Nationwide House Energy Rating Scheme

Software Accreditation Protocol

July 2019

Disclaimer

Enquiries about the protocol and the accreditation process can be directed to:

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1. Introduction

1.1. Using this document

This document is aimed at those seeking software accreditation under the Nationwide House Energy Rating Scheme (NatHERS) and software that is currently accredited and needs to implement updates or obtain reaccreditation.

Section 1	Introduction
	Provides an overview of how this Protocol works.
Section 2	Key data sets and rules
	Provides a summary of key data sets and rules which need to be incorporated/applied in software tools for accreditation purposes. Appendix 1 summarises the key requirements of accreditation.
Sections 3 & 4	Applying, updating and testing
	Steps out the activities to get accredited or implement software updates. Flowcharts are used to illustrate workflows. Appendix 2 provides a guide on software testing processes, a description of the dwelling designs, a list of features tested, and software accuracy requirements. Appendices 3 and 4 provide forms to facilitate new applicants submitting their documentation. Appendix 5 is a required form for all software developers who want to implement minor updates or bug fixes in their software.
Section 5	Information sources
	Provides a consolidated list of references referred to in the Protocol.
Section 6	Glossary
	Acronyms and technical terms commonly used in the NatHERS sphere.

1.2. NatHERS and the National Construction Code

NatHERS provides a standardised approach to rating the thermal performance of Australian dwellings.

NatHERS is included in the National Construction Code (NCC) as one of the regulatory pathways to meet minimum energy efficiency requirements, by providing an energy rating to assess proposed new dwellings or major renovations/additions for the following building classes[a]:

- Class 1a — a single dwelling (detached house or group of two or more attached dwellings)
- Class 2 — sole occupancy units in multi-unit residential buildings
- Class 4 — a dwelling in a building that is Class 5, 6, 7, 8 or 9 if it is the only dwelling in the building (e.g. residence (e.g. caretaker residence) within a non-residential building).

The NCC minimum requirements are reviewed and updated every three years, and adopted by States and Territories through their building legislation.

[a] The NCC building classification system, which groups buildings by their function and use

1.3. NatHERS software and energy rating

NatHERS accredited software tools calculate a dwelling's energy rating (from 0 to 10 stars) based on the estimated energy use for heating and cooling. The energy use is determined by the dwelling's design, construction materials, climate and assumptions about how the building is used.

NatHERS accredited software tools produce an energy ratings report in the form of a NatHERS Certificate, which can be used to:

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

CSIRO's Chenath Engine is the underpinning calculation engine that NatHERS accredited software tools link to or need to align with. Where a software tool does not incorporate the Chenath Engine, some clauses in this Protocol may not apply and the software tool developer should contact the NatHERS Administrator to discuss their proposal further.

1.4. Why accreditation is required

This Software Accreditation Protocol (SAP) aims to ensure that NatHERS accredited software tools apply a standardised approach and produce consistent results in energy ratings of dwellings. While this document outlines requirements that must be met, it does not constitute a fully definitive set of rules and should be read in conjunction with all relevant documentation referred to in this document.

For building energy efficiency ratings used for NCC compliance, the software must operate in "accredited mode". This mode must incorporate NatHERS specific data and calculations (refer to Section 2). Additional modes of operation or functions for users may be available in the software, however these are not covered by this SAP and are not considered to be accredited as part of NatHERS.

1.5. Protocol updates

This Protocol will be reviewed every three years to align with the regular NCC updates.

Updates to this Protocol are subject to the approval of the NatHERS Steering Committee.

Any revisions of this Protocol will be communicated to stakeholders through the NatHERS website and emailed as part of the NatHERS Star Newsletter.

2. What are the key inputs for NatHERS accredited software

To understand the accreditation process, software developers should read this Protocol in conjunction with documents listed in Section 5 Information sources.

2.1. Accredited mode

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

Accredited mode requires software tools to incorporate the following data sets (i.e. fixed inputs and calculations) referred to in this section, including:

- NatHERS climate zones and weather data
- internal heat loads
- occupancy hours / thermostat and adjustable shade settings
- thermal properties of building materials
- window values
- infiltration calculations
- area correction factor
- star bands conversion table
- ceiling fan settings
- Cp (wind pressure) values
- openings and perforation factors
- additional features not listed above, including building orientation, terrain exposure, external sun obstructions, internal zoning and associated conditioning, floor and wall types, windows and shading. See principles for ratings set out in the NatHERS Technical Note 2019.

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.

2.2. Software testing processes and accuracy requirements

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, AccuRate, which is the commercial software tool developed by CSIRO to interface with the Chenath Engine.

Depending on the circumstance, software tools must be tested using up to nine NatHERS dwelling designs in different climate zones to determine how the software assesses thermal performance when compared to the benchmark software tool (AccuRate).

In special circumstances software tool developers may apply for an exemption from meeting a particular accuracy requirement/s in the NatHERS SAP. The intention of this process is to avoid software accreditation hold-ups due to **minor** divergences from accuracy requirements and to provide rigour and transparency to decision-making. This process is outlined at Appendix 7.

There are three pathways and four methods (see Table 1) used for testing, accrediting and maintaining NatHERS software tools.

The three pathways are:

- *New accreditation:* For software tools that have never been accredited under NatHERS — refer to Section 3
- *Major update/reaccreditation:* For software tools that have been accredited under NatHERS, but have incorporated major updates or changes — refer to Section 4.1
- *Minor update/bug fix:* For software tools that have been accredited under NatHERS, but have incorporated minor changes and bug fixes — refer to Section 4.3

The four methods used to support accreditation for each pathway (Appendix 2) in summary are:

- Method 1: simple testing undertaken as the first step for new applications for software accreditation
- Method 2: comprehensive testing for new applications for software accreditation, undertaken following the completion of Method 1
- Method 3: testing for reaccreditation and major updates
- Method 4: testing for minor changes and bug fixes.

Table 1: Testing methods

Activity	Method 1	Method 2	Method 3	Method 4
	New accreditation		Major update / reaccreditation	Minor update / bug fix
Research and review all SAP related information	✔	✔	✔	▪
Submit EOI	✔	▪	▪	▪
Confirm testing requirements with Administrator	✔	✔	✔	▪
Obtain test pack	✔	✔	✔	▪
Seek approval from Administrator of independent assessor	▪	✔	✔	▪
Test dwellings	Dwelling 110	Dwellings 100, 200, 300, 400, 500, 610, 620, 630	Dwellings 200, 500, 610 Subject to review on case-by-case basis	
Developer conducts testing	✔	✔	✔	✔
Independent assessor conducts testing	▪	✔	✔	▪
Generate NatHERS Certificates	▪	✔	✔	▪
Submit form to request bug fix or minor change	▪	▪	▪	✔
Submit				
• test results spreadsheet	✔	✔	✔	✔
• access to software and project file	▪	✔	✔	✔
• revised user guide / training manual	▪	✔	✔	✔
• NatHERS certificates		✔	✔	✔
NatHERS review and feedback	✔	✔	✔	✔

✔ applicable ✔ as required ▪ not applicable

Further information: Software Testing Processes and Accuracy Requirements (Appendix 2)

2.3. Chenath Engine and AccuRate (benchmark tool)

The CSIRO Chenath Engine performs the majority of calculations and modelling required to produce an energy rating.

CSIRO maintains and improves the Chenath Engine and makes it available for linking to other NatHERS accredited software tools. The Chenath Engine assimilates inputs from front-end software to calculate and produce energy ratings.

Front-end software tools intending to use the Chenath Engine must be capable of producing a scratch file to be sent to the Chenath Engine. The software must also be capable of 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 2.

It is essential that prospective software developers understand the working of the Chenath Engine, and the assumptions and rules of AccuRate, which is the benchmark front-end software tool. The Chenath Repository provides an open source library of key documents, including methodologies, algorithms and rules implemented in AccuRate 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 NatHERS 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 Appendix 2 (Method 3), in order to comply with NatHERS software tool accuracy requirements.

Table 2: Key inputs and behavioural settings

Inputs and behavioural settings	What does the accredited software tool do?	What does Chenath do?	More information
Climate zones and weather			
NatHERS climate zones and weather data NatHERS divides Australia into 69 regions, or climate zones, with similar climatic conditions. For each NatHERS zone there is corresponding hourly climate data for meteorological variables of temperature, humidity, wind speed and solar radiation over a one-year period. The climate data, which is representative of average climatic conditions, allows the energy performance of a building to be simulated for any given location.	• Stores NatHERS climate zone library (unique zone ID number, town/city, postcode, longitude and latitude) — provided by NatHERS • Stores hourly weather data library (*.txt file) — provided by NatHERS • Writes appropriate weather file name to scratch file • Allows Chenath to access weather data	• Reads weather file name and path from scratch file • Accesses the weather file content from the front-end software, for simulation	• Interactive NatHERS Climate Zone Map (NatHERS website) • Climate zones/ postcodes (Software Testing Procedures – Appendix 2, Table B)

Inputs and behavioural settings	What does the accredited software tool do?	What does Chenath do?	More information
Operational behaviours			
Internal heat loads NatHERS has set assumptions on internal heat loads and the consequent need for active heating and cooling. The heat loads include latent heat (related to the change in moisture content in the air) and sensible heat (generated by occupants, cooking, lighting and electrical appliances not related to the change in the moisture content in the air).	• Calculates hourly internal heat loads for each dwelling zone • Writes data to scratch file	• Reads hourly internal heat loads for each zone from scratch file, for simulation	• Hstar portal – heat load tables
Occupancy hours thermostat settings and adjustable shading NatHERS requires all spaces to be identified as conditioned or unconditioned zones, based on the function of the space (how it is occupied). For example: living area, bedroom, laundry. This enables appropriate thermostat settings to be allocated to each dwelling zone. Thermostat settings NatHERS has thermostat settings for heating and cooling at temperatures that people feel comfortable. NatHERS accredited software tools must incorporate hourly heating and cooling thermostat settings to maintain each zone's unique thermal comfort level. Adjustable shading NatHERS software tools must apply standardised schedules of indoor and outdoor adjustable shade settings. These settings are derived from the likely operation of shading devices during particular times of the day, under particular weather conditions.	• Stores occupancy constants library (occupancy hours, thermostat settings, shading device operation rules for each climate zone and dwelling zone) – original *.dat files provided by CSIRO) • Determines occupancy-related data for each dwelling zone • Writes occupancy data to scratch file	• Reads occupancy data for each dwelling zone from scratch file, for simulation	• Hstar portal – thermostat settings
Physical items			
Thermal properties of building materials NatHERS software tools must use standard thermal resistance and thermal capacitance data for all materials, as outlined in Material Properties Used in NatHERS Software Tools. "Materials" include normal materials, insulation (bulk) materials and air gaps. These materials are generic and the inclusion of a material/product by a commercial name is generally not supported. However, if a generic material cannot be selected, and a product or material needs to be considered for inclusion, please refer to 'Process for including (the properties of) new materials into NatHERS accredited software'.	• Stores materials library file - original *.csv file provided by CSIRO • Writes material number and thickness to scratch file	• Stores materials library file (binary format) • Reads materials itemised in scratch file and matches this with the material properties in the binary format library, for simulation	• NatHERS website: Material properties used in NatHERS software tools • Process for including (the properties of) new materials into NatHERS accredited software.

