

# 2021 ASSESSMENT REPORT

## HDS315118 - Housing and Design

### Examination Assessment Report

Throughout the assessment process, Markers were looking for evidence of understanding on how each of the key criterion elements were applied in the context of each question and how well the aims and brief of the question were satisfied.

### Section A

#### Question 1: Cool Climate— Student Outcomes.

The scenario for this question was based around an existing shack, the Cloudy Bay House on South Bruny Island, designed by Australian architect Richard Leplastrier with David Travalia. The client wished to build a similar house like this on a west facing ocean view property on Kangaroo Island (South Australia). An emphasis within the question dialogue is on the clever design as it is simple, small in layout and, importantly, shields the occupant from the wind. The views can be enjoyed or closed with sliding fibre cement panels over windows and other openings to provide a secure outdoor/indoor space. More importantly the panels can be opened and closed according to the wind direction. She also enjoyed the experience of living in a house where the living and sleeping was separated from the bathroom and workplace/studio. She liked being in touch with seasonal changes and fresh air. The existing house is timber framed with fibre cement and timber boards.

The students were asked to provide advice to improve the passive design advice for it to be used on a more permanent basis at Kangaroo Island, which is a similar latitude to Bendigo with appropriate sun angles provided within the Information Sheet.

The key aim was to provide design advice on how to inhabit the site provided with the design needs as above.

As part of their response, students were to undertake the following:

1. Draw an outline of the external house plan on the site to show the best orientation for the location, justifying the orientation strategy with concise annotations.
2. Draw and annotate the method they proposed to generate and store power, as well as the means to collect and store water.
3. With the orientation established, draw over the faint drawings, to show what changes they recommend making to the house design and the possible material/construction to ensure thermal comfort. They could also change windows and doors where appropriate and explaining with concise annotations.

## Key Considerations

The Markers were looking for the following considerations within the responses:

- appropriate orientation to capture the sun
- opportunities to capture the Western views
- use of thermal mass within the interior living space
- alternative building materials for main living area, such as use of reverse brick construction or SIPs
- Use of double glazing in all windows with direct access to the internal living space, operative to allow for ventilation
- summer shading for the courtyard – use of deciduous trees, sails, etc.
- appropriate placement of water tank for harvesting rainwater
- appropriate placement of solar voltaic cells and battery storage or wind power
- use of eaves and evidence of understanding of sun angles and their interaction with the eaves and eaves length
- use of insulation under floor, walls and ceiling using appropriate ratings
- consideration of window placements, increasing Northern glazing, reducing Southern glazing
- control of cross ventilation in Courtyard, and
- consideration of alteration of floor design, but within footprint and in keeping with original design.

180 students attempted this question, making it preferred option in Section A. Question 2 had 53 students attempt it, despite it using the same design.

Many students had difficulty in addressing this question to a satisfactory standard. Weaker responses did not complete the site plan showing the orientation of the building or any informative annotation. Changes were limited on the existing “faint outline” with many students not visualising them or presenting minimal considerations as listed above.

Many students found it difficult to translate the intent, layout/orientation, and function of the original design to the context of the Kangaroo Island site in the time available. Additionally, many students found it challenging to interpret the roof shapes and eave overhangs particularly from the existing kitchen and around the courtyard.

Many students' indicative sectional views did not indicate where they were 'sliced' on the floor plan. This made it difficult to reconcile the plan and raised issues with the interpretation of the proposed roof designs.

Satisfactory responses were mixed with some students not using the existing site plan to show orientation of the home. Many site plans were not completed to scale, thus not providing an accurate representation on how the dwelling would fit on the site. Some responses discussed these considerations but did not apply them visually in context with the existing building. Other

responses regarded it important to offer high thermal mass and insulation within the Courtyard, which was not necessary. Many included generic passive design attributes without individualising them to the design task.

More successful responses applied several changes to the drawing provided and addressed most of the considerations above, but some of these responses fell short of achieving an “A” standard due to a combination of a lack of visuals displaying positioning of solar voltaic cells, sun angles, clear indication of window placement and other validation of their design amendments.

The most successful responses apply all or most of the considerations above, but also experiment with the layout to make the home more suitable for a permanent residence, while keeping a connection to the original genre of the existing design, particularly the use of an internal courtyard. Annotations also need to be of a high standard.

