation pathways. There are provisions for new entrants, existing tools requiring re-accreditation, tools making major changes or bug fixes, and tools making minor changes or bug fixes.

The WoH SAP sets out the accuracy requirements for tools with respect to the NatHERS benchmark tool, AccuRate Home. The WoH SAP requires that tools calculate energy use and generation across a range of 3 house designs and 10 appliance scenarios in 11 representative climate zones across the country. The WoH SAP sets accuracy benchmarks on each of the appliance modules individually, and on the final outputs.

New accreditation

Software Providers seeking accreditation for the first time must undertake a two-phase process including:

1.   an expression of interest (EOI) for accreditation and

2.   comprehensive testing.

Reaccreditation

Reaccreditation is undertaken to maintain alignment across the tools. It occurs every three years and typically aligns with the three-yearly updates of the NCC. The process usually includes major updates, such as changes to the Chenath Engine, or input data, such as updates to the climate files and new building features WoH calculation rules or new appliance features or modules.

Minor updates

Minor updates need to be implemented by accredited tools from time to time to facilitate innovation and amend minor errors. The rating impact of these must be limited so as not to substantially alter the existing regulatory arrangements. These are often initiated by the Software Provider, but sometimes in response to issues identified by other parties.

1.2.1.   Format of this document

Section 1   Introduction

Provides an overview of how this WoH SAP works, including the suite of documents, which make up the WoH SAP.

Section 2   Mandatory inputs, outputs and conditions of NatHERS accredited software

Provides the accuracy requirements, a summary of key data sets and WoH calculation Methods, which need to be incorporated, applied and generated by software tools.

Section 3   Applying and updating processes

Explains the activities to get accredited, reaccredited or implement software updates.

Section 4   Testing methods and materials

Details the testing procedures and materials for accreditation, reaccreditation and software updates

Section 5   Information sources

Software Providers must be familiar with and incorporate principles detailed in the documentation listed in this section to ensure correct functioning of the software.

2. Mandatory inputs, outputs and conditions of NatHERS accredited software

To understand the accreditation process, Software Providers must read this WoH SAP in conjunction with documents listed in Section 5 Information Sources and other documents required by the Administrator.

2.1. Software accuracy requirements

Note: the software accuracy requirements are under review and may be updated in consultation with the Steering Committee and software providers as tool accreditation progresses.

The consistency and accuracy of energy performance ratings is fundamental to the objectives of NatHERS. Results must be accurate across a range of dwellings and produce results consistent with the benchmark tool, AccuRate Home. Depending on the circumstance, software tools must be tested (refer to section 4 for testing details) using three NatHERS dwelling designs in 11 representative climate groups to determine whether they meet minimum accuracy requirements for:

- accreditation and reaccreditation (Table 1) where accuracy requirements are assessed relative to the benchmark software tool.
- minor updates (Table 2) where ratings are compared to the most recently released software tool version.

	Table 1 — New accreditation and reaccreditation accuracy requirements		
	Condition	**Parameter**	**Specification**
	Condition 1	100%	≤ ±10 % Energy load by appliance module and fuel type ≤ ±10 % Total energy load (use) by fuel type ≤ ±10 % Electricity import and export for model/assessment ≤ ± 5 points on WoH performance rating
AND	Condition 2	≥ 95%	≤ ±5 % Energy load by appliance module and fuel type ≤ ±5 % Total energy load (use) by fuel type ≤ ±5 % Electricity import and export for model ≤ ± 2 points on WoH performance rating
AND	Condition 3	≤ 75%	Limited simulation bias – less than 75% of results can have ratings higher than the benchmark results

Table 2 — Minor change rating divergence limits	
Percentage of simulations	**WoH rating compared to the latest version of the software**
100%	≤10%
99%	≤5%

2.2. Accredited mode – minimum requirements for accreditation

To comply with requirements under the NCC, energy efficiency ratings must be calculated by NatHERS accredited software tools run in **accredited mode** (also referred to as regulation mode)[1]. This ensures calculations for energy ratings are accurate, representative of Australian conditions and comparable across different types of dwellings and locations.

The NatHERS Whole of Home National Calculation Method (the WoH Method) outlines the methods that underpin accredited software tools under the NatHERS WoH framework. It provides the equations and assumptions that support the modelling of energy performance, as well as context and explanations as to how these settings were derived.

NatHERS accredited software tools may also have non-accredited modes of operation for the purpose of providing additional information and functionality for users. These non-accredited modes of operation are not covered by this Protocol and cannot be used for the purposes of NCC compliance.

2.2.1.   Modules and calculations

The WoH front-end software must be capable of applying the Chenath Engine energy load outputs and apply equations and assumptions for each of the modules as provided in the WoH Method. A summary of the modules and their components is provided at Table 3.

Table 3 — WoH assumptions, modules and calculations		
Modules	**Elements**	**Comments**
Occupancy	Number of occupants	Based on total floor area, excluding garage
	Patterns of occupation	Two profiles: all day and work day
	Calculation of WoH performance using the two occupation profiles	The process of blending the two thermal outputs together for a single thermal profile
	Thermostat settings	Heating and cooling defined for eight NatHERS thermal zones
	Pattern of conditioning	Daytime and night-time conditioning based on occupancy profiles
	Internal heat gains	Hourly sensible and latent heat gains based on people, lights, cooking and appliances
	Ventilation	Opening and closing of doors and windows based on occupancy profiles
	Shading	Operation of operable shade devices as defined in the Chenath scratch documentation

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[1]   The operation of NatHERS Software using a specific set of defined inputs and parameters for the purposes of completing an Assessment for achieving Deemed to Satisfy (DTS) NatHERS pathway compliance with a particular Jurisdiction's application of the National Construction Code (NCC).