Inputs and behavioural settings	What does the accredited software tool do?	What does Chenath do?	More information
Windows NatHERS software tools must be able to incorporate data from two windows libraries. Default windows The default windows library consists of 136 generic windows that can be used when the full information about the windows of a dwelling are not available at the time of rating. If a default window is used in a NatHERS assessment, an allowable tolerance for the U-value and SHGC value will be shown on the NatHERS Certificate to allow the substitution of windows without re-rating. Custom windows The custom windows library includes specific windows available on the Australian market. Each window has been tested and approved using Australian Fenestration Ratings Council (AFRC) protocols. This library is routinely updated by the AFRC and needs to be uploaded to software tools on a regular basis in accordance with Implementing Updates, Changes and Bug Fixes (Section 4). When custom windows are used in a NatHERS assessment, the windows will be displayed on the NatHERS Certificate and can be checked off for compliance.	• Stores default and custom windows libraries as *.csv files. ○ CSIRO provides default windows library ○ AFRC provides custom windows library • Writes window system ID and corresponding windows features to scratch file	• Stores default and custom windows information in binary format libraries • Reads window library name (default or custom) and window system ID in scratch file and matches this to corresponding window in one of the binary format libraries	• NatHERS website: A guide to windows in NatHERS Software factsheet
Infiltration calculations NatHERS calculates hourly air changes for each zone. These are influenced by the terrain, dwelling height above ground, number and nature of ceiling penetrations and the characteristics of the roof and sub-floor spaces.	• Calculates infiltration parameters for each dwelling zone • Writes infiltration parameters to scratch file	• Reads infiltration parameters from scratch file, for simulation	• Infiltration Calculations in AccuRate, Dong Chen, CSIRO
Wind pressure coefficient This measures the wind pressure on an opening relative to the dynamic wind pressure based on the building footprint, building height, wind direction, wall orientation and associated wing walls.	• Calculates the c_p values for the scratch file	• Uses the c_p values and other related information to calculate air flow rate through openings.	• Calculation of c_p values for scratch file
Getting results			
Total energy load NatHERS software must calculate the total average energy load, and the average heating and cooling loads over the total air conditioned floor area, in MJ/m^2 per annum.	• Nil	• Calculates energy loads based on inputs, and provides numbers to front-end software tools.	

Inputs and behavioural settings	What does the accredited software tool do?	What does Chenath do?	More information
Area correction factor (ACF) Once Chenath has calculated the energy loads, NatHERS software tools must apply an ACF. This accounts for the difference in total building surface area to floor area ratio in small versus larger dwellings, as well as buildings with a partially shared external envelope (walls, floors or ceilings), by ensuring the heat transfer through the building fabric is proportionate to the total building surface area and that smaller dwellings are fairly compared with larger ones.	• Calculates **adjusted** total energy load (applies area correction factor formula)	• Nil	• Hstar portal "Area correction factors in AccuRate", Dong Chen, 2012
Star rating The NatHERS star ratings range for each climate zone is called a 'star band'. The star band ranges from zero to ten stars in 0.1 star increments. A total adjusted energy load (MJ/m^2 p.a.) has been determined for each 0.1 star increment for each NatHERS climate zone. This information is provided in a star bands conversion table. NatHERS software tools must determine the total adjusted energy load (MJ/m^2 p.a.), and convert this into a star rating using the star bands conversion table. This enables a fair comparison of buildings in different regions despite the variability in weather conditions across Australia.	• Determines star rating based on the adjusted total energy load provided in star bands table.	• Nil	• NatHERS Stars in 0.1 star increments are available at nathers.gov.au • Decimal Point Star bands paper, Dong Chen – available on request from NatHERS Administrator

2.4. NatHERS Certificate and stamps

NatHERS accredited software tools must be able to produce NatHERS Certificates and stamps for ratings by both NatHERS accredited assessors and non-accredited assessors (also known as raters) for:

- Class 1a and Class 2 single dwelling
- Class 2 summary

NatHERS accredited software tools must also be able to produce a NatHERS QR stamp (also known as a mini certificate) linking each principal page of the design documentation to the NatHERS Certificate.

The data input specifications for each field of the NatHERS Certificates and stamps are available from the NatHERS Administrator. Certificate design files are available from the NatHERS Administrator.

NatHERS Certificates 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.

Building data gathered from the NatHERS certificates shall 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 Accreditation.

Further information: NatHERS Certificate (NatHERS website).

3. How to get accredited

3.1. Accreditation process for new tools

The process for accrediting new software tools is broadly divided into the following stages:

- Research:
  - This requires a software tool developer to become familiar with NatHERS and the accreditation process, in order to determine whether to proceed with accreditation.
- Expression of Interest (EOI):
  - This provides an early opportunity for the NatHERS Administrator and the software tool developer to work together to clarify any queries and address any issues that may arise throughout the software accreditation process.
- Software testing – Method 1:
  - The testing of a simple dwelling is undertaken as the first step for a new software tool and provides an opportunity for software tool developers to quickly understand significant deviations from the required test results.
- Software testing – Method 2 and submitting a formal application for accreditation:
  - This more comprehensive testing is commenced once Method 1 testing has been successfully completed and confirmed. It involves testing by both the software tool developer and an independent accredited assessor.

To achieve accreditation, new software tools must:

- satisfy the Requirements for Accreditation in Appendix 1
- undergo testing as described in Software Testing Procedures and Accuracy Requirements in Appendix 2.

3.2. Costs

The NatHERS 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 tool developer, including any costs from engaging an independent NatHERS assessor(s).
- If further information is required to clarify or validate information in the application, this must be provided at the software tool developer's expense.

3.3. Granting software accreditation

Once the software tool satisfies the NatHERS requirements, the NatHERS Administrator (on behalf of the NatHERS Steering Committee), will offer NatHERS software accreditation to the software tool developer.

The software tool developer will need to agree to the Terms and Conditions to confirm accreditation.

The NatHERS Administrator will work with the software tool developer to determine the timing and communications of the release of the new NatHERS accredited software tool, including updating the NatHERS website.

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

Further information: Terms and Conditions [Appendix 6]

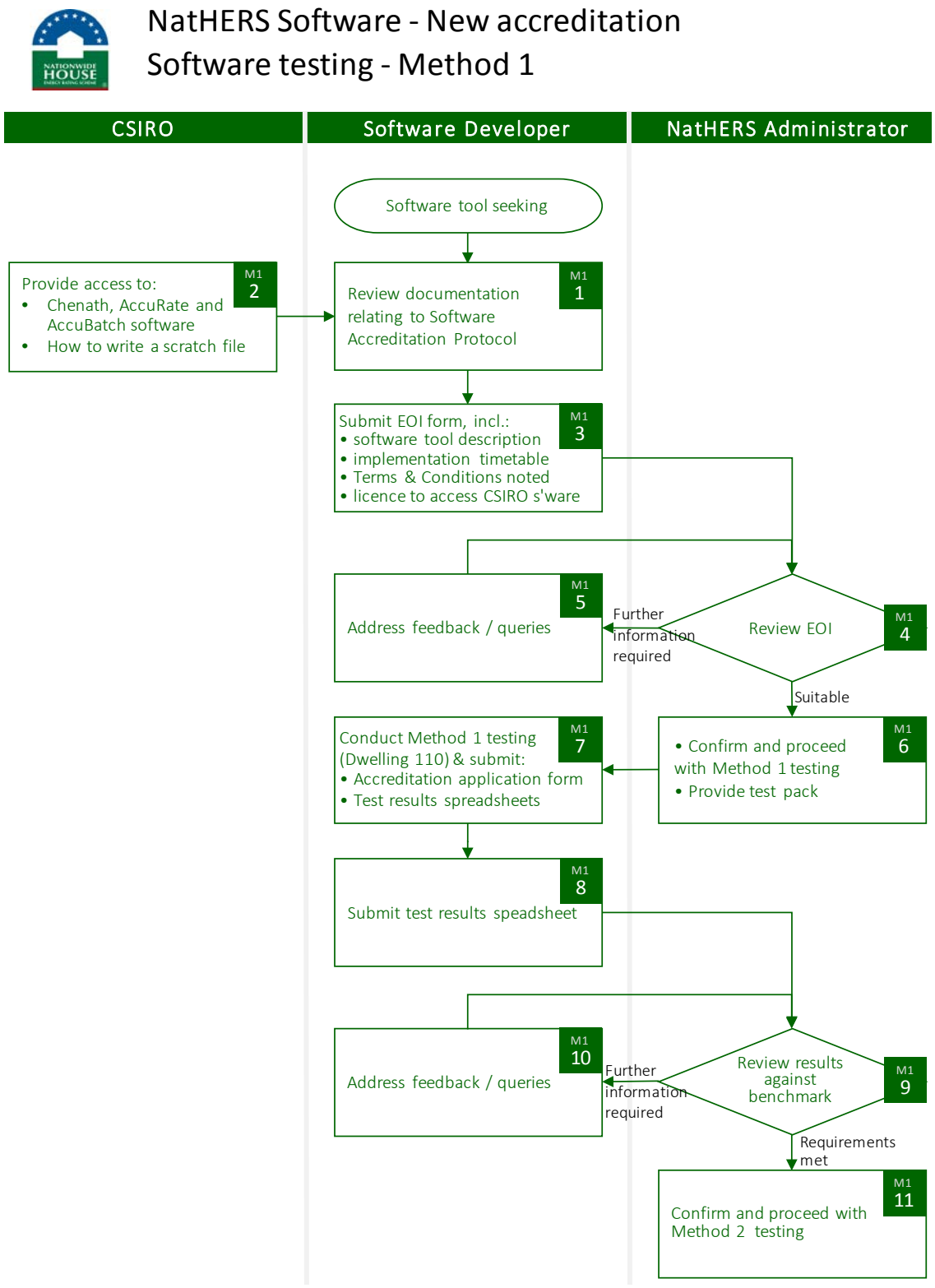
3.4. Period of accreditation and reaccreditation