## Question 2: Tropical Climate – Student Outcomes

The quality of responses to this question varied considerably. The focus of this question required students to:

1. Orientate the design on a site.
2. Include active solar and water collection and storage.
3. Annotate the existing plan and make recommendations for changes to the existing Bruny Island house that was to be relocated in the tropical region of Townsville (Zone 1).

The question required a mixture of the use of scale (measured) drawings and unscaled sketches.

Students were required to suggest suitable design features for a hot humid climate and identify changes required and explain what existing design elements were unsuitable.

Highly successful responses were those where students were clearly able to articulate the changes they would make and explain why these were needed. These students selected and justified key elements of passive design for tropical regions including:

- orientation and recognition of the sun paths – east/west loading to avoid direct sun access
- roof form (shape, size, and orientation)
- elevation of the building (breeze underneath, raised into the breeze, access views)
- building materials (low thermal mass and light in colour)
- construction methods (lightweight timber vs brick/concrete)
- insulation (foil, R and U values)
- ventilation (cross and convective, clear breeze ways, active fans, roof venting/extraction)
- glazing (louvers/bifold and window placement and size) double glazing NOT required
- shading (use of awnings/eaves, angles, and placement)

- planting (vegetation and landscaping for shading and funnelling cooling breezes, size type and placement)
- sectional and elevational sketches (to support annotations)
- diagrammatic representation of concepts
- energy collection and storage (solar panels do not store electricity or heat)
- water collection and storage
- scale drawings on site plan
- north arrow on the proposed altered floor plan
- alteration of the original floor plan to suit the site to satisfy the users' needs (e.g., view/zone/breeze/sun, but retaining courtyard feature), and
- additional features (water features, verandas/decks, parking, sail cloths, pergolas).

In the less successful responses, students typically mentioned some of these points but provided few justifications in the annotations to explain some of the stated theoretical aspects of their answers (the why as to the what). It was observed, that in many instances, students appeared to repeat a formulaic response with little regard to the actual individual design. There were also limited illustrations or adjustments on the existing floorplan to support the annotation provided.

Many students included generic passive design attributes without individualising them to the design task.

Some students were not able to successfully translate the intent, layout/orientation and function of the original design and site to a tropical context in the time available and others found it challenging to interpret the roof shapes and eave overhangs.

Many students were not able to explain the active solar system aspect of the question (many thought solar panels collected and stored electricity) which indicates more emphasis on passive solar during learning/teaching opportunities is required.

Many students' indicative sectional views did not show where they were 'sliced' on the floor plan. This made it difficult to reconcile with the plan and raised issues with the interpretation of the proposed roof designs.

Another weakness was the failure to include an indication of North on the sketched floor plan. This made it difficult to interpret some students' design intent and rationale.

Weaker responses typically included passive solar features, attributes, considerations, and orientations that would be generically applied to cool temperate zones, such as double-glazed windows for the courtyard (despite being open to the elements on both sides) or double-glazed louvers as well as concerns over solar loads from a northern aspect (rather than eastern and western concerns).

## Section B.

### Question 3: Functional Use of Space - Student Outcomes

Responses to this question ranged from strong to very weak.

This question required students to make use of two adjoining farm sheds constructed using different materials and with differing wall heights into a comfortable, functional two person home suitable for a couple. The question focused on the correct use of scale and measured drawings, using an existing footprint to accommodate a list of internal spaces, fixtures, fittings, and furniture. Students were also required to incorporate natural light and air through the space and address privacy. A further requirement of the question was to provide additional sketches to help demonstrate how the internal arrangements would work.

The list of requirements included:

- a kitchen
- dining space with seating for six
- an area to lounge with their friends or family with seating for six
- a queen-sized bed
- a washing machine and laundry sink
- a walk-in shower, toilet and vanity basin, and
- storage.

Highly successful responses articulated design thinking using clear annotation and accurate drawings. They illustrated the relationship between public and private zones and flow of movement through the spaces using succinct and clear presentation methods. These responses included selecting and justifying key elements of functional design including:

- open plan public areas - kitchen- living- dining,
- wet zones for the laundry and bathroom,
- enclosed private bedrooms (some with connections and inclusion of an ensuite bathroom)
- appropriate location and number of storage options throughout the home, and
- appropriate placement of openings - windows/doors that promote good circulation, air movement and light entry.

Very good responses also addressed additional features such as good kitchen layout that included a work triangle, innovative methods of gaining access to additional light such as light tubes, skylights or clerestory windows (drawn roughly in section or elevation) and glass panel doors.