Modules	Elements	Comments
Heating and cooling	Default appliances	Heating and cooling device types based on fuel type, and energy consumption and efficiency
	Hourly loads	Calculated by Chenath based on occupancy profiles and appliance type
	Energy use	A function of the hourly energy use and load for a zone, coefficient of performance for the specified appliance and system loss
	Appliance demand	Sum of the load in each zone (hourly) for the specified appliance
	Zones without specified conditioning devices	Apply relevant heating and or cooling devices
	Under-sized units	Determination of whether appliance demand exceeds known appliance size for specified efficiency. For assessor guidance
Hot water	Hot water demand	Number of occupants multiplied by nominal litres per person per day
	Location	Heating technology and postcode determine the location zone grouping (1 to 5)
	Hot water system type	Category based on fuel type and storage vs tankless operation
	Energy calculation	Function based on hot water demand, location and hot water system type
	Solar PV diverters	Function for calculating energy flows for electric hot water systems that employ a solar PV diverter as a primary operating function. The HWS becomes a pseudo battery (stores energy as hot water rather than electricity)
Lighting	Annual load	A function of watts per square metre, average hours use per day and total floor area, not including garage
	Hourly load	Based on the number of hours per day (reflecting monthly factor) lights are assumed to be on
Pool pump (future update to include spa pumps and heating for both)	Pool volume	Actual or estimated (based on surface area) volume
	Base pump size	Base size (kW) correlated with pool size
	Pump energy	A function of pump size and efficiency (single, dual, multiple speed)
	Hours of operation	*Under development as at 31 Aug 2022*
	Pool cleaning	*Under development as at 31 Aug 2022*
	Cleaning energy	*Under development as at 31 Aug 2022*
On-site energy generation and storage	Solar PV	A function to calculate annual electricity generation in kilowatt hours (kWh) based on array size, orientation and inverter capacity (kW).

2.2.2.   Special exemptions

In special circumstances, Software Providers may apply for an exemption to being able to model a particular dwelling feature. To be eligible, the Software Provider must demonstrate that the level of impact is minor, i.e. can be absorbed by the standard SAP tolerances. If this is not possible the software may need to be excluded from particular features.

The special exemption process avoids software accreditation delays and provides rigour and transparency in decision-making. This process is outlined in the Standard Operating Procedure — Feature exemption application.

2.3. Chenath and AccuRate Home (benchmark tool)

The NatHERS benchmark tool, AccuRate Home, consists of two primary elements:

- Thermal performance calculation
- WoH performance calculation

2.3.1. Thermal performance calculation

The heating and cooling energy use (thermal performance) is determined by the dwelling's design, construction materials, climate and assumptions about how the building is used. The CSIRO Chenath Engine performs the majority of calculations and modelling required to produce the thermal performance component of a house energy rating in the NatHERS benchmark tool. The Chenath Engine is also used for the NatHERS Thermal assessments of new homes and major renovations.

CSIRO maintains and improves the Chenath Engine and makes it available to link to other NatHERS accredited software tools. The Chenath Engine integrates inputs from front-end software to calculate and produce energy ratings. CSIRO uses the AccuRate Home to calculate and produce energy ratings for NatHERS benchmarking processes. The combination of the AccuRate Home interface and Chenath Engine form the NatHERS benchmark tool.

Front-end software tools intending to use the Chenath Engine must be capable of:

1. producing a scratch file to be sent to the Chenath Engine
2. converting the Chenath Engine output text files into an adjusted energy load.

The front-end software must also have a valid licence with CSIRO to be accredited.

The key roles of front-end software versus the Chenath Engine are summarised in Table 3 of the Thermal SAP.

It is essential that prospective Software Providers understand the working of the Chenath Engine, and the assumptions and rules AccuRate Home. The Chenath Repository provides an open source library of key documents, including Methods, algorithms and rules implemented in AccuRate Home and the Chenath Engine. Further documents and how to obtain them are listed in Section 5.

Further information: Chenath Repository https://hstar.com.au/Home/Chenath

Note:

- Any change to the Chenath Engine that is approved by the Steering Committee for release, may result in new benchmark results. In these circumstances, all accredited software tools will need to meet these new results by retesting as outlined in Section 4.2, in order to comply with NatHERS software tool accuracy requirement.
- This Protocol only applies to software tools proposing to use the Chenath Engine.

2.4. NatHERS Certificates, Rating Reports and Stamps

NatHERS accredited software tools must be able to produce:

- NatHERS Certificates and Stamps for ratings by NatHERS accredited assessors and
- Energy Rating Reports for ratings by non-accredited assessors (also known as Raters).

These Certificates, Rating Reports and Stamps are required to generate the following formats:

- single dwelling (Class 1 and Class 2)
- summary Class 2
- summary Class 1 (optional)

They must also apply the specifications in the NatHERS Certificate and Stamp Fields Specifications document and design templates. WoH accredited tools must be able to fill the WoH specific sections of the NatHERS Certificate in addition to the Thermal requirements.

NatHERS Certificates and Rating Reports can be generated through the HSTAR online certification portal managed by the CSIRO (queries.hstar.accurate@csiro.au). Alternatively, the functionality of creating a NatHERS Certificate can be embedded in the software tool's own portal. The certificates and rating reports and associated floor plans must be accessible to the Administrator or their agent and Assessor Accrediting Organisations (AAOs) for the purpose of quality assurance purposes. The Administrator shall also be provided with access to generate certificates for the purpose of iterative testing.

Data of all NatHERS Certificates and Rating Reports **must** be made available to CSIRO for inclusion on the Australian Housing Data website at https://ahd.csiro.au/ in accordance with the Terms and Conditions of software accreditation.

2.5. NatHERS accredited software tool terms and conditions

In addition to items raised above, further accreditation requirements are included in the Terms and Conditions. The intent is to protect the Software Provider and Administrator, define communication and data management and prevent incorrect or deceptive use of the software by users.

A Software Provider is required to adhere to the terms and conditions, which in summary, include:

- conditions or events which will end accreditation
- conditions for variation of agreement
- terms and conditions which a Software Provider must impose on users of the software when the software is used in accredited mode and non-accredited mode
- incorporating reasonable changes to the software tool
- software tool version management
- cyber security
- software user support
- restrictions on NatHERS Certificate generation based on the accreditation status of the assessor
- cooperating with AAO quality assurance activities
- Administrator's access to data for audit and quality assurance activities
- Administrator's access to software
- limitation of Administrator's liability and indemnity
- Software Provider's minimum insurance
- use of NatHERS trade mark
- records management
- responsibility for costs
- confidentiality and privacy
- dispute resolution.