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

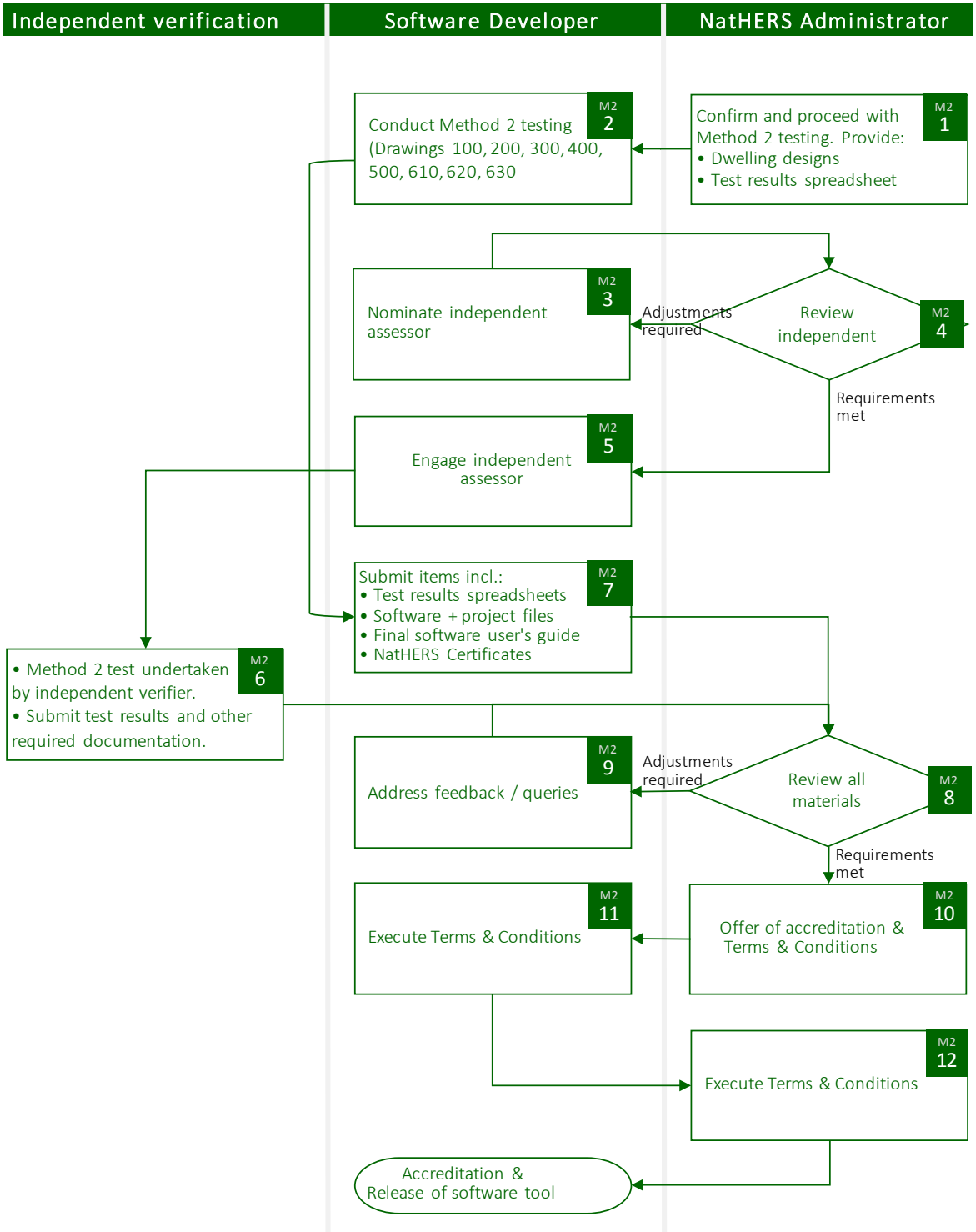
- the Developer may seek a 12-month extension of accreditation
- the Administrator may agree to extend the accreditation on the same or varied Terms and Conditions as appropriate.

Further information: Terms and Conditions [Appendix 6]

Figure 1: Pathways for new accreditation



NatHERS Software - New accreditation
Software testing - Method 2



4. Implementing updates, changes and fixes

After software tools have been accredited, updates, changes and fixes will need to be implemented from time to time to facilitate innovation and amend errors. The scale of these changes range from major updates, usually initiated and facilitated by the NatHERS Administrator, to minor changes and bug fixes, often initiated by the software tool developer.

Software testing is required in all instances prior to commercial release of the new version of the software tool.

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

All superseded versions of a software must be made available in case ratings generated by previous versions are queried.

4.1. Major updates and reaccreditation

Major updates are usually facilitated by the NatHERS Administrator and usually align with the three-yearly updates of the NCC. They can include changes to the Chenath Engine (and consequent benchmark results), or other input data including the climate files and new building features.

Major updates can have significant impacts on energy ratings and therefore require comprehensive testing and consultation. The agreed process for major updates is defined in the Memorandum of Understanding between the NatHERS Administrator and the Australian Building Codes Board (ABCB), which is broadly divided into the following steps:

- Proposal development
    - The NatHERS Administrator obtains approval to proceed with the development of a major update(s) and undertake a Preliminary Impact Analysis (PIA). CSIRO, in consultation with the NatHERS Administrator, develops a beta version of the potential updated benchmark software for testing.
- Preliminary impact analysis
    - The PIA provides an early-stage analysis of the impacts associated with a major update(s), determining if the changes provide a net benefit, and considering implementation options. The PIA identifies the problem(s) and considers options and solutions, including consulting with software tool developers and other stakeholders. Where the PIA identifies a significant impact, a Regulation Impact Statement (RIS) may be undertaken. If a RIS is not required, the software update is commenced.
- Regulation impact statement (if required)
    - A RIS is undertaken by the NatHERS Administrator and/or the ABCB and includes more rigorous cost-benefit analysis of the proposed updates and more detailed stakeholder consultation.
- Software update process
    - Following approval of the major update(s), the NatHERS Administrator advises software tool developers, who are then required to undertake software testing — refer to Appendix 2: Software Testing Processes and Accuracy Requirements.

To achieve reaccreditation, software tools must:

- satisfy the Requirements for Accreditation in Appendix 1.
- undergo testing as described in Software Testing Procedures and Accuracy Requirements in Appendix 2.

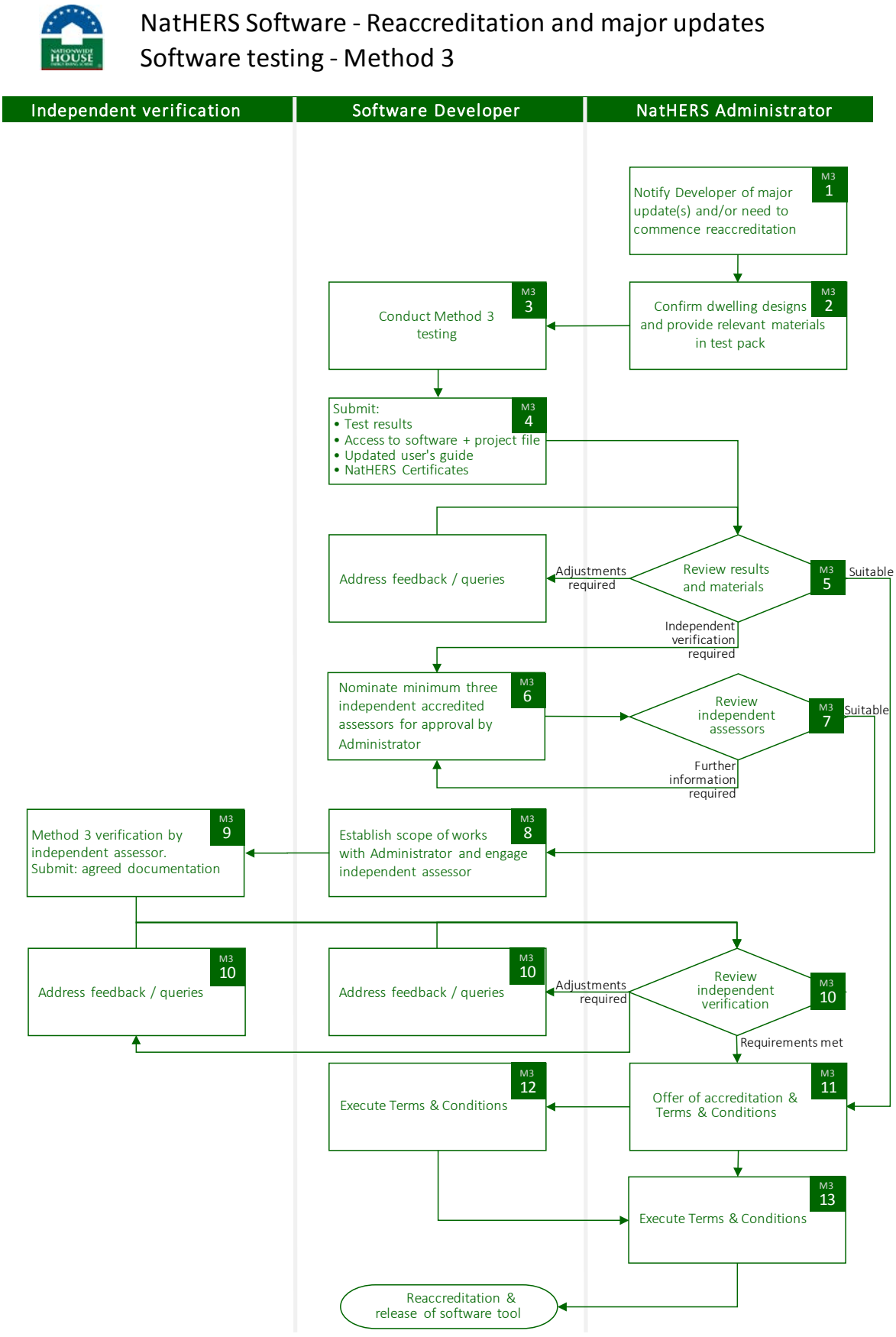
4.2. Testing processes for updates and reaccreditation

The steps described in the flowchart at Figure 2 and Appendix 2, are a general guide only and in some circumstances reduced or additional testing may be deemed necessary by the NatHERS Administrator.

If the software tool developer fails to satisfy the requirements, or testing indicates a significant impact on the star rating output of the software tool, the NatHERS Administrator (on behalf of the NatHERS Steering Committee) may withhold accreditation of the updated software tool.

For major changes, a transition period may be required between versions of the software tools.