Another element of stronger responses included sketches that proposed alternate internal arrangements using bubble diagrams. It was pleasing to see several students using a key to help label and annotate and coloured markers or pencils to highlight circulation, zoning and other features and elements of the design response.

Satisfactory responses identified some key requirements without fully justifying them. Many also did not include additional drawings or illustrations to support their ideas or use sufficient annotations to justify their design choices. Some students produced a questionable layout or arrangement of spaces that did not flow well or created large areas of 'dead space'.

The overall area of 75m<sup>2</sup> was more than sufficient to create generous usable spaces and may have allowed for the inclusion of additional storage across multiple areas of the home and possibly a second or ensuite bathroom.

The weaker responses were those where students did not fulfil the requirements of the brief and did not including all required furnishings, or if they were included, they were not drawn to the correct scale.

Weaker responses also unnecessarily included passive solar or universal design elements. Some did not include the additional window that was expected to be shown to help admit extra light. In some cases, overall external parameters were incorrect. A few students used the wrong scale of 1:100 instead of 1:50.

Highly successful responses were presented using clear headings, sketches and illustrations to clarify aspects of their design with concise annotations that clearly addressed the required functional elements for this context.

#### **Question 4: Accessible Design – Student Outcomes**

This question was attempted by 59 students. This wheelchair accessible design question enabled most students to provide a satisfactory response or better. Most students applied the critical dimensions of the kitchen from the information supplied on the information sheet, although some did so without consideration of how a kitchen needs to function. Almost all students used scale well, drawing at the requested 1:50 scale, although some students omitted or relocated windows or doors without justification.

The wording of the question left some ambiguity about the need for a stove and an induction cooktop. Some students interpreted this as an oven and a cook top, while others included a full stove plus an induction cooktop. A minority of students read this as a duplication and only included the induction cooktop.

Plan drawings were generally clear and easy to read. Many lacked detailed annotations that provided more information than the drawing already offered. Annotations should go beyond the drawing to justify why students have made design decisions.

Most students didn't provide enough bench space. Some students assumed that the space under the window couldn't be used as kitchen bench space and tried to squash many fixtures and appliances in a small space, often at the expense of storage or useable bench space.

Stronger responses included some, or all, of the following:

- alternative table dimensions to the 1000mm x 1800mm table listed in the information sheet. These included the use of bench seats or a round table to create more circulation space through the room

- child safe features like rounded edges on bench tops
- lighting such as task and general lighting and ventilation including rangehoods
- Designed with knowledge of a wheelchair user's range of reach from low storage areas to overhead cupboards. Ensuring that all storage and appliances were in the range of 300 mm – 1300mm
- annotations which justified all design decisions against the needs of the wheelchair user and his children
- toe clearance at the bottom of the cupboards and appliances of 150mm deep x 230mm high.
- sections or joinery elevations to further explain the layout of the kitchen
- storage, cooking and preparation zones within the kitchen to create a functional working triangle of less than 8m.

Weaker responses:

- prioritised a bench facing the children for direct supervision of homework over space for a functional kitchen and use of a wheelchair, including room for a turning circle,
- had a lack of storage and integrated amenities like rubbish bins and microwaves. The microwave was often placed in awkward locations as an afterthought,
- didn't consider the reach and usability of amenities of a sink or stove if a user wasn't able to wheel underneath.

## External Folio Assessment Report

### Introduction

It is important that students who are new to this course read through the following information as it provides valuable insight on what needs to be done and what to avoid, to achieve successful outcomes for their major folio. Folios submitted in 2021 varied in quality, and although referencing protocols had improved, for a small minority of students referencing standards were still not meeting the desired protocols. This aspect has been identified in previous years' assessment reports which are available on the TASC website. These should be viewed by all students to ensure they adhere to the folio guidelines closely.

The 2020 report provided advice and suggestions to assist students to complete a successful folio but unfortunately there were still low-quality folios submitted in 2021. Summary statements have been made, regarding content sections observed by the Marking Team below.

## Criterion 6. Locate and analyse information about user needs and influences in design projects.

### *Client's Needs Analysis*

Successful folios contained an in-depth discussion of the client's (user's) needs and provided a strong rationale and analysis. Students should draw their aims from this, and the Brief, as these reflect the context of the user's needs. An exemplar was provided within the 2019 report, indicating how this important phase could be structured. There was evidence in some folios that students or their teachers had read the report and utilised this structure to good measure, but this was not consistent. Weaker folios used dot points of recognised needs without providing justification.