2.5.1. Requirements imposed on licensed users

To avert the incorrect or deceptive use of the software, the Administrator must have the ability to obtain from software providers appropriate and satisfactory information relating to an assessor's use of the software and creation of NatHERS Certificates or Rating Reports.

The Software Provider must impose conditions on a licensed user as provided in the Terms and Conditions (Appendix 1). This enables the Administrator or an AAO to conduct quality assurance, audits and investigations, and to pass on the findings to appropriate parties (state and territory

authorities and regulators, local councils, building certifiers/surveyors, builders and architects, homeowners).

3. Steps to obtain and maintain accreditation

This section details the processes to obtain accreditation for the first time, reaccreditation or implementing minor updates. Testing details are provided at Section 4.

1	Preliminary steps — preparing	Software Provider: **research** and clarify requirements of accreditation	▶ section 3.1
↓			
2	Expression of interest	Software Provider: **submit** preliminary information (new accreditation only)	▶ section 3.2
↓			
3	Test and submit	Software Provider: **test** the software and submit preliminary accreditation material	▶ sections 3.3 and 4
↓			
4	Due diligence + feedback	Administrator: **review** submission and provide feedback	▶ section 3.4
↓			
5	Follow-up + final submission	Software Provider: **respond** to feedback from the Administrator, then submit final package	▶ section 3.5
↓			
6	Decision + confirmation	Administrator: **finalise** accreditation	▶ section 3.8
↓			
7	Release software	Software Provider: **release** software version	▶ section 3.7

3.1. Step 1 — Preliminary steps — Software Provider

New accreditation

A Software Provider must become familiar with NatHERS and the accreditation requirements and processes, in order to determine whether to proceed with accreditation. The preparation includes reviewing this SAP, all documents and data inputs referred to in sections 2 and 5, and any other material stipulated or recommended by the Administrator.

The Software Provider must contact the CSIRO to obtain access to Chenath and AccuRate Home. There is also requirement that tools seeking WoH accreditation either:

- have or are undertaking NatHERS Thermal accreditation (refer to Thermal SAP document) or
- have agreed access rights with a software tool that has existing NatHERS accreditation.

Reaccreditation

The Software Provider must work with the Administrator to familiarise themselves with proposed NCC and other software updates, as well as any revised requirements, conditions and processes of reaccreditation.

Minor updates

The Software Provider must liaise with the Administrator to:

- confirm the appropriate testing or other evidence to demonstrate compliance with rating divergence requirements and
- discuss the timeline for release, including any special requirements, with the Administrator.

3.2. Step 2 — Expression of interest (EOI) — Software Provider

This step applies only to Software Providers seeking accreditation for the first time.

New accreditation

The EOI process is the first of two phases for new accreditation. It provides an early opportunity for the Administrator and the Software Provider to work together to clarify any queries and address any issues that may arise throughout the software accreditation process.

A simple dwelling (SAP 610) must be rated as the first step for a new software tool. This helps Software Providers to quickly understand significant deviations from the required benchmark results. The test results do not need to meet the benchmark results in this early phase of the accreditation process.

The Software Provider must submit an EOI for Accreditation form, which includes the following information:

- summary of the new software tool (500 words maximum)
- indicative timetable for software testing and accreditation application
- any key issues (e.g. questions, concerns) or details of matters to be resolved and discussed with the Administrator, relating to the accreditation process
- independent tester's details (if known, this may be provided during the testing phase)
- in-principle agreement to the Terms and Conditions
- other supporting information (optional).

3.3. Step 3 — Test and submit — Software Provider

Precise software testing is required to ensure the software tool meets the accuracy requirements (2.1). Section 4 details the testing materials and processes.

In brief, the Administrator will:

- outline the testing requirements (dwellings designs, appliance configurations and climate zones)
- confirm whether or not independent testing is required
- provide the test pack documentation and files.

New accreditation

Independent testing is a key quality assurance component of developing a high quality software tool.

The Software Provider will:

- nominate an independent tester (preferably a NatHERS accredited assessor) and seek approval from the Administrator

- engage the assessor (pending Administrator agreement) at their own cost and detail the scope of testing (Section 4) identified by the Administrator
- provide all relevant documentation and facilitate access by the independent tester to CSIRO benchmark software (as required) and the software tool to enable them to undertake the verification
- reiterate to the tester that their work is independent in nature.

The Administrator will:

- review the nominated independent tester and either require the Software Provider to select an alternative tester if an actual or perceived conflict of interest exists, or agree to the engagement of the tester
- provide the testing requirements and materials (Section 4 — Software testing: methods and materials).

The independent tester will provide evidence of accreditation with an AAO to the Administrator and Software Provider if requested.

When testing is complete, the Software Provider will submit the relevant material to the Administrator (admin@nathers.gov.au), listed in:

- Table 4 — checklist for items to be submitted as part new accreditation and reaccreditation, noting that not all items need to be submitted simultaneously
- Table 5 — checklist for items to be submitted as part of reaccreditation
- Table 6 — checklist for submission of request for minor updates.

The Summary class 1 and class 2 certificates, rating reports and stamps, should be based on a minimum of two dwellings. The information may be drawn from:

- de-identified ratings in the software provider's archives/library or
- two SAP 610 for Class 2 summaries and
- Two SAP 200 for Class 1 summaries (optional).