Figure 2: Pathway for reaccreditation and major updates



4.3. Minor changes and bug fixes

Minor changes or bug fixes are small in nature and do not substantially alter the existing regulatory arrangements for stakeholders. The level of impact on rating outcomes must result in [b]:

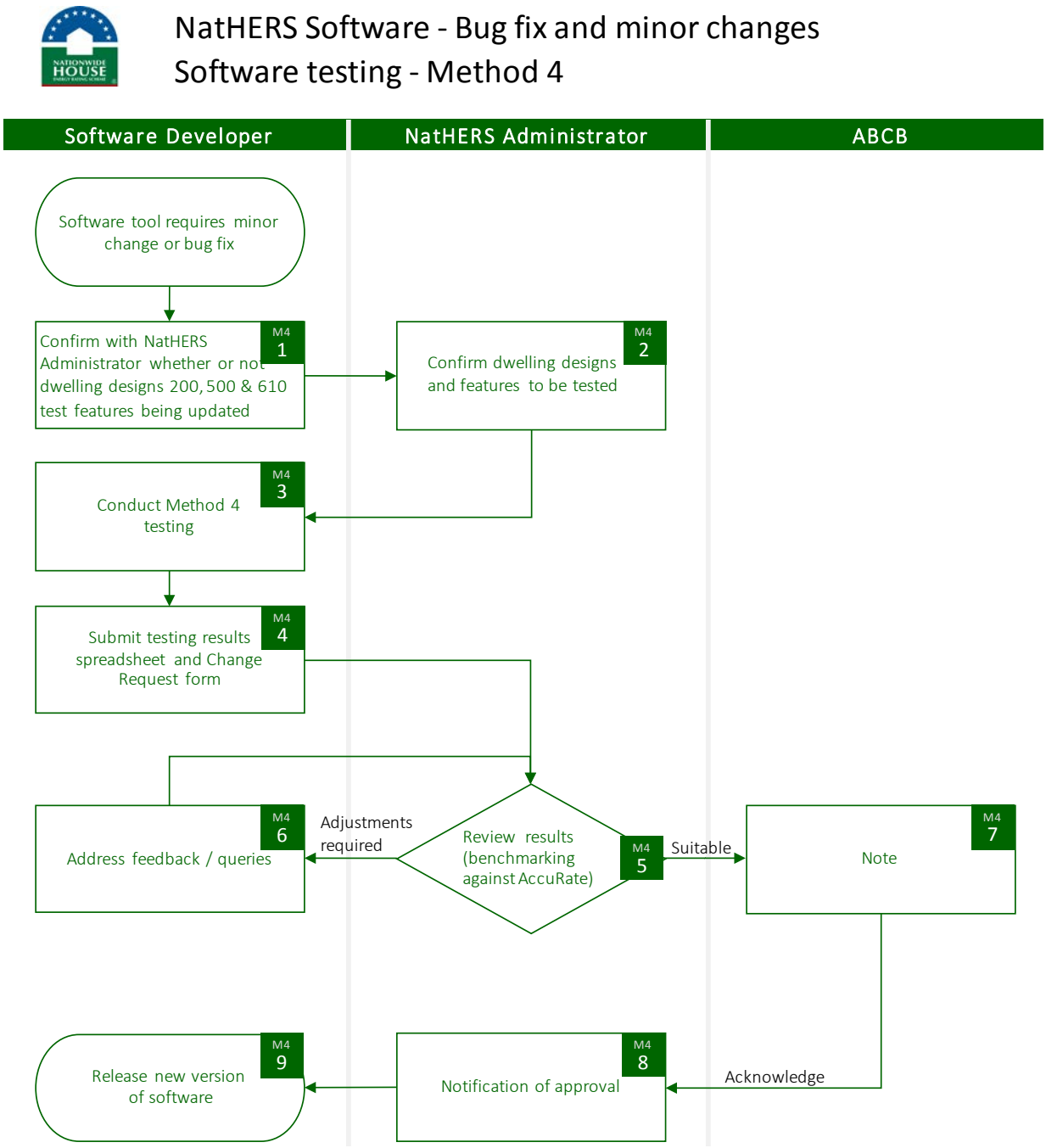
- 100% of star differences are within ±1 star and
- 99% of these must be within ±0.2 stars.

The process of implementing minor changes and bug fixes is described in Appendix 2. It is broadly divided into the following stages:

- conduct Method 4 testing
- submit Request for Minor Changes and Bug Fix form (Appendix 5), access to the software version and project file
- implement changes when approved.

[b] Source: Memorandum of Understanding between NatHERS Administrator and Australian Building Codes Board in relation to NatHERS Software Tools

Figure 3: Pathway for minor changes and bug fixes



5. Information sources

The following documents are referred to in this Protocol. Further information relating to NatHERS is available at www.NatHERS.gov.au[d].

Document	Available from
AccuBatch V2.0 User Manual, Dong Chen CSIRO, March 2010	https://publications.csiro.au/rpr/download?pid=csiro:EP101114&dsid=DS4
AccuRate and the Chenath Engine for Residential House Energy Rating, Dong Chen 2016	hstar.com.au/Home/Chenath
AccuRate Fan Speed Calculation, Dong Chen, CSIRO Sustainable Ecosystems, June 2018	CSIRO
AccuRate Sustainability V2.3.3.13, Internal Heat Gain Estimation from Occupants and Appliances, Dong Chen, May 2018	CSIRO
Area Correction Factors in AccuRate v1.1.4.1, Dong Chen, 2012 Treatment of the area adjustment for buildings with partially shared external envelope (walls, floors or ceilings)	hstar.com.au/Home/Chenath
NatHERS Technical Note , 2019 Principles for ratings in accreditation mode	nathers.gov.au
Calculation of *cp* values for SCRATCH file, 8 August 2015	CSIRO
Conflict of interest declaration form	NatHERS Administrator
Decimal-Point StarBands Used in AccuRate V1.1.4.1, Dong Chen, June 2013	CSIRO
Description of input data file for the AccuRate simulation engine V3.21 (AccurateEngine.exe), February 2019 How to write a scratch file for Chenath	CSIRO
A guide to windows in NatHERS Software factsheet	nathers.gov.au
Material Properties Used in NatHERS Software Tools, 2012, Dong Chen A list of material properties used in NatHERS software tools	nathers.gov.au or hstar.com.au/Home/Chenath
Infiltration Calculations in AccuRate V2.0.2.13, Dong Chen, 2013	hstar.com.au/Home/Chenath

[c] Note, documentation may be updated additional documentation may become available after publication of the SAP. Please confirm with the NatHERS Administrator if additional or revised documentation is available.
[d] Note, documentation may be updated additional documentation may become available after publication of the SAP. Please confirm with the NatHERS Administrator if additional or revised documentation is available.

Document	Available from
Modelling of Roof spaces, Sub-floors and Non-Vertical Air Gaps in the AccuRate Engine, October 2003	CSIRO
NatHERS Climate Files — contact NatHERS Administrator	NatHERS Administrator
NatHERS Interactive Map	nathers.gov.au
NatHERS Star Bands – 0.1 star increments spreadsheet	NatHERS Administrator
Openings and Perforations Used in AccuRate, Dong Chen, June 2014, modified August 2014	CSIRO
Process for including (the properties of) new materials into NatHERS Accredited Software	nathers.gov.au
Software standardisation [draft]	NatHERS Administrator
Software testing dwelling designs	NatHERS Administrator
Software test results spreadsheet	NatHERS Administrator

6. Key terms and acronyms

Term / acronym	Definition
ABCB	Australian Building Codes Board
Accredited mode	A mode of software operation where NatHERS specifications (e.g. climate zones, window values, heat loads) are applied to allow equal comparison between different dwellings in different NatHERS climate zones.
AccuBatch	Software designed to allow users to simulate multiple AccuRate projects automatically with multiple house designs, climate zones and thermostat settings.
AccuRate	A CSIRO user interface which is compatible with the Chenath engine. AccuRate is used as the benchmark tool against which the simulated results of other software tools are compared.
Administrator, NatHERS	The NatHERS Administrator is responsible for accreditation of NatHERS ratings tools and for ensuring national coordination and consistency. The role is undertaken by the Commonwealth Government on behalf of Australian state and territory governments.
AFRC	Australia Fenestration Rating Council. The AFRC is responsible for maintaining the NatHERS custom windows library used by NatHERS accredited software tools.
Area correction factor (ACF)	An adjustment formula applied to the energy load to account for different rates of heat transfer due to differences in the total floor to surface area ratio. Smaller dwellings have a greater surface area (wall and ceiling combined) for their floor area when compared to larger dwellings.
Benchmark software	See “AccuRate”
Bug fix	(As defined in the Memorandum of Understanding between the NatHERS Administrator and ABCB.) A coding error fix to existing software to generate an energy rating that does not affect ratings and current regulatory requirements. A bug fix could include, but is not limited to: o interruption or impediment to producing a rating o interruption or impediment to the functioning of the software o correction of data fields on the NatHERS Certificate o corrections to coding caused by integration with software architecture ‘plugins’ that lead to functionality failure, not simulation/calculation related o corrections to software that need to be implemented immediately due to functionality failure affecting the ability of an assessor to either use the software, and/or generate certificates with correct data
Chenath engine	The calculation engine that predicts the annual heating and cooling loads of a dwelling. CSIRO maintains the Chenath Engine and licenses the engine to software tool developers.

Term / acronym	Definition
Climate zone, NatHERS	NatHERS divides Australia into zones of similar climatic conditions. There are 69 NatHERS climate zones which are generally aligned with postcode boundaries for convenience, except where there is a topographical or other feature within the postcode area that impacts the local climate. A list of NatHERS climate zones and an interactive map are available on the NatHERS website.
Conditioned area	The area of the dwelling's enclosed zones that may be actively heated and/or cooled, e.g. kitchen, living area, bedroom. It excludes unconditioned zones that are separated and not actively heated or cooled e.g. separate laundry, toilet, bathroom and garage.
Cooling and heating loads (thermostat setting)	The energy needed for heating and cooling the conditioned area to maintain a certain temperature range for thermal comfort. The range is described by the thermostat setting and varies according to the climate zone to account for the acclimatisation of local residents, i.e. the temperature at which people will feel neither too cool nor too warm in that climate.
CSIRO	Commonwealth Scientific and Industrial Research Organisation — responsible for updating and maintaining the Chenath calculation engine and AccuRate software.
Dwelling	A place of residence. Dwellings, as described in the NCC, include: Class 1: detached and attached houses Class 2: sole-occupancy units in multi-unit residential building Class 4: residence within a building of non-residential nature.
Energy load	The predicted annual energy requirement for conditioned zones to maintain thermal comfort within the dwelling. Measured in megajoules per square meter per annum — $(MJ)/m^2$ p.a.
Energy rating	A star value (from 0 to 10 stars for NatHERS) calculated for the predicted annual energy load of a dwelling in a particular NatHERS climate zone. When using software in accredited mode, the energy rating must be reported in 0.1 star increments.
EOI	Expression of Interest
Hstar portal	The website linking to: o technical information on the Chenath calculation engine o NatHERS Certificate generator for AccuRate and BERS Pro
Latent heat load	The heat which must be extracted to condense water vapour.