As recommended in previous years, the textbook, "Nelson Visual Communication Design" from Cengage Learning by Kristen Guthrie, gives excellent guidelines for writing brief and aims, context etc and could be a helpful class reference book.

### *The Brief*

In more successful folios, the brief was a concise statement. Some students tended to draw their brief statements out – often a paragraph in length, and this should be avoided.

This year, there was a definite reduction in students using café design, sporting or large-scale commercial facilities as the basis for their folio work. Stronger folios generally focussed on multiple room domestic developments or refurbishments that required sophisticated design thinking and problem-solving.

Students who focussed on off the grid dwellings did make improvements on previous years, where storage of electricity was also considered along with the use of greywater and compostable sewage systems.

The Marking Team still strongly recommends that students should choose a location/site that is accessible to them to visit and observe, whether be a green field site or the interior of a building for their folio. This gives them an opportunity to practice their acquired site analysis or spatial analysis skills, utilising the conditions of the site to help inform their design. Students who choose locations off the net for their brief will most likely not be familiar with the site, although the climatic conditions can be researched.

### *The Aims*

Stronger folios listed at least 4 – 6 aims that were tangible, practical, and had a good degree of sophistication, for example:

- A minimal and contemporary building design which remains aesthetically cohesive with the natural environment.
- Create a building envelop that incorporates passive design elements to retain a comfortable interior climate year-round.

The weaker folios listed items such as a bed or bathroom for a dwelling which are obvious without doing some higher-level thinking to devise strong aims. Some aims were too vague e.g., 'design for upward of 4 people'. This is not specific enough to determine whether the final design fulfilled the aim. Again, please refer to "Nelson Visual Communication Design".

Basic aims examples:

- Two Vehicle Garage with space for a ride on Lawn Mower
- Have a Jacuzzi or Bath that has access to the views

### *Project Context*

It is important that all teachers and students read the guidelines; where this occurs, the expectations of the Project Context were followed more closely. However, the older "Site Context" formula still featured in some folios and this may reflect the TASC folio guidelines. This will be addressed in early 2022. As "Project Context" expectation is still evolving, markers were lenient in marking this section. An exemplar was provided in the 2019 report, and another will be provided this year.

Stronger folios included a project context statement that discussed the significance of the project, i.e., the need for support housing for people in need. Those working to the old formula made their context relevant to the client, the stage of life or demographic state, their needs, or interests and why the development was sited there, and what things within the area were of relevance.

Weaker folios either used many maps of different resolutions and scale to explain an area without including support statements or explained something about the site but did not include any on-ground visuals.

### *Site Analysis*

Strong site analysis should include a high degree of detail, complemented with a hand-drawn scaled site map (highly recommended by markers) as part of this section. Some students also included cross-sections or topographic details. Other inclusions were shadow analysis, vegetation types & their significance, access, seasonal prevailing winds, sun arcs and orientation details, shadow impacts, rainfall data and impacts, potential impacts on neighbours or from existing neighbours, existing architectural influences, soil analysis and views. Students who had visited the site and taken photos showed greater understanding and were able to communicate and showcase the features of the site in their folios. Relevant information such as seasonal wind, solstice sun angles & arcs and rainfall was also referenced clearly.

Strong interior spatial analysis included a scaled plan of the existing dwelling or area being redeveloped and adjoining areas being impacted along with photos taken by the student explaining the current use or issue and where the proposed change will be undertaken.

Unfortunately, few folios displayed these quality elements.

Weaker folios did not include many of the elements above and often relied on cut and paste diagrams from Google Maps, Sun Calc. and Willy Weather, with little explanation of their

relevance. Some students completing an interior spatial analysis failed to show the relationship between the room(s) being renovated or extended and the rest of the house.

### *Precedent Research*

This work varied in quality. Higher level folios were well researched and included precedents that were relevant to their brief. Some would purposely direct the reader's attention to the aims being addressed. Stronger Folios included an in-depth discussion, stating the relevance, of how the idea could be utilised including what changes may need to be made. Also, folios that offered multiple possibilities that could be used to fulfil an aim may also have scored well. Stronger folios categorised their precedents and related them to key aims, i.e., architectural styles, interior solutions and so on. The strongest folios used case studies precedents, analysing and evaluating features that were relevant to their aims and brief and evaluating what adjustments may need to be made. These folios displayed a high degree of understanding of the relevance of the precedent to the aim and brief.