New accreditation

Table 4 — Submission checklist - new accreditation		
	New accreditation **Stage 1 — EOI phase**	**New accreditation** **Stage 2 – main testing phase**
EOI form	☐	—
Test result spreadsheet and software rating files	☐ Dwelling 610	☐ Software Provider, dwellings: 200, 500, and 610 ☐ Independent tester (if required by Administrator), dwellings: 200, 500 and 610
Software — beta version	—	☐
Software – final version IF different to Beta version	—	☐
NatHERS certificates	—	☐ Dwelling 500 ☐ Summary class 2 ☐ Summary class 1 (optional)
NatHERS stamps	—	☐ Dwelling 500 ☐ Summary class 2 ☐ Summary class 1 (optional)

	New accreditation Stage 1 — EOI phase	New accreditation Stage 2 – main testing phase
Rating report	—	☐ Dwelling 500 ☐ Summary class 2 ☐ Summary class 1 (optional)
Rating files used to generate summary certificate/report/stamp		☐
Access to certificate portal	—	☐
Training manual / user guide	—	☐
Evidence of Chenath licence	☐	☐
Evidence of thermal accreditation	☐	☐
Terms and Conditions — in principle agreement and proposed draft / customisations		☐
Any other material requested by the Administrator	☐	☐

Reaccreditation

Table 5 — Submission checklist — reaccreditation	
Item	**Reaccreditation**
Test result spreadsheet and software rating file	☐ Dwellings 200, 500 and 610
Software – beta version	☐
NatHERS certificates	☐ Dwelling 500 ☐ Summary class 2 ☐ Summary class 1 (optional)
NatHERS stamps	☐ Dwelling 500 ☐ Summary class 2 ☐ Summary class 1 (optional)
Rating report	☐ Dwelling 500 ☐ Summary class 2 ☐ Summary class 1 (optional)
Rating files used to generate summary certificate/report/stamp	☐
Access to certificate portal	☐
Training manual / user guide	☐
Evidence of Chenath licence	☐
Terms and Conditions – in principle agreement and proposed draft amendments/customisations	☐
Any other material requested by the Administrator	☐

Minor updates

Table 6 — Submission checklist – minor updates	
Item	
Evidence to support compliance with accuracy requirements	☐ Test results (for each dwelling) spreadsheet OR ☐ Other rating impact data
Rating files	☐ Rating files for each dwelling (if

Beta version of software	☐
Minor change and bug fix request form	☐
NatHERS certificates and stamps	☐ Only if and as requested by Administrator
Access to certificate portal and capability to generate certificates	☐

3.4. Step 4 — Due diligence and feedback — Administrator

New accreditation and reaccreditation

The Administrator (or their agent) will undertake due diligence on the submitted documentation and software files. This may include:

- spot check of rating results provided in the testing results spreadsheet
- modify corresponding features in the applicant's and benchmark rating files to compare results to determine rating congruence – the Administrator will work with the Software Provider to resolve any concerns
- ensure the WoH component of the certificate and stamp fields are designed and populated correctly
- review any fixed data inputs.

The Administrator may request further information from either the Software Provider or independent tester (in the case of new accreditations).

Minor updates

The process for minor updates is detailed in Standard Operating Procedure: Minor Updates, available from the NatHERS Administrator upon request.

3.5. Step 5 — Follow-up and final submission — Software Provider

The Software Provider will address any requests from the Administrator. Where further concerns need to be resolved, the Administrator may initiate an independent verification process.

When all issues have been addressed, the Software Provider will submit the final packages as itemised in either:

- Table 4 — Submission checklist - new accreditation
- Table 5 — Submission checklist — reaccreditation or
- Table 6 — Submission checklist – minor

3.6. Step 6 — Decision and confirmation — Administrator

New accreditation and reaccreditation

Once the software tool satisfies the minimum NatHERS accreditation requirements (Section 2) the Administrator will notify the Steering Committee. Where special conditions are stipulated, Steering Committee approval may be required which may influence the final decision. The Administrator (on behalf of the Steering Committee) will then offer NatHERS software re/accreditation to the Software Provider. The Accreditation Notice (letter of offer) must be countersigned and the Terms and Conditions agreed to by the Software Provider.

Unsuccessful applicants can make modifications to their software tool and reapply by submitting new simulation results.

Once the submission has been reviewed by the Administrator, applications are forwarded to the Australian Building Codes Board (ABCB) for information. Subsequently, unless further queries are identified, the Administrator will advise the Software Provider that they may proceed with releasing the new version of the software. The Administrator may stipulate any special conditions, if any, including communications, release timeframe and transition timeframes. This will occur on a case-by-case basis, depending on the urgency of the update.

3.7. Step 7 — Release and phase out — Software Provider

Release new version

Any revisions, updates or new versions of NatHERS accredited software tools must be identified by a new version number.

The Administrator will work with the Software Provider to determine the timing and communications of the release of the new NatHERS accredited software tool, including updating the NatHERS website. The most appropriate software release timelines and transitioning arrangements will depend on a number of factors, including the scale of the impact on NatHERS and the regulatory environment as the higher priority.

Guidance to release timing

The Administrator will advise of the most appropriate strategy for release timing, including consideration of any impacts on NatHERS.

Where the impacts on NatHERS are **critical or major**, the cause must be addressed immediately or within the time period specified by the Administrator. Examples of critical or major impacts include:

- the tool consistently overstates the star rating
- NCC regulatory requirements are breached
- evidence of fraudulent practices
- no workaround for critical functionality or critical data
- misleading or incorrect information displayed on the Certificate.

Where the impacts on NatHERS are negligible/low, the timing of the release of the new version is at the Software Provider's discretion. Examples of negligible/low impacts include:

- does not affect accreditation requirements, ratings, regulatory requirements
- is a minor inconvenience only
- is of a cosmetic or typographical nature.

Transition rules

Software transition rules, which must be implemented by the Software Provider, will be specified by the Administrator. These include:

- Class 1 thermal performance rating can only be started in the latest version of the software.
- Class 2 thermal performance rating, if it is the first in the development, can only be started in the latest version of the software.

Exemptions may apply where the assessor has a written request from a regulator to use a retired version[2].

Accessing retired versions

Superseded versions of the Software Tool will remain accredited as per the Accreditation Notice. It is however imperative to ensure Assessors move immediately or as quickly as possible to the most current version of the software.

These include:

- Class 1 thermal performance rating can only be started in the latest version of the software.
- Class 2 thermal performance rating, if it is the first in the development, can only be started in the latest version of the software.