Term / acronym	Definition
Minor change	Minor changes include: 1. A coding error fix that may have a minor impact on NatHERS rating outcomes and current regulatory requirements. Coding errors could include, but are not limited to: • calculation of an existing simulation process where ratings could be affected • interruption or impediment to the generation and calculation of an energy rating or • providing consistency to software functionality for different modelling scenarios. 2. An enhancement to the existing software to generate or accurately calculate a NatHERS energy rating that may have a minor impact on rating outcomes and current regulatory requirements. • Enhancements include, but are not limited to: o improvements to simulation functionality and accuracy and o updates of 'plugin' libraries – e.g. AFRC custom window libraries or postcodes. Note: 'Minor' refers to the level of impact on rating outcomes. To be minor, the change must result in: The level of impact on rating outcomes must result in[e]: • 100% of star differences are within ±1 star and • 99% of these must be within ±0.2 stars.
Major change	Major changes to NatHERS software include: 1. major changes to the Chenath Engine 2. changes that are likely to substantially alter the regulatory arrangements for businesses, relevant organisations or individuals, and 3. changes that do not meet the definition for a bug fix or minor change.
MJ	Megajoule – unit of energy
NatHERS	Nationwide House Energy Rating Scheme. An Australian Government initiative that facilitates nationally consistent house energy assessments across Australia from accredited software. Software accredited under the scheme can be used to assess the thermal efficiency (energy efficiency) of a dwelling.
NatHERS Certificate	The official energy rating certificate generated by an accredited software detailing data from the Assessment. There are four certificates: 1. Class 1 certificate by a NatHERS accredited assessor 2. Class 1 certificate by a non-accredited assessor 3. Class 2 summary certificate by a NatHERS accredited assessor 4. Class 2 summary certificate by a non-accredited assessor

[e] Source: Memorandum of Understanding between NatHERS Administrator and Australian Building Codes Board in relation to NatHERS Software Tools

Term / acronym	Definition
National Construction Code (NCC)	The Australian Building Codes Board document that specifies minimum requirements for safety, health, amenity and sustainability, in the design and construction of new building and new building work in existing buildings
NCC	National Construction Code
Regulation mode	See accredited mode.
Sensible heat load	The amount of heat that must be extracted from air in a dwelling zone to maintain the prescribed heating thermostat setting. It excludes any latent heat required to condense water vapour. The Chenath Engine applies sensible heat gains to the zones in the house depending on their source e.g. cooking and fridge in a kitchen, appliances like televisions and stereos, and lights in living rooms, and the heat gain from people sleeping in a bedroom.
Software	The software that determines the energy load and energy rating (between 0 to 10 stars) of a dwelling. Software may contain the Chenath Engine (a calculation engine that calculates heat transfer and conditioning energy requirements for a dwelling), or other calculation engine. It will also have a customised user interface (where software users input design and construction elements for the dwelling) for commercial application and regulatory purposes.
Stamp	A mini-certificate including the dwelling address and star rating generated by the software tool which is placed on design documentation used for the assessment.
Star bands	The relative energy load range (MJ/m^2 p.a.) within each climate zone, from 0 to 10 stars in 0.1 star increments. This allows fair comparison of dwellings given climatic variability across Australia. NatHERS Stars in 0.1 star increments are available at www.nathers.gov.au.
Steering Committee	The body that oversees the development and administration of NatHERS, currently the Energy Efficiency Advisory Team under the Council of Australian Governments Energy Council. The Steering Committee has currently delegated responsibility for the administration of the scheme to the NatHERS Administrator.
Thermal comfort	A range of environmental conditions within a dwelling which affect how comfortable the occupant feels (e.g. air temperature, humidity and movement, and the radiant temperature of surrounding surfaces). The exact conditions which make a dwelling comfortable vary according to climate and psychological factors of an occupant.
Thermal performance (energy efficiency)	The performance of the building fabric (roof, walls, windows and floors), as determined by the predicted heating and cooling loads when subjected to a test for standard occupancy patterns in a given climate zone. The lower the loads, the higher the thermal performance and star rating.

Appendix 1 Requirements for accreditation

Minimum requirements

The software tool must:

1. Meet minimum software accuracy requirements provided in Software Testing Procedures and Accuracy Requirements (Appendix 2)
2. Be commercially available at the time of accreditation
3. Incorporate standard NatHERS data and calculation rules:
    a. NatHERS climate zones and weather data
    b. internal heat loads
    c. occupancy hours/ thermostat and adjustable shade settings
    d. thermal properties of building materials
    e. windows values
    f. infiltration calculations
    g. area correction factor
    h. star bands conversion table
    i. generate NatHERS Certificates (class 1 and class 2 summary certificates by NatHERS accredited and non-accredited assessors) and stamps with accurate star ratings in accredited mode
    j. a check box on the web portal for the assessor to acknowledge that heating and cooling cap requirements have been met before a certificate can be produced.

The software tool developer must:

4. Have a Chenath user licence if that calculation engine is utilised
5. Maintain a software tool users' helpdesk
6. Provide a sufficiently detailed user manual or help files for software tool users that can be amended to reflect approved changes to the software
7. Adhere to the Terms and Conditions.

Recommended requirements

8. The software tool uses the Chenath Engine to perform calculations.

Appendix 2 Software testing procedures and accuracy requirements

Software Tool Accreditation

Software testing procedures and accuracy requirements

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This Appendix supports the Nationwide House Energy Rating Scheme (NatHERS) Software Accreditation Protocol (SAP) by detailing the testing processes for software accreditation, reaccreditation, major and minor changes and bug fixes. It applies to software tools using the CSIRO-developed Chenath engine and all other engines.

Depending on the circumstance, software tools must be tested using up to nine NatHERS dwelling designs in different climate zones to determine how the software assesses thermal performance when compared to the benchmark software tool (AccuRate).

Software testing — Method 1

This method applies to the first stage of testing when a software tool developer (Developer) seeks NatHERS accreditation for their software tool for the first time. It provides an early opportunity for the NatHERS Administrator (Administrator) and the Developer to work together to collaboratively resolve any issues that may arise through the formal accreditation process.

Method 1 tests the simple dwelling design 110 in all NatHERS climate zones. The simple design allows Developers an opportunity to quickly understand significant deviations from the required test results. It tests a range of modelling features, including the ability of software to follow the NatHERS zoning requirements, and check the accuracy of thermal load calculations of conditioned and unconditioned zoned areas.

Once Method 1 testing is successfully completed, the Developer can progress to Method 2.

Research

1. The Developer will review this SAP and documents referenced from the following sources[f]:
    - NatHERS website:
        - NatHERS Technical Note
        - Material Properties Used in NatHERS Software Tools
        - Process for including (the properties of) new materials into NatHERS Accredited Software
        - A guide to windows in NatHERS Software factsheet
        - NatHERS Interactive Map
    - NatHERS Administrator:
        - NatHERS Star bands (energy load to star rating conversion table)
        - NatHERS Climate Files
        - Conflict of interest declaration form
        - Openings and Perforations Used in AccuRate, Dong Chen, June 2014, modified August 2014
        - Calculation of *cp* values for scratch file, 8 August 2015
        - AccuRate Sustainability V2.3.3.13, Internal Heat Gain Estimation from Occupants and Appliances, Dong Chen, May 2018
        - AccuRate Fan Speed Calculation, Dong Chen, CSIRO Sustainable Ecosystems, December 2011

[f] Note, documentation may be updated additional documentation may become available after publication of the SAP. Please confirm with the NatHERS Administrator if additional or revised documentation is available.

- Modelling of Roof spaces, Sub-floors and Non-Vertical Air Gaps in the AccuRate Engine, October 2003
- Default windows library

- CSIRO HERS Portal website:
  - AccuRate and the Chenath Engine for Residential House Energy Rating
  - Area Correction Factors in AccuRate
  - Infiltration Calculations in AccuRate V2.0.2.13
  - AccuBatch User Manual

2. The developer will contact the CSIRO to obtain:
   - access to the Chenath Engine, AccuRate and AccuBatch
   - description of input data file for the AccuRate simulation engine V3.21 (AccurateEngine.exe) — this document explains how to write a scratch file.

Expression of Interest (EOI)

3. The Developer will submit an EOI for Accreditation form (Appendix 4 of the Software Accreditation Protocol), which includes the following information:
   a. summary of the new software tool (500 words maximum)
   b. indicative timetable for software testing and accreditation application
   c. any key issues (e.g. questions, concerns) or details of matters to be resolved and discussed with the Administrator, relating to the accreditation process
   d. independent verifier's details (if known)
   e. in-principle agreement to the Terms and Conditions
   f. other supporting information (optional).

Feedback and test pack

4. The Administrator will assess the EOI and raise with the Developer any issues which need to be addressed.
5. The Developer will address any feedback or queries from the NatHERS Administrator.
6. The Administrator will confirm that Method 1 testing can proceed and provide the Developer with the most up-to-date version of the test pack, which consists of:
   a. Testing documents
      - dwelling design 110
      - software test results spreadsheet which compares the Developer's simulation results to benchmark results and calculates a pass/fail for heating and cooling loads and star ratings, for each dwelling in each climate
      - AccuRate project file

b. Administrative documents

- draft Terms and Conditions of NatHERS software accreditation
- Conflict of Interest form (only for independent assessor to complete during Method 2 testing)

c. Technical documents

- additional to those listed in 1.a. above
- custom windows library – contact details of the Australian Fenestration Rating Council to obtain access to their data portal and the custom windows library
- default windows library.

Conduct software testing and submit

7. The Developer will undertake testing of dwelling design 110 for all 69 NatHERS climate zones.

   a. Testing involves inputting dwelling design specifications into the software tool and recording the simulation results (cooling and heating loads (MJ/m2 p.a.), star rating and total conditioned dwelling area (after the net correction factor has been applied in the test results spreadsheet). The spreadsheet will calculate a pass/fail for each component and whether the results fall within tolerances, compared to the benchmark tool.

   b. When testing each dwelling, the Developer must incorporate NatHERS specifications to allow equal comparison between different dwellings in different NatHERS climate zones. NatHERS specifications include window values, NatHERS climate zones and weather data, internal hourly heat loads for living spaces, occupancy hours/ thermostat and adjustable shade settings, thermal properties of building materials, infiltration calculations, area correction factor, and star bands values.
   Note: Unique NatHERS values/specifications must be applied during testing to fulfil accreditation mode. No testing using the test pack documentation is open to a user's interpretation. Please contact the Administrator to confirm the testing approach if there is any ambiguity.

8. Submit the test results spreadsheet to the Administrator at admin@nathers.gov.au.

Assessment of results and feedback

9. The Administrator (or their agent) will review the results and provide feedback on any items which need to be addressed. If deemed necessary, the Administrator may request additional and/or independent testing of the software.

10. The Developer will address any requests from the NatHERS Administrator.

11. The Administrator, when satisfied with the test results, will inform the Developer that Method 2 testing can begin.

Software testing — Method 2

Method 2 can commence once the Administrator has confirmed that Method 1 testing has been successfully completed. This method involves testing by both the Developer and an independent accredited assessor.

Confirmation to proceed

1. The Administrator will:
    a. Outline the testing requirements (dwellings designs and climate zones)
    b. Provide the additional test pack documentation for Method 2 (if not already provided).

Conduct software testing

2. The Developer will undertake testing of dwelling design 100, 200, 300, 400, 500, 610, 620 and 630 in all NatHERS climate zones indicated in Table B.
    a. Testing involves inputting dwelling design specifications into the software tool and recording the simulation results (cooling and heating loads (MJ/m2 p.a.), star rating and total conditioned dwelling area (after the net correction factor has been applied in the test results spreadsheet). The spreadsheet will calculate a pass/fail for each component and whether the results fall within tolerances, compared to the benchmark tool.
    b. When testing each dwelling, the Developer must incorporate NatHERS specifications to allow equal comparison between different dwellings in different NatHERS climate zones. NatHERS specifications include window values, NatHERS climate zones and weather data, internal hourly heat loads for living spaces, occupancy hours/ thermostat and adjustable shade settings, thermal properties of building materials, infiltration calculations, area correction factor, and star bands values.
    Note: Unique NatHERS values/specifications must be applied during testing to fulfil accreditation mode. No testing using the test pack documentation is open to a user's interpretation. Please contact the Administrator to confirm the testing approach if there is any ambiguity.