Weaker folios contained examples that may have had relevance to the brief or aims but did not include sufficient justification or analysis. Some students created a "product catalogue" with these precedents having negligible impact on design decisions. The Marking panel strongly recommend that future students look to research and gather multiple design precedents that lens themselves to a case study being carried out.

### *Referencing*

Consistency in referencing protocols remains an issue. In some folios, images were not referenced, either with a numeral figure or footnote under the image, but they were listed in the bibliography. A reminder that this would have drawn a marking penalty. Bibliographies were well constructed this year - closely conforming to the Harvard referencing system. This may reflect students using citation software, that is now readily available online.

It was pleasing that no academic integrity issues were reported, but the Marking panel still recommends that teachers read through final drafts prior to submission to TRACS and consider submitting versions to Turnitin for checking prior to uploading too.

There is an increase in the number of students using software to produce final drawings and some concept work. Improvements were observed here as many students did reference this software and the "blocks" they used; only a minority did not.

It is also highly recommended that students utilise plagiarising check software such as Turnitin themselves to help address any plagiarism issues that they may have missed. All students should make themselves familiar with the TASC **Authenticity and Academic Integrity: A Guide** document to mitigate poor referencing and adhere to appropriate protocols.

## **Criterion 7. Use and Document the Design Process**

Statistics show that many students experience difficulty achieving highly on this criterion.

### *Design Development*

Successful folios showed clear design development using accurate drawings that comply with architectural conventions, including appropriate scale bars or dimensions. In-depth discussion outlining and justifying the changes being made and considerations for the next iteration were also evident. The plan drawings were often supplemented with elevation or section drawings with relevant annotation.

A good number of students included “visual brainstorming” sketches that were annotated clearly and supported by dialogue explaining their design thinking – these were well regarded by the Markers. Some students did provide bubble diagrams but did not support them with any written communication explaining their design thinking. It is important that students do not rely on this genre of visual work alone but use it to help inform their scaled concept drawings.

Stronger folios also regularly reflected on the aims or listed the aims that were being addressed in their annotations.

Weaker folios did not always include key furnishings in their concept work, thus not providing strong evidence that they had checked that room proportions were workable, and that circulation and flow had been considered.

Design development drawings need to be clearly presented and be large enough to be legible. Scale, scale bars, dimensioning and an indication of the north location are also a critical part of the design process. These elements were often absent. A reminder that these draw a significant marking penalty. There needs to be consistent use of scale throughout the formal concept stage and into the final drawings.

Several design concepts were basically the same from concept 1 through 3 with very little design progression and minimal discussion. In some cases, design analysis was superficial, providing an explanation of what was included but no justification and clarification of the design evolution.

Some designs had negative aspects highlighted in concept 1 but continued to include these in other concepts and in many cases also featured in the final design even though the feature had been identified as a negative. This was often closely linked to some students creating concepts with intentional “faults” in their design work that are “set to fail”, such as “there are no windows in the design, this will have to be addressed in the next design”.... or “a toilet could only be accessed externally”. This would often suggest that the student had undertaken “Reverse Design” – where they came up with one concept and then tried to de-construct it to form lesser iterations of it. This is not an appropriate design practice.

Overall, the presentation of work still needs greater consideration. Weaker projects had quite small drawings with minimal detail that were difficult to interpret clearly. Stronger projects included either hand drawn images that were accurately presented and contained appropriate supporting annotations. Some students did choose to use CAD in this phase too, and these were generally easy to visualise and assess. It is important that hand drawings are done with appropriate weighted pencils so that scanned copies are clearly legible. Digital annotations do allow for easier reading and more ordered discussion of design details. Even in stronger folios, students often had drawings scaled too small, making the text the main content on the page rather than the visual design work.

Some folios contained completely different design developments or different shape or forms not having any connection to the previous iteration, indicating the student was coming up with a fresh idea every-time, rather than developing their original concept further. It is suggested that students experiment with different forms as part of their preliminary brainstorming work, which can still be included within the folio, so long as it does not push the folio over 20 pages. It is quite appropriate to have a modified footprint, so long as there is a connection to the former iteration.