Exemptions may apply where the assessor has a written request from a regulator to use a retired version.

3.8. Period of accreditation and reaccreditation

Accreditation is granted to a major software tool version (including its minor versions resulting from minor updates) in perpetuity, in accordance with the Accreditation Notice. Accreditation Notices are written confirmation granting NatHERS accreditation to a particular new Major version as well as extending continued accreditation to "retired" versions.

The period of accreditation is generally three years. Where possible, the accreditation term and expiry will align with major updates associated with the NCC amendment cycle. However:

- the Software Provider may seek a 12-month extension of accreditation
- the Administrator may agree to extend the accreditation on the same or varied Terms and Conditions as appropriate.

Accreditation of a software tool version(s) may be withdrawn if:

- ownership or control of the Software Tool is transferred from the Software Provider to another entity, or
- the Software Provider or Software Tool breaches requirements set out in the Software Accreditation Protocol Terms and Conditions.

Further information: NatHERS Software Accreditation Terms and Conditions

3.9. Costs

The Administrator does not impose a fee for accreditation. However:

- all stages of accreditation of software tools must be prepared and lodged at the expense of the Software Provider, including any costs from engaging an independent tester
- if further information is required to clarify or validate information in the application, this must be provided at the software tool Software Provider's expense.

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[2] Both major and minor versions, when they are superseded by a new major or minor version become "retired". Retired versions can only be used for new ratings if the assessor has a written request from a regulator (the relevant certifier/building surveyor that will be certifying the documentation set for building approval), and should not be used for ratings not yet finalised wherever possible. Retired versions will be itemised in the new Accreditation Notice to ensure their long-term legitimacy.

4. Software testing: methods and materials

Note: the software testing materials are under review and may be updated in consultation with the Steering Committee and software providers as tool development and first-time accreditation progresses.

The consistency and accuracy of thermal performance ratings is fundamental to the objectives of NatHERS.

NatHERS accredited software tools must meet minimum accuracy requirements for accreditation, reaccreditation and updates. The accuracy requirements are assessed relative to the benchmark software tool developed by CSIRO to interface with the Chenath Engine.
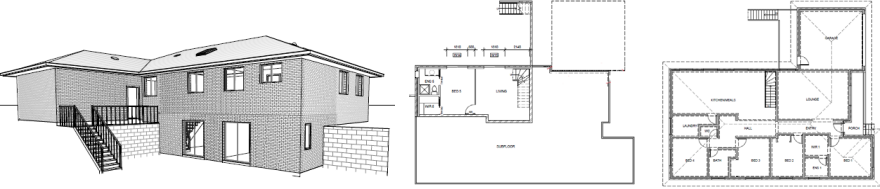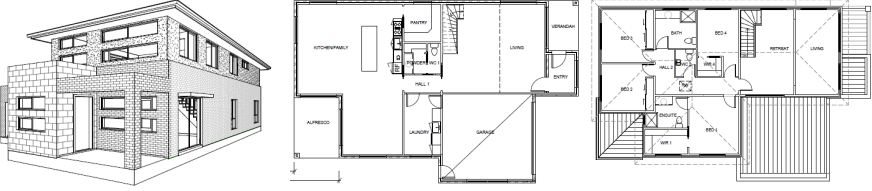
If the Software Provider fails to satisfy the requirements relating to a new version, or where an update of a previously accredited Software is being reaccredited, or testing indicates a significant impact on the star rating output of the software tool, the Administrator (on behalf of the Steering Committee) may withhold accreditation of the updated software tool.

4.1. Testing materials

4.1.1. NatHERS testing dwelling designs

The SAP dwellings designs used in WoH testing include two Class 1 and one Class 2 (Figure 2) designs. New accreditation and reaccreditation entails modelling all three dwellings, whereas minor updates are generally limited to two designs depending on what features are being updated. Dwelling design features are available from the Administrator.

Figure 2 — NatHERS test dwelling designs	
200 5-bedroom split level brick veneer	
500 4-bedroom double storey	
610 1-bedroom ground floor apartment	

4.1.2.   Appliances

The fixed appliance modules for calculating energy use in the WoH tool include:

- heating
- cooling
- hot water systems
- lighting
- pool pumps (2-star single speed, 5-star dual speed and 8-star multi speed) and cleaners (main filtration, booster pump and robotic)
- on-site energy generation and storage (solar photo voltaic: 0kW, 3kW and 5kW)

4.1.3.   Climate zones and categories

Eleven NatHERS representative climate zones have been determined for WoH testing. These cover each of the states and the water heater zones, and have been selected based on historic certificate volume. The zones are provided in Table 7.

Table 7 — WoH representative climate zones			
NatHERS climate zone number	**NatHERS climate zone name**	**Postcode**	**Category**
1	Darwin	800	Hot
10	Brisbane	4000	Hot
13	Perth	6000	Mixed
16	Adelaide	5000	Mixed
19	Charleville	4470	Mixed
24	Canberra	2600	Cold
26	Hobart	7000	Cold
32	Cairns	4870	Hot
56	Mascot	2021	Mixed
60	Tullamarine	3043	Cold
66	Ballarat	3350	Cold

4.2. Testing scenarios

New accreditation — EOI and main phase

Testing scenarios assess how closely the software tool meets the accuracy requirements when compared to the benchmark tool. There are three dwellings with 20 appliance scenarios each, spread across 11 representative climate zones. The scenarios are listed at:

- Table 8 — apartment (610)
- Table 9 — detached dwellings (200, 500)
- Table 10 — Detached dwelling simulation scenarios

Reaccreditation

Under development as at 31 August 2022.

Minor updates

Under development as at 31 August 2022.

4.2.1. Apartment (Class 2) testing scenarios using SAP 610

Apartment simulations focus on heating, cooling and hot water appliances. They do not include pool or solar PV appliances as these are generally on common property, and not allocated to the specific unit or apartment. Note the appliances to be run in combination with the solar PV diverter are to be confirmed in discussion with the NatHERS Administrator.