Independent verification

3. The Developer will:
    c. Nominate an independent assessor and seek approval from the Administrator. The Accredited Assessor Organisations (Building Designers Association of Victoria (BDAV) and Australian Building Sustainability Association (ABSA)) can assist and provide contact details of independent accredited assessors.
    d. The independent assessor must provide to both the Administrator and the Developer:
        - evidence of accreditation with an Assessor Accrediting Organisation
        - a conflict of interest declaration form.
4. The Administrator will review the nominated assessor(s), and require the Developer to select an alternative independent assessor(s). If an actual or perceived conflict of interest exists for

the nominated assessor(s), the Administrator will require the Developer to select an alternative independent assessor(s).

5. The Developer will:
   a. Engage, at their own cost, the approved independent, accredited, experienced, thermal performance assessor to undertake testing of all Method 2 dwellings and climate zones.
   b. Provide all relevant documentation and facilitate access by the independent assessor to CSIRO software (as required) and the software tool to enable them to undertake the verification.
6. The approved independent assessor will undertake testing as outlined in item 2 (Method 2) and provide to both the Developer and the Administrator at admin@nathers.gov.au:
   a. a written statement that the testing was their work
   b. an outline of the methods and assumptions used in testing to verify that software results are within required tolerances
   c. completed software test results spreadsheets
   d. NatHERS Certificates:
      - Single dwelling by accredited assessor: one certificate per dwelling in any climate zone
      - Single dwelling by non-accredited assessor: one certificate for any dwelling in any climate
      - Summary by accredited assessor: one certificate for dwellings 610, 620 and 630 in any climate
      - Summary by non-accredited assessor: one certificate for dwellings 610, 620 and 630 in any climate

Formal application for accreditation

7. When independent testing completed, the Developer will ensure the assessor has provided documentation itemised in item 6.d above to the Administrator, and submit (refer to checklist at Appendix 5):
   a. Method 2 test results spreadsheet
   b. The project file for each dwelling
   c. NatHERS Certificates as itemised in item 6.d above
   d. Statement of compliance with Minimum Accreditation Requirements (Appendix 1)
   e. Access to the beta version of the software tool to access the project files
   f. Training manual/user's guide for the software tool

Assessment of results and feedback

8. The Administrator (or their agent) will review the submitted documentation and seek clarification if required. If necessary, the Administrator may request additional and/or independent testing and nominate an assessor to undertake this work.

9. The Developer will address any requests from the NatHERS Administrator.
10. When satisfied the test results meet the NatHERS accuracy requirements, the Administrator will provide the Developer with a letter of offer for accreditation and the Terms and Conditions.
11. The Developer will need to agree and sign the Terms and Conditions.

    Note: Software accreditation will only be granted when Method 2 testing has been successfully completed and the software tool assessments meet the accuracy requirements.
12. Upon receipt of the Administrator's formal notification of accreditation and executed Terms and Conditions, the Developer will agree with the Administrator on communications to stakeholders of the changes and release the new software tool.

Software testing — Method 3

Method 3 testing applies when Developers seek reaccreditation, or need to implement major changes.

The standard test subjects (subject to review) for Method 3 are dwellings 200, 500 and 610, tested in all NatHERS climates.

Confirmation to proceed

1. The Administrator will notify the Developer of proposed major changes or the need to commence reaccreditation. The Developer and Administrator will determine if dwelling designs 200, 500 and/or 610 test the features being changed. If these designs do not test the features, the Developer will discuss with the Administrator alternative NatHERS dwelling designs to be tested.

2. The Administrator will:

    a. outline the testing requirements (dwellings designs and climate zones)
    b. confirm whether or not independent testing is required
    c. provide the test pack documentation.

Conduct software testing and submit

3. The Developer will undertake testing of dwelling design 200, 500 and 610, in all NatHERS climate zones indicated in Table B.

    a. Testing involves inputting dwelling design specifications into the software tool and recording the simulation results (cooling and heating loads (MJ/m2 p.a.), star rating and total conditioned dwelling area (after the net correction factor has been applied in the test results spreadsheet). The spreadsheet will calculate a pass/fail for each component and whether the results fall within tolerances, compared to the benchmark tool.

    b. When testing each dwelling, the Developer must incorporate NatHERS specifications to allow equal comparison between different dwellings in different NatHERS climate zones. NatHERS specifications include window values, NatHERS climate zones and weather data, internal hourly heat loads for living spaces, occupancy hours/ thermostat and adjustable shade settings, thermal properties of building materials, infiltration calculations, area correction factor, and star bands values.
    Note: During testing unique NatHERS values/specifications must be applied to fulfil accreditation mode. No testing using the test pack documentation is open to a user's interpretation. Please contact the Administrator to confirm the testing approach if there is any ambiguity.

    c. Generate the following certificates:

        - Single dwelling by accredited assessor: one certificate per dwelling in any climate zone
        - Single dwelling by non-accredited assessor: one certificate for any dwelling in any climate

Assessment of results and feedback

4. When testing is complete, the Developer will submit (refer Appendix 5) to the Administrator:
    a. test results spreadsheet
    b. the project files
    c. NatHERS certificates
    d. revised training manual and/or software user guide
    e. access to the revised version of the software to read the project file
    f. any other material requested by the Administrator.
5. The Administrator (or their agent) will review the submitted documentation and project files. They will conduct spot checks of the project files, focussing on, but not limited to, items which cannot be verified via the NatHERS certificates. If necessary, the Administrator may request additional information from the Developer.

Independent verification (if required)

6. Where further concerns need to be resolved, the Administrator will identify the key areas to be resolved and initiate an independent verification process, and ask the Developer to nominate a minimum of three independent accredited assessors for consideration by the Administrator.
7. The Administrator, if necessary, may seek additional supporting documentation, and will provide a decision on the suitability of the Assessor(s).
8. The Developer will engage the Assessor at their own cost and detail the scope of verification as identified by the Administrator. The Developer will reiterate to the Assessor that their work is independent in nature.
9. The Assessor, as an independent party, will undertake testing to address key unresolved issues identified by the Administrator and will, subject to confirmation by the Administrator, submit:
    a. a conflict of interest declaration
    b. a written statement that the verification was their work
    c. a report to the Administrator, including:
        - an outline of the methods and any assumptions used in verification
        - findings
        - recommendations (if any)
        - any other documentation recording data analysis

    Where the Assessor has any concerns about the work required of them they should contact the Administrator.
10. The Administrator will review the Assessor's submission and may request further information from either the Developer or Assessor.

11. When satisfied the test results meet the NatHERS accuracy requirements, the Administrator will provide the Developer with a letter of offer for accreditation and the Terms and Conditions.
12. The Developer will need to agree and sign the Terms and Conditions.

    Note: Software accreditation will only be granted when Method 3 testing has been successfully completed and the software tool assessments meet the accuracy requirements.
13. Upon receipt of the Administrator's formal notification of reaccreditation and executed Terms and Conditions, the Developer will agree with the Administrator on communications of the changes and release the new version of the software tool including notifications to software tool users.

Software testing — Method 4

Method 4 testing applies when Developers need to implement minor changes and bug fixes.

The standard test subjects (subject to review) for Method 4 are dwellings 200, 500 and 610 tested in all NatHERS climate zones. The results will be compared to test results from the most recent software version.

Confirmation to proceed

1. The Developer will notify the Administrator of proposed bug fixes and minor changes.
2. The Developer and Administrator will determine if dwelling designs 200, 500 and/or 610 test include the features being changed. Alternative dwellings and/or testing procedures may be specified if dwelling designs 200, 500 and/or 610 do not test for the proposed change.

Conduct software testing and submit

3. The Developer will:
   a. Apply the results of the most recent version of their own software as a benchmark to compare against updated ratings. The spreadsheet will consist of the following:

Dwelling Number	Climate zone number	Suburb	Postcode	Star rating		
				Current version	Proposed version	Difference
000	00	abcd	0000	0.0	0.0	0.0
					Summary	
					≤± 0.2 star difference	*pass/fail*
					≤± 1 star difference	*pass/fail*

   b. Undertake testing of agreed dwelling designs in all NatHERS climate zones and record the star rating for each dwelling in each climate zone.
4. Submit to the Administrator on completion of testing:
   a. test results spreadsheet
   b. access to software version being tested
   c. project file(s)
   d. NatHERS software tool change Request for Bug Fixes and Minor Changes form (Appendix 5 of the Software Accreditation Protocol).

Assessment of results and feedback

5. The Administrator (or their agent) will review the submitted documentation. If necessary, the Administrator may request additional information, or independent testing, and nominate an assessor to undertake this work.
6. The Developer will address any requests from the Administrator.

7. Once all conditions have been met, the Administrator will submit documents to the Australian Building Codes Board for information.
8. The Administrator will advise the Developer in writing of the outcome.
9. Upon receipt of the Administrator's formal notification of approval of the changes, the Developer will release the new version of the software tool, including notifications to software tool users.

NatHERS testing dwelling designs

Each dwelling design has unique specifications to test particular building features. The specifications explore the impact of:

- insulation levels and types
- window types, including glass, frame type and size
- glazing to floor area ratio
- floor construction, ventilation and coverings
- roof construction and colour e.g. attic, hip roof, concrete or flat
- wall construction and colour, solar absorptance, including thermal mass
- internal walls adjacent to subfloors and roof spaces
- internal zoning including double height voids, apartment corridors and basements
- orientation
- terrain and exposure (impact of elevation)
- external shading from shade structures and neighbouring buildings
- infiltration e.g. windows, doors, exhaust fans
- ceiling penetrations
- other key construction techniques that may apply to particular NatHERS climate zones such as building styles in tropical and cyclone prone areas.

Refer to Table A for details on which features are tested in each dwelling.