## **Criterion 8. Generate design solutions which respond positively to the brief and identified aims**

### *Design Resolution*

Strong folios clearly showed a resolution to their design problem. High scoring folios had well refined drawings, to scale (with scale evidence included i.e., a scale bar), dimensions and the direction of North. They provided in-depth narratives discussing the design features presented within each drawing whether it be the floor plans, elevations, section drawings and 3D drawings. These narratives also linked the design features with the brief and aims of the project.

Strong folios provided an evaluation that discussed and rationalised how each Aim was achieved. All aims originally listed should have been addressed in a comprehensive manner.

As in previous years, some students claimed that a “particular” aim was addressed within the evaluation but did not provide evidence of this occurring throughout their concept work or within their final section of realisation drawings and annotation. Students are reminded that they need to justify throughout their folio how they are addressing their aims as well as justifying them in their final evaluation.

In some weaker folios, a set of drawings as prescribed in the folio guidelines was provided but they were not well detailed and contained little or no discussion explaining the design features.

As indicated earlier, some students that listed simple, unsophisticated aims restricted their opportunity to attain high outcomes in their folio assessment.

Drawing quality and annotations of the final floor plan generally need further improvement to ensure conventions are met for Criterion 8, such as wall thickness and furniture inclusions, all drawn to Australian Standards, whether drawn by hand or produced by CAD.

The inclusion of storyboards and colour schemes are not relevant, unless one of the aims is associated with the element of design “colour” and a mood or feeling they are trying to achieve, nor are they required in the final design section of a folio. Some of this information can be provided within precedent research, but best to avoid catalogue style precedent work. Some folios showed lighting and power-point location plans. These are not relevant to Housing and Design folios, and are not required in a folio, except for universal or accessible design folios, with a particular reference to switch heights.

## General Advice for Future Students

### *Pencil Scans and spell check*

Please ensure hand drawn drawings are drawn with a sharp HB or HB pacer and scanned to 300 DPI and is clearly legible. Undertake a spell check too.

### *Folio Publishing*

Seek guidance and instruction from your teacher in using design elements and principles in the publishing of your folio. PowerPoint is a reasonable Publishing Software, but pages using design templates take up too much available space, so just use blank pages. Adobe In Design is another recommended publishing software. It is also important for students to adhere to the folio guidelines and stay within the 20 Page limit. A content page is not necessary. Avoid using white or light-coloured text on black backgrounds. The Marking panel strongly recommends keeping your publishing simple – use black text on white background. Also – many students used up valuable page space by only having one paragraph or one image/ drawing on one page. Use your page space effectively but avoid over-crowding and replicating written dialogue to fill the space.

### *The Use of Cad in Folios*

The inclusion of CAD has the potential to positively impact student's time management and development of architectural discourse and skills, as well as benefits such as greater efficiency, more precise drawings, and the ability to easily edit designs. Additionally, the use of CAD can resolve difficulties that often occur in the design of complex forms. Over the last few years, there has been an increase in the use of computer drafted drawings (CAD) within the Major Project Folios. This is a useful design tool that students are welcome to utilise if they desire, but students should not expect to receive a comprehensive tuition in the use of any CAD software as it is not part of the course syllabus, which is already rich in content. It is strongly recommended that students also take the time to develop their sketching and drafting skills to a good standard as such drawings are highly regarded in folio work and are also a requirement of end of year exams. As to whether students choose to use CAD or to draw by hand, these are just the tools and the crucial factors are scale, proportion, appropriate conventions along with appropriate annotations and narrations of the design. These should all be used to a good standard.

Students who have studied CAD can use this skill set to their advantage and would not be penalised. However, other students may be strong visually and artistically or possess natural drafting skills and they are certainly advantaged too.

However, the quality of student work, whether it be created using CAD or by hand is marked on its merits. As to whether students choose to use CAD or to draw by hand, (these are just the tools) the crucial factors are scale, proportion, appropriate conventions along with appropriate annotations and narrations of the design. These are all used to a high standard in successful folios.

It is important that students develop traditional drawing techniques. There is a connection between a student's ability to draw by hand and their ability to design. A sketch demonstrates a process of thinking, analysing, and evaluating, that often gets lost in CAD work. There is a need to develop foundational skills, and practice the design process, so complacency does not creep into the design development of creative thinkers. By including traditional methods in the design process, students can express their ideas creatively and authentically. **This is a critical skill for all students to possess to be successful in their end of year exam.**