	Table 8 — Apartment simulation scenarios											
Scenario	**Heating and Cooling**									**Hot water**		**Lighting**
	Primary				**Secondary**							
	Heating	**Performance**	**Cooling**	**Performance**	**Heating**	**Performance**	**Cooling**	**Performance**		**Type**	**Performance**	**Power density (w/m²)**
1	Non ducted reverse cycle air conditioner	ZERL 1.5 star	Non ducted reverse cycle air conditioner	ZERL 1.5 star	Nil (default)		Nil (default)			Electric storage small	-	5
2	Non ducted reverse cycle air conditioner	ZERL 3 star	Non ducted reverse cycle air conditioner	ZERL 3 star	Non ducted reverse cycle air conditioner	ZERL 2 star	Non ducted reverse cycle air conditioner	ZERL 2 star		Electric storage large	-	5
3	Non ducted reverse cycle air conditioner	2013 Fixed 2 star	Non ducted reverse cycle air conditioner	2013 Fixed 2 star	Non ducted reverse cycle air conditioner	2013 Fixed 1 star	Non ducted reverse cycle air conditioner	2013 Fixed 1 star		Electric instantaneous	-	5
4	Non ducted reverse cycle air conditioner	2013 variable 4 star	Non ducted reverse cycle air conditioner	2013 variable 4 star	Non ducted reverse cycle air conditioner	2013 variable 2 star	Non ducted reverse cycle air conditioner	2013 variable 2 star		Gas storage 4.0 star	4 star	5
5	Ducted reverse cycle air conditioner	ZERL 1.5 star	Ducted reverse cycle air conditioner	ZERL 2.5 star	Ducted reverse cycle air conditioner	ZERL 1.5 star	Ducted reverse cycle air conditioner	ZERL 2.5 star		Gas storage 5.0 star	5 star	5
6	Ducted reverse cycle air conditioner	ZERL 3.5 star	Ducted reverse cycle air conditioner	ZERL 4.5 star	Ducted reverse cycle air conditioner	ZERL 3.5 star	Ducted reverse cycle air conditioner	ZERL 4.5 star		Gas instantaneous 4.0 star	4 star	4
7	Ducted reverse cycle air conditioner	2013 Fixed 1.5 star	Ducted reverse cycle air conditioner	2013 Fixed 1.5 star	Ducted reverse cycle air conditioner	2013 Fixed 1.5 star	2013 Fixed 1.5	2013 Fixed 1.5 star		Gas instantaneous 5.0 star	5 star	4
8	Ducted reverse cycle air conditioner	2013 Variable 3 star	Ducted reverse cycle air conditioner	2013 Variable 3 star	Ducted reverse cycle air conditioner	2013 Variable 3 star	Ducted reverse cycle air conditioner	2013 Variable 3 star		Gas instantaneous 6.0 star	6 star	4

| Scenario | Heating and Cooling | | | | | | | | Hot water | | Lighting |
| | Primary | | | | Secondary | | | | | | |
	Heating	Performance	Cooling	Performance	Heating	Performance	Cooling	Performance	Type	Performance	Power density (w/m²)
9	Gas ducted heater	4 star	Ducted evaporative cooler	n/a	Gas ducted heater	4	Ducted evaporative cooler	n/a	Gas instantaneous 7.0 star	7 star	4
10	Gas ducted heater	5 star	Ducted evaporative cooler	n/a	Gas ducted heater	5	Ducted evaporative cooler	n/a	Solar-electric	17 STC	4
11	Gas ducted heater	6 star	Ducted evaporative cooler	n/a	Gas ducted heater	6	Ducted evaporative cooler	n/a	Solar-electric	27 STC	3
12	Gas space heater	4 star	Evaporative cooler	n/a	Non ducted reverse cycle air conditioner	ZERL 2.5	Non ducted reverse cycle air conditioner	ZERL 3.5	Solar-electric	38 STC	3
13	Gas space heater	4.5 star	Evaporative cooler	n/a	Non ducted reverse cycle air conditioner	ZERL 3.5	Non ducted reverse cycle air conditioner	ZERL 4.5	Solar-gas	17 STC	3
14	Gas space heater	5 star	Evaporative cooler	n/a	Nil (default)	n/a	Nil (default)	n/a	Solar-gas	27 STC	3
15	Gas space heater	6 star	Evaporative cooler	n/a	Nil (default)	n/a	Nil (default)	n/a	Solar-gas	38 STC	3
16	Electric Resistance Heater		Nil (default)	n/a	Non ducted reverse cycle air conditioner	n/a	Nil (default)	n/a	Heat-pump	17 STC	5
17	Nil (default)		Nil (default)	n/a	Nil (default)	n/a	Nil (default)	n/a	Heat-pump	27 STC	5
18	TBC		TBC		TBC		TBC		Solar diverter water heater	Type 1	5
19	TBC		TBC		TBC		TBC		Solar diverter water heater	Type 2	5
20	TBC		TBC		TBC		TBC		Solar diverter water heater	Type 3	5

4.2.2. Detached dwelling (Class 1) simulation scenarios

Detached dwelling scenarios have designations for pools and solar PV. These scenarios must be run for dwelling designs 200 and 500. The scenarios are itemised in Table 9. Note the appliances to be run in combination with the solar PV diverter are to be confirmed in discussion with the NatHERS Administrator.