Table A: Design features tested in dwelling designs

		Dwelling								
	Feature	**100** Single storey 4-bed	**110** Single storey 4-bed	**200** Split-level 5 bed	**300** Single storey 3-bed	**400** Elevated tropical 3-bed	**500** Double storey 4-bed	**610** Apartment above basement	**620** Apartment mid-level (5th floor)	**630** Apartment top floor (11th floor)
Air infiltration	Openness, standard	✓	✓		✓	✓	✓	✓	✓	✓
	Openness, ventilated			✓						
	Sealed exhaust fans	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Sealed exhaust fans with heat lamps	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Ceiling fans		✓		✓	✓				
	Recessed luminaires	✓	✓	✓			✓			
	Sealed windows	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Unsealed windows						✓			
	Sealed external doors	✓	✓	✓	✓	✓	✓	✓		
	Unsealed external doors	✓	✓	✓	✓		✓			
Ceiling fans	1200mm diameter		✓		✓	✓				
Doors external	Solid timber	✓	✓	✓	✓	✓	✓			
	Hollow core	✓	✓	✓		✓	✓			
	Steel	✓	✓	✓	✓		✓			
	Glazed				✓			✓		

	Feature	Dwelling								
		100 Single storey 4-bed	**110** Single storey 4-bed	**200** Split-level 5 bed	**300** Single storey 3-bed	**400** Elevated tropical 3-bed	**500** Double storey 4-bed	**610** Apartment above basement	**620** Apartment mid-level (5th floor)	**630** Apartment top floor (11th floor)
	Partially glazed					✓				
Eave	Eave projection includes gutter	✓	✓	✓		✓				
	Eave projection does not include gutter				✓		✓	✓	✓	✓
	Eaves included in roof space			✓						
Exposure	Suburban	✓	✓	✓	✓	✓	✓	✓		
	Open								✓	
	Exposed									✓
Floor coverings	Carpet and underlay	✓	✓	✓	✓		✓	✓	✓	✓
	Ceramic tiles	✓	✓	✓	✓		✓	✓	✓	✓
	Ceramic tiles with underlay			✓		✓	✓			
	Timber (12mm)	✓	✓	✓			✓			
	Timber (14mm)					✓				
	Concrete no coverings	✓	✓	✓	✓	✓	✓			
Orientation	All site bearings are taken from true North	✓	✓	✓	✓	✓	✓	✓	✓	✓
Vertical shading schemes	Adjacent neighbours						✓			
Window horizontal offsets	Horizontal offsets from parent wall detailed	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tubular skylights	Default, single glazed with shafts and ceiling diffusers	✓	✓	✓						
Roof window	Fixed						✓			
	Operable			✓						
Roof window type	Default						✓			
	AFRC			✓						
Window type	Generic	✓	✓	✓	✓	✓	✓	✓	✓	✓
Window operating type	Awning	✓		✓	✓		✓	✓	✓	✓
	Fixed	✓		✓	✓		✓	✓	✓	✓
	Sliding	✓	✓	✓	✓	✓	✓		✓	✓
	Double hung				✓					
	Casement				✓					
	Louvre					✓				
	16mm Western Red Cedar, Louvre					✓				
	Glazed hinged doors				✓			✓		
Floor type	FT1		✓	✓		✓				
	FT2	✓								
	FT3						✓			
	FT4									
	FT5			✓		✓				
	FT6						✓			
	FT7			✓						
	FT8					✓				

	Feature	Dwelling								
		100 Single storey 4-bed	**110** Single storey 4-bed	**200** Split-level 5 bed	**300** Single storey 3-bed	**400** Elevated tropical 3-bed	**500** Double storey 4-bed	**610** Apartment above basement	**620** Apartment mid-level (5th floor)	**630** Apartment top floor (11th floor)
	FT9							✓		
	FT10								✓	✓
	FT11							✓		
	FT12						✓			
	FT13			✓						
	FT14				✓					
Roof type	RT1			✓						
	RT2			✓						
	RT3	✓	✓							
	RT4	✓								
	RT5					✓				
	RT6				✓					
	RT7				✓					
	RT8						✓			
	RT9						✓			
	RT10						✓			
	RT11									✓
	RT12						✓			
	RT13						✓			
Soffit liner	SL1	✓	✓	✓			✓			
	SL2					✓				
Ceiling type	CT1	✓	✓	✓						
	CT2			✓						
	CT3				✓	✓				
	CT4						✓			
	CT5	✓	✓							
	CT6			✓						
	CT7							✓	✓	
	CT8							✓		
	CT9									
Wall external	WT1	✓		✓			✓			
	WT2	✓		✓			✓			
	WT4	✓			✓		✓			
	WT5		✓							
	WT6				✓					
	WT7				✓					
	WT8				✓					
	WT13					✓				
	WT14						✓			
	WT15			✓						
	WT17			✓						
	WT18			✓	✓					
	WT19					✓				
	WT20					✓				
	WT22							✓	✓	✓
	WT25				✓					
	WT27			✓						
	WT28			✓						
	WT30				✓					
	WT31				✓					
	WT33						✓			
	WT34							✓		
	WT36						✓			
Wall internal	WT3		✓							
	WT9	✓		✓			✓			

	Feature	Dwelling								
		100 Single storey 4-bed	**110** Single storey 4-bed	**200** Split-level 5 bed	**300** Single storey 3-bed	**400** Elevated tropical 3-bed	**500** Double storey 4-bed	**610** Apartment above basement	**620** Apartment mid-level (5th floor)	**630** Apartment top floor (11th floor)
	WT10	✓		✓	✓	✓	✓			
	WT11				✓					
	WT12	✓		✓	✓		✓			
	WT16			✓						
	WT21					✓				
	WT23							✓	✓	✓
	WT24							✓	✓	✓
	WT29			✓	✓					
	WT32				✓					
	WT35						✓			
Unique design features	Sub-floor			✓						
	Floors over open air					✓	✓			
	Ventilated wall cavity			✓						
	Double height void						✓			
	Internal walls adjacent roof space	✓		✓	✓		✓			
	Internal inter-tenancy walls							✓	✓	✓
	Internal walls adjacent to sub-floor			✓						
Zone area m²	Net conditioned	148.51	148.51	187.57	140.69	142.03	209.36	53.92	86.12	92.6
	Unconditioned	12.00	12.00	12.00	16.49	15.88	22.08	5.28	3.79	3.76
	Garage	32.07	32.07	32.07	19.55		34.08			
	Corridor							31.68		
	Basement							1043.74		
	Total	192.58	192.58	231.64	176.73	157.91	265.52	1134.61	89.91	96.36
Zone type	Living	1	1	2		1	2			
	Living/kitchen	1	1	1	1	1	1	1	1	1
	Daytime	3	3	3	3	3	6	2	2	1
	Bedroom	4	4	5	3	3	4	1	2	2
	Night time	2	2	4	1	2	3		2	2
	Unconditioned	2	2	2	3	3	3	1	1	1
	Garage	1	1	1	1		1			
	Roof Space	1	1	1	1	1	1			
	Sub-floor			1						
	Shared basement/ carpark							1		
	Corridor							1		
	Total	15	15	20	13	14	21	7	8	7

NatHERS climate zones

Table B: NatHERS climate zones

Climate zone name	Town name	NatHERS climate zone	Primary postcode	Longitude	Latitude
Darwin	Darwin	1	800	130.8	-12.5
Port Hedland	Port Hedland	2	6721	118.4	-20.7
Longreach	Longreach	3	4730	143.4	-23.8
Carnarvon	Carnarvon	4	6701	115.2	-24.7
Townsville	Townsville	5	4810	146.8	-19.2
Alice Springs	Alice Springs	6	870	133.9	-23.7
Rockhampton	Frenchville	7	4701	150.6	-23.4
Moree	Moree	8	2400	149.5	-29.5
Amberley	Caboolture	9	4510	153	-27.1
Brisbane	Brisbane	10	4000	153	-27.5
Coffs Harbour	Coffs Harbour	11	2450	152.7	-30.1
Geraldton	Geraldton	12	6530	114.9	-28.8
Perth	Breton Bay	13	6043	115.4	-31.1
Armidale	Armidale	14	2350	151.9	-30.5
Williamtown	Brimbin	15	2430	152.5	-31.9
Adelaide	Adelaide	16	5000	138.6	-34.9
Sydney (RO)	Sydney	17	2000	151.2	-33.9
Nowra	Nowra	18	2541	150.5	-35
Charleville	Charleville	19	4470	145.3	-26.6
Wagga	Wagga	20	2650	147.4	-35.1
Melbourne (RO)	Melbourne	21	3000	145	-37.8
East Sale	East Sale	22	3852	147.1	-38.1
Launceston (Ti Tree bend)	Launceston	23	7250	147.1	-41.4
Canberra	Canberra	24	2600	149.1	-35.3
Cabramurra	Mount Hotham	25	3741	147.1	-37
Hobart	Hobart	26	7000	147.3	-42.9
Mildura	Mildura	27	3500	142.4	-34.3
Richmond	Liverpool	28	2170	150.9	-33.9
Weipa	Weipa	29	4874	142.3	-12.5
Wyndham	Wyndham	30	6740	126.7	-15.2
Willis Island	Christmas Island	31	6798	105.6	-10.5
Cairns	Cairns	32	4870	145.8	-16.9
Broome	Broome	33	6725	122.2	-18
Learmonth	Learmonth	34	6707	114	-22.3
MacKay	MacKay	35	4740	149.1	-21.3
Gladstone	Gladstone	36	4680	151.1	-24.2
Halls Creek	Halls Creek	37	6770	127.3	-18.7
Tennant Creek	Tennant Creek	38	860	134.2	-19.6
Mt Isa	Mt Isa	39	4825	139.2	-21.6

Climate zone name	Town name	NatHERS climate zone	Primary postcode	Longitude	Latitude
Newman	Newman	40	6753	119.7	-23.2
Giles	Lake Darlot	41	6438	121.1	-28.9
Meekatharra	Meekatharra	42	6642	118.6	-25.6
Oodnadatta	Coober Pedy	43	5723	135.1	-28.5
Kalgoorlie	Beverley	44	6304	116.8	-32.2
Woomera	Woomera	45	5720	136.1	-30.5
Cobar	Cobar	46	2835	145.4	-31.6
Bickley	Bickley	47	6076	116.2	-32.1
Dubbo	Dubbo	48	2830	148.7	-32.2
Katanning	Lime Lake	49	6315	117.3	-33.3
Oakey	Cranley	50	4350	151.9	-27.6
Forrest	Forrest	51	6434	125.7	-30.8
Swanbourne	Swanbourne	52	6010	115.8	-32
Ceduna	Ceduna	53	5690	132.3	-31.9
Mandurah	Mandurah	54	6210	115.7	-32.6
Esperance	Esperance	55	6450	122.2	-33.4
Mascot	North Epping	56	2021	151.2	-33.9
Manjimup	Manjimup	57	6258	116.4	-34.3
Albany	Albany	58	6330	117.9	-34.9
Mt Lofty	Cleland	59	5152	138.7	-35
Tullamarine	Bell Post Hill	60	3215	144.3	-38.1
Mt Gambier	Mt Gambier	61	5290	140.8	-37.8
Moorabbin	Devon Meadows	62	3977	145.3	-38.1
Warrnambool	Warrnambool	63	3280	142.5	-38.4
Cape Otway	Cape Otway	64	3233	143.7	-38.7
Orange	Arkell	65	2795	149.5	-33.8
Ballarat	Ballarat	66	3350	143.9	-37.6
Low Head	Low Head	67	7253	146.8	-41.1
Launceston (Airport)	Launceston	68	7212	147.5	-41.6
Thredbo Village	Thredbo Village	69	2625	148.3	-36.5

Software accuracy requirements

New accreditation, reaccreditation and major updates (Methods 1, 2 and 3 testing)

Test results for each dwelling must meet the tolerance requirements as follows:

1. **Conditioned area of dwelling compared to benchmark tool**
   - **a.** New accreditation: floor area[g] difference of conditioned areas does not exceed ±3 %. Note this requirement will be reviewed in the 2022 SAP.
   - **b.** Reaccreditation: no threshold has been set and any reasonable deviation will be accepted. The NatHERS Administrator may determine the software as not meeting software accuracy requirements if the conditioned floor area compared to the benchmark tool is deemed excessive. Note this requirement will be reviewed in the 2022 SAP.