Table 9 — Detached dwelling simulation scenarios

| Scenario | Heating and cooling | | | | | | | | Hot Water | | Lighting | Solar PV | | | | | Battery | | Pool | | |
| | Primary | | | | Secondary | | | | | | | | | | | | | | | | |
	Heating	Performance	Cooling	Performance	Heating	Performance	Cooling	Performance	Type	Performance	Power density (w/m²)	Size (kW)	Number of arrays	Orientation	Slope (deg)	Inverter size (kW)	Technology	Size (kWh)	Size	Pump	Cleaner
1	Non ducted reverse cycle air conditioner	ZERL 1.5 star	Non ducted reverse cycle air conditioner	ZERL 1.5 star	Nil (default)		Nil (default)		Electric storage small	-	5	None	None			None	None	n/a	None	None	None
2	Non ducted reverse cycle air conditioner	ZERL 3 star	Non ducted reverse cycle air conditioner	ZERL 3 star	Non ducted reverse cycle air conditioner	ZERL 2 star	Non ducted reverse cycle air conditioner	ZERL 2 star	Electric storage large	-	5	3	1	N	0	3	None	n/a	50000L	Single	Main
3	Non ducted reverse cycle air conditioner	2013 Fixed 2 star	Non ducted reverse cycle air conditioner	2013 Fixed 2 star	Non ducted reverse cycle air conditioner	2013 Fixed 1 star	Non ducted reverse cycle air conditioner	2013 Fixed 1 star	Electric instantaneous	-	5	5	1	NE	15	5	None	n/a	50000L	Single	Booster
4	Non ducted reverse cycle air conditioner	2013 variable 4 star	Non ducted reverse cycle air conditioner	2013 variable 4 star	Non ducted reverse cycle air conditioner	2013 variable 2 star	Non ducted reverse cycle air conditioner	2013 variable 2 star	Gas storage 4.0 star	4 star	5	6.5	1	NW	22.5	5	None	n/a	50000L	Single	Robotic
5	Ducted reverse cycle air conditioner	ZERL 1.5 star	Ducted reverse cycle air conditioner	ZERL 2.5 star	Ducted reverse cycle air conditioner	ZERL 1.5 star	Ducted reverse cycle air conditioner	ZERL 2.5 star	Gas storage 5.0 star	5 star	5	10	1	N	22.5	8.5	Lithium-Ion	10	25000L	Multi	Main
6	Ducted reverse cycle air conditioner	ZERL 3.5 star	Ducted reverse cycle air conditioner	ZERL 4.5 star	Ducted reverse cycle air conditioner	ZERL 3.5 star	Ducted reverse cycle air conditioner	ZERL 4.5 star	Gas instantaneous 4.0 star	4 star	4	10	2	NE/NW	22.5	8.5	Lead acid	10	25000L	Multi	Booster
7	Ducted reverse cycle air conditioner	2013 Fixed 1.5 star	Ducted reverse cycle air conditioner	2013 Fixed 1.5 star	Ducted reverse cycle air conditioner	2013 Fixed 1.5 star	2013 Fixed 1.5	2013 Fixed 1.5 star	Gas instantaneous 5.0 star	5 star	4	10	3	E/N/W	22.5	8.5	Zinc Bromine	10	25000L	Multi	Robotic
8	Ducted reverse cycle air conditioner	2013 Variable 3 star	Ducted reverse cycle air conditioner	2013 Variable 3 star	Ducted reverse cycle air conditioner	2013 Variable 3 star	Ducted reverse cycle air conditioner	2013 Variable 3 star	Gas instantaneous 6.0 star	6 star	4	10	2	N/W	22.5	8.5	Lithium-Ion	15	75000L	Variable	Main
9	Gas ducted heater	4 star	Ducted evaporative cooler	n/a	Gas ducted heater	4	Ducted evaporative cooler	n/a	Gas instantaneous 7.0 star	7 star	4	6.5	1	N	22.5	5	Lead Acid	15	75000L	Variable	Booster
10	Gas ducted heater	5 star	Ducted evaporative cooler	n/a	Gas ducted heater	5	Ducted evaporative cooler	n/a	Solar-electric	17 STC	4	6.5	1	N	22.5	5	Zinc Bromine	15	75000L	Variable	Robotic
11	Gas ducted heater	6 star	Ducted evaporative cooler	n/a	Gas ducted heater	6	Ducted evaporative cooler	n/a	Solar-electric	27 STC	3	None	None	n/a	n/a	None	None	n/a	None	n/a	n/a
12	Gas space heater	4 star	Evaporative cooler	n/a	Non ducted reverse cycle air conditioner	ZERL 2.5	Non ducted reverse cycle air conditioner	ZERL 3.5	Solar-electric	38 STC	3	None	None	n/a	n/a	None	None	n/a	None	n/a	n/a
13	Gas space heater	4.5 star	Evaporative cooler	n/a	Non ducted reverse cycle air conditioner	ZERL 3.5	Non ducted reverse cycle air conditioner	ZERL 4.5	Solar-gas	17 STC	3	None	None	n/a	n/a	None	None	n/a	None	n/a	n/a
14	Gas space heater	5 star	Evaporative cooler	n/a	Nil (default)	n/a	Nil (default)	n/a	Solar-gas	27 STC	3	None	None	n/a	n/a	None	None	n/a	None	n/a	n/a
15	Gas space heater	6 star	Evaporative cooler	n/a	Nil (default)	n/a	Nil (default)	n/a	Solar-gas	38 STC	3	None	None	n/a	n/a	None	None	n/a	None	n/a	n/a
16	Electric Resistance Heater		Nil (default)	n/a	Electric resistance heater	n/a	Nil (default)	n/a	Heat-pump	17 STC	5	None	None	n/a	n/a	None	None	n/a	None	n/a	n/a
17	Nil (default)		Nil (default)	n/a	Nil (default)	n/a	Nil (default)	n/a	Heat-pump	27 STC	5	None	None	n/a	n/a	None	None	n/a	None	n/a	n/a
18	TBC		TBC		TBC		TBC		Solar diverter water heater	Type 1	5	10	1	N	22.5	8.5	None	n/a	None	n/a	n/a
19	TBC		TBC		TBC		TBC		Solar diverter water heater	Type 2	5	10	1	N	22.5	8.5	Lithium-Ion	10	None	n/a	n/a
20	TBC		TBC		TBC		TBC		Solar diverter water heater	Type 3	5	10	1	N	22.5	8.5	None	n/a	None	n/a	n/a