AND

2. **Required minimum energy load and star rating results compared to the benchmark tool**

Percentage of individual simulations	Heating load difference and cooling load difference		Star difference	
			New accreditation	Interim requirement for reaccreditation under SAP 2019 (to be reviewed in the 2022 SAP)
100%	≤ ±10 % or ≤ ±10 MJ/m^2 p.a.	—	—	—
≥ 95%	≤ ±5 % or ≤ ±5 MJ/m^2 p.a.	OR	≤ ±0.2 stars	≤ ±0.25 stars

AND

3. **Limited simulation bias**
   - **a.** Less than 75% of star rating differences shall be greater than the benchmark results.

Accuracy exemption application

A software tool provider may apply for an exemption from meeting a particular accuracy requirement if it is considered **minor** by the NatHERS Administrator. The steps for this process are outlined in NatHERS Software Testing Accuracy Exemption Application (Appendix 7).

Minor changes and bug fixes (Method 4 testing)

The level of impact on rating outcomes[h] results are provided in the table below:

Percentage of simulations	Star difference compared to the latest version of the software
100%	≤ ±1 star
99%	≤ ±0.2 stars

[g] The area of a space is measured to the structure i.e. structural framing

[h] Source: Memorandum of Understanding between the NatHERS Administrator and Australian Building Codes Board in relation to the NatHERS Software Tools

Appendix 3 Software accreditation expression of interest form

NatHERS
Software Tool Accreditation

Expression of Interest (EOI)

Satisfactory completion of this EOI is a pre-requisite for submission and consideration of a formal application for NatHERS Software Tool Accreditation. It provides an early opportunity for the NatHERS Administrator to work with the Software Tool Developer and assist with any issues that may arise throughout the software tool accreditation process.

All stages of accreditation must be prepared and lodged at the expense of the Software Tool Developer. If further information is required by the Administrator regarding the application, this must be provided at the Software Tool Developer's expense.

Applicant

Contact information

Software tool title

Summary of software tool

Maximum 500 words

Questions and issues

Details of matters to be resolved prior to commencing the accreditation process

Summary of proposed implementation timetable

Independent verifier's details (if available)

Details of independent, experienced NatHERS thermal performance assessor(s) engaged to undertake software testing

Supporting documentation

Detail any supporting documentation, including a list of any attachments.

Signed	☐ I understand that the proposed software tool must meet minimum NatHERS software tool requirements to achieve accreditation ☐ I agree in-principle to the standard Terms and Conditions of Accreditation ……. *Signature* *Date* ……. *Name and title*

Please return the form and any attachments to the NatHERS Administrator via admin@nathers.gov.au.

Appendix 4 Software accreditation, reaccreditation & update application form

NatHERS

Software Testing – Submission / checklist

This is a generic checklist and coversheet the Software Tool Developer may wish to refer to as part of the Accreditation Application process, after completing testing as outlined in the Software Accreditation Protocol, Appendix 2.

Applicant

Contact information

Software title & version

Item	Method 1	Method 2	Method 3	Method 4
	Expression of Interest form			
Independent assessor for approval	n.a.	☐ Independent assessor's details including AAO accreditation details ☐ Independent assessor's conflict of interest declaration form	☐ Independent assessor's AAO details including accreditation details ☐ Independent assessor's conflict of interest declaration form	n.a.
Software	n.a.	Beta version	Beta version	If requested
Dwelling/rating files	n.a.	☐ Dwelling 100 ☐ Dwelling 200 ☐ Dwelling 300 ☐ Dwelling 400 ☐ Dwelling 500 ☐ Dwelling 610 ☐ Dwelling 620 ☐ Dwelling 630	☐ Dwelling 200 ☐ Dwelling 500 ☐ Dwelling 610	If requested by NA.
Benchmark test result spreadsheet	☐ Dwelling 110	☐ Dwelling 100 ☐ Dwelling 200 ☐ Dwelling 300 ☐ Dwelling 400 ☐ Dwelling 500 ☐ Dwelling 610 ☐ Dwelling 620 ☐ Dwelling 630	☐ Dwelling 200 ☐ Dwelling 500 ☐ Dwelling 610	☐ Dwelling 200 ☐ Dwelling 500 ☐ Dwelling 610
NatHERS Certificate by accredited assessor produced by Developer	n.a.	☐ Dwelling 100 ☐ Dwelling 200 ☐ Dwelling 300 ☐ Dwelling 400	☐ Dwelling 200 ☐ Dwelling 500 ☐ Dwelling 610	n.a.

		☐ Dwelling 500 ☐ Dwelling 610 ☐ Dwelling 620 ☐ Dwelling 630 ☐ Class 2 summary certificate for dwellings 610, 620 and 630		
NatHERS Certificate by **non**-accredited assessor produced by Developer	n.a.	☐ Dwelling (any of 100 to 500) ☐ Class 2 summary certificate for dwellings 610, 620 and 630	☐ Dwelling 200 ☐ Dwelling 500 ☐ Dwelling 610	n.a.
User guide/manual	n.a.	☐	☐	n.a.

Appendix 5 Request for bug fixes and minor changes form

NatHERS
Software tool change request
for bug fixes and minor changes

This form should only be used for bug fixes or minor changes that are minor or machinery in nature. If multiple changes are being proposed, each specific change must be clearly detailed, including the impact of each change and the cumulative impact of all the changes. Please return the form to the NatHERS Administrator via admin@nathers.gov.au.

Proposal title			
Software version number *State proposed version number – see Software Accreditation Protocol for requirements.*	Current: Proposed:		
Contact information			
Date of submission			
Proposal type	*Bug fix*/es ☐	*Minor change/s* ☐	*Combination* ☐
Reason for change *Detail the nature and extent of the problem/s that is/are to be addressed by the change. Provide information about who is affected and in what way. Provide evidence of the problem and describe the risks of not making the change. Attach correspondence if necessary.*			
Impact of change *Explain whether the change is a bug fix or minor change and the impacts of the proposed change (note the definitions of bug fixes and minor changes). If it is a minor change, outline the testing process undertaken to demonstrate the impact.*			
Proposed implementation *Explain how the change is to be implemented, and the*			

proposed timeline. Include details about any dependencies.	
Training resources *Will training resources need updating? Please attach (as outlined in the Software Protocol).*	
Communications *Detail how users will be informed. Any public communications referring to NatHERS will need to be cleared by the NatHERS Administrator. Please submit these.*	
Supporting documentation *Detail any supporting documentation, including a list of any attachments.*	
Relationship to legislation *Detail any related legislation. Will state and territory building administrations be affected by these changes? If you don't know leave blank.*	
Recommendation	

Appendix 6 Terms and Conditions

in prep

Appendix 7 NatHERS Software testing accuracy exemption application process

Overview

The processes for accrediting/reaccrediting software tools under the Nationwide House Energy Rating Scheme (NatHERS) are outlined in the NatHERS Software Accreditation Protocol (SAP) and underpinned by benchmark documentation, including dwelling designs, AccuRate benchmark software project files and software test result spreadsheets.

This document outlines the process for software tool developers to apply for an exemption from meeting a particular accuracy requirement/s in the NatHERS SAP. The intention of this process is to avoid software accreditation hold-ups due to minor divergences from accuracy requirements and to provide rigour and transparency to decision-making.

Departures from the NatHERS SAP accuracy requirements may stem from benchmark document faults, intractable issues such as how to model double height void zones, or valid software tool specific modelling. It is expected that tool developers will raise issues as they occur and the NatHERS Administrator (NA) will assess/address these as quickly as possible and on a case-by-case basis. Also, the NA may, if complex, engage a third party to provide advice. Issues raised concerning benchmark documentation will be shared with all software tool providers.

In summary, the exemption application process:

1. allows tool providers to notify the NA of potential faults in the benchmark documentation in a consistent and transparent manner
2. enables tool providers to apply for an exemption from the accuracy requirements if minor and justifiable
3. facilitates the overall software accreditation process by smoothing over minor hurdles
4. enables the NA to develop scope of works for amendment to future benchmark document versions.

Proposed steps

The steps for reporting benchmark document errors or applying for an exemption from specific accuracy requirements are shown below.

Step	Party	Activity
1	Developer	Raise the issue with the NA. This will allow the NA to determine if a comparable issue has already been raised, is being/has been processed and what supporting documentation should be provided
2	NA	Advise if Exemption Application needs to be provided by the Developer
3	Developer	Complete Exemption Application form and provide supporting documentation

Step	Party	Activity
4	NA	Review the submission guided by due diligence checklist. The NA will: • Determine if further information is required • Review proposed options and, if applicable, identify additional/alternative options • Consult on, and analyse impacts of option (e.g. relevant stakeholders, effectiveness, interim vs longer term solutions, timeframes, costs) and undertake risk assessment
5	NA	If required, consult with third party technical expert
6	NA	Make recommendation/provide solution and share this with all developers.
7	NA	Implement

NatHERS Software Accreditation Protocol
Software testing accuracy exemption application

This form is used to apply for exemptions from accuracy requirements under the NatHERS Software Accreditation Protocol. If there are multiple issues, each specific one needs to be clearly detailed, particularly the impact of each issue and the cumulative impact of the issues.

Software tool developer	
Software title + version	
Contact information *Name, phone, email*	
Date of submission	
Title of issue *A unique title to identify the issue*	
Benchmark versions	
AccuRate version	
AccuBatch version	
Test results spreadsheet version	
Chenath version	
Description of issue	
Building feature(s)	
Dwelling design(s) affected	
Climate zone(s)	
Other	
Degree of variation from the benchmark	
Evidence	
Cause of issue *(if known)* *e.g. software tool capabilities; benchmark tool AccuRate or AccuBatch; dwelling design interpretation; test result spreadsheets; other*	
Impact – type and scale *Who, what, when and to what extent*	
Suggested treatment *Briefly identify feasible options to address the issue including option limitations or constraints*	
Supporting documentation *Detail any supporting documentation, including a list of any attachments; software*	

NatHERS Administrator due diligence checklist

Category	
Check SAP issues tracking document(s)	
• Has issue already been reported and dealt with?	
• If not, add issue to tracking document(s)	
Is independent testing required?	
• In-house?	
• Third party?	
Cause of issue	
• Software tool capabilities	
• Benchmark tool AccuRate or AccuBatch	
• Dwelling design interpretation	
• Other	
Impact of issue(s)	
• Who?	
• When?	
• What?	
• To what extent?	
Risks of impacts and solutions	
Options	
• Identify alternative/additional options to address the issue	
• Brief description of costs and benefits compared to SAP compliance	
• What are the consequences of **not** taking any action?	
• Identify any options which are limited or constrained (e.g. due to other regulation).	
• Justification for proceeding with the recommended option and rejecting other options.	
• Relationship to regulation or NatHERS rules	
Is a particular jurisdiction impacted?	
Is a particular regulatory requirement or Australian Standard impacted?	
• Effectiveness of addressing the problem and objectives	
• Will the problem self-correct within a reasonable timeframe?	
Communications	
• Who will be informed	
• What will be communicated?	
• How will it be communicated	
Recommendation	
• Provide a summary, recommendation and rationale for exemption or non-exemption	
• Will any condition need to be documented in the Terms & Conditions	