Table 10 — Heating and cooling to zone mapping

SAP 200				SAP 500				SAP 610			
Zone Name	Primary	Secondary	Default[1]	Zone Name	Primary	Secondary	Default[1]	Zone Name	Primary	Secondary	Default[1]
WIR 5	N	Y	N	Kitchen family	Y	N	N	Bedroom	N	Y	N
Ens 5	N	Y	N	Pantry	N	N	Y	Kitchen/living	Y	N	N
Bed 5	N	Y	N	Living	Y	Y	N	Ensuite	N	Y	N
Living	Y	N	N	Hall 1	N	N	Y	WIR	N	Y	N
Lounge	Y	N	N	Powder	N	N	Y				
Entry	Y	N	N	WC 1	N	N	Y				
Bed 1	N	Y	N	Bed 1	N	Y	N				
Ens 1	N	Y	N	WIR 1	N	Y	N				
Bed 2	N	Y	N	Ensuite	N	Y	N				
Bed 3	N	Y	N	Bed 2	N	Y	N				
Bed 4	N	Y	N	Bed 3	N	Y	N				
Kitchen/Meals	Y	N	N	Bed 4	N	Y	N				
WIR 1	N	Y	N	Retreat	Y	N	N				
Hall	Y	N	N	Hall 2	N	N	Y				
WC	N	N	Y	WC 2	N	N	Y				
				WIR 4	N	Y	N				

1

Default system is as per the National Calculation Method, reproduced below in Table 11.

Table 11 — ZERL star rating of default heating and cooling by climate type

	Description	Fuel Type	Cold climate	Mixed climate	Hot/humid climate
Heating HSPF	MEPS level non-ducted reverse-cycle air conditioner (heat pump)	Electric	2.5	3.5	4.0
Cooling TCSPF	MEPS level non-ducted refrigerative air conditioner (heat pump).	Electric	3.5	3.5	4.0

4.3. Testing processes

The testing steps described in this section are a general guide only and in some circumstances may be modified, if deemed necessary by the Administrator.

4.3.1. Data entry

Testing involves inputting SAP dwelling design specifications (available from the Administrator on request) and appliance scenarios as listed in Table 8 — Apartment simulation scenarios and Table 9 — Detached dwelling simulation scenarios into the software tool and recording the simulation results.

If a specification may appear ambiguous, refer to the NatHERS WoH Benchmark file, which may clarify the specifications of an item. Please contact the Administrator if the NatHERS WoH Benchmark file does not provide clarification.

4.3.2. Recording results – test results spreadsheet

For new and reaccreditation testing the Administrator will provide the test result spreadsheet. This is prepopulated with benchmark results, including the WoH energy results, and the NatHERS WoH rating metric result for each dwelling in each climate zone. When the Software Provider enters their simulation results, the spreadsheet will calculate a pass/fail for each component and indicate whether the results fall within tolerances, compared to the NatHERS benchmark tool.

For minor updates, the Software Provider will submit the minor update test result spreadsheet.

4.3.3. Generating certificates and stamps

For new and reaccreditation testing, certificates and stamps need to be generated to ensure certificates and stamps are correctly designed and populated. The required certificates and stamps are itemised in Table 4, Table 5, and Table 6.

4.3.4. Submitting results

Once testing is complete, the Software Provider will submit the test results spreadsheet and, except for the EOI stage, software rating files and beta version to the Administrator at admin@nathers.gov.au.

4.3.5. Testing processes

New accreditation

Software tools must be tested using three NatHERS dwelling designs in all 11 representative NatHERS climate zones to determine how the software assesses WoH performance when compared to the benchmark tool.

Testing is conducted by the Software Provider with spot checks by the Administrator.

The Software Provider must test all SAP dwellings in the 11 representative NatHERS climates zones during this phase.

Reaccreditation

The Software Provider will test dwellings 200, 500 and 610 in 11 NatHERS climates. However, the Administrator and Software Provider will need to consult and confirm that the dwellings and climate zones are appropriate to test for the features being corrected/updated. This consultation may need to be repeated if test results reveal changes to the NatHERS WoH rating results in excess of the maximum threshold.

Minor updates

The standard test dwellings are 200, 500 and 610, tested in 11 NatHERS climate zones. This requirement may be varied and alternative dwellings and/or testing procedures may be specified if these standard designs do not test for the proposed update. In this case, dwelling features may be modified (by agreement with the Administrator), alternative dwellings specified by the Administrator or historic software rating analysis may be used to demonstrate accuracy compliance.

Simulations must be done using the beta version of the tool and results compared to the current public version of the software simulation results.

Test results must include a dwelling identifier, climate zone number, the NatHERS WoH rating result calculated by the current version on the market and the proposed new version, and the difference of these.

5. Information sources

The Software Provider must ensure they understand and apply aspects of the information referred to in Table 12. Further information relating to NatHERS is available at www.nathers.gov.au.

Methods, algorithms and rules implemented in AccuRate Home, the benchmark tool and the Chenath engine are key elements of rating software Table 13 below is a collection of documentation for the, and NatHERS guides and materials. This list is subject to updates as new information and regulatory requirements emerge.

Table 12 — NatHERS documentation	
Document	**Available from**
— NatHERS Technical Note , 2019 • Principles for ratings in accreditation mode	nathers.gov.au
Conflict of interest declaration form	admin@nathers.gov.au
Information collection, storage and dissemination policy	nathers.gov.au
Minor update request form	nathers.gov.au
NatHERS Accredited Software Terms and Conditions	nathers.gov.au
NatHERS certificate and stamp fields specifications	nathers.gov.au
NatHERS Software accreditation Expression of interest form	admin@nathers.gov.au
Process for including (the properties of) new appliances into NatHERS Accredited Software	(in prep)
Software testing dwelling designs (detailed drawing sets of relevant dwellings)	admin@nathers.gov.au
Software test results spreadsheet – new accreditation and reaccreditation	admin@nathers.gov.au
Software test results spreadsheet – minor update	admin@Nathers.gov.au
Standard Operating Procedure – Minor updates	admin@Nathers.gov.au
Standard Operating Procedure – Feature exemption application	nathers.gov.au

Table 13 — Technical documentation / references	
Document	**Available from**
NatHERS Whole of Home Calculation Method	On request