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PURCHASE AND DEVELOPMENT OF
STANDS TO ALLEVIATE THE HOUSING
CRISES IN SOUTH AFRICA.

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BACKGROUND

The magnitude of the housing problem in South Africa as well as our neighbouring states is nothing new to any caring and well informed person, and the fact that there are billions of rands made available by the Government and private companies locally, as well as funding from overseas Governments and companies is no secret, however the secret is **WHAT IS BEING DONE TO ALLEVIATE THE PROBLEM IN THE SHORTEST POSSIBLE TIME.**

THE PLAN

The plan consists of a few basic problems being addressed at the same time, thus being :

The shortage of housing

The biggest problem prospective home owners face at present is the enormous cost of a decent house, and many young couples cannot fit the cost of a bond into their budget, therefore they purchase a house which is above their means and live below the bread line in the hope that bond rates will be reduced in the near future. When an increase in rates comes about these people lose their homes, with all the capital that has been paid to date, as well as time spent to beautify the home by gardening or whatever means. The biggest and most costly loss to the economy however is the loss of pride and belonging which these people have to face, the reason being that they have now lost everything that is important to them as well as facing the fact that they will probably never own a house again unless it is bought cash, in a third parties' name which is creditworthy or by some miracle the banks change their qualification for new bonds. In many cases these people are divorced because of the financial strain being placed upon them, their productiveness at work deteriorates and they ultimately become part of the many unemployed roaming the streets.

To combat this problem the idea is to create a people bank with all the relevant information such as income, preferred township, amount that can be afforded towards payment of a bond, etc., obtain as many serviced stands in different areas as close to amenities as possible, qualify the right person for a stand and **build a timber frame house according to S.A.B.S code 082 of 1988** to best suit his budget.

At this point I would like to point out that timber frame is a much cheaper way of building and a full comparison will be found under the heading "comparison of building costs and times" later in this document.

Unemployment

By building new houses at an accelerated pace the workforce required would have to be larger and on the site training would have to be given to unskilled personnel or personnel used to the conventional building methods (returning exiles could be utilised to a great extent for this purpose). Electricians and plumbers who are at present facing bankruptcy would be able to employ more people and therefore create more jobs. If the investment capital made available by the overseas investors is utilised foreign currency is poured into the country stimulating the economy, so in short the whole exercise will once again put money in the hand of the individual allowing more people to spread the wealth and build a better economy as well as address the housing problem in a relatively short period of time.

COMPARISON OF BUILDING COSTS AND TIMES

If one looks at the current cost of building a new dwelling which is approximately R650.00 per m² with very basic finishes and increasing with the quality of finishing improving one has to realise that once the builder adds on his overheads and profit you are approaching a selling price of approximately R1000.00 per m² for a reasonable house without taking the stand into consideration. Thus if we use the example of a 100 m² house, which is a reasonable size for a family of 4 or 5 it can be assumed that, based on the above, the head of this family would have to pay R100 000.00 for his house excluding the price of the stand. Let us now assume that his stand would cost R18000.00, the total cost of his house now constitutes a total commitment of R118 000.00 for a period of 25 years. To most families this is totally out of reach and they start losing hope for the future.

Let us now consider the option of timber frame housing. We use the same family and build the same house at a cost of approximately R650.00 per m² with reasonable finishing and builders overheads and profit included. Thus the cost of building has now drastically improved and ends up at an amount of R65 000.00. Include the stand and you can see that this same house can now be purchased at a total cost of R83 000.00 which can be afforded by a far greater section of the community.

If one now considers the fact that it takes half the time to erect a timber frame house it can be appreciated that instead of a team completing one house a month they can now complete two, and if one uses simple arithmetic it will be realised that double the amount of houses can be erected in the time we are taking to stick to conventional methods.

Let us assume that this project is given the nod and we proceed with the 216 stands that are currently available, employing 50 building teams we will be in a position to offer at least 100 families a home within the first month and the numbers will increase as the workforce becomes larger.

If one considers that in the U.S.A. 99% of the 1,2 million homes built annually are timber frame and in Australia, Japan, Canada, etc. over 90% of homes are timber frame it is about time that we realise **our way of building is making us a poor and homeless nation.**

AVAILABILITY OF STANDS

At present we have approximately 216 stands, which are serviced, available on the East Rand with the possibility of a further 1000 being serviced and made available soon. If one considers that these stands sold at a price of R21000.00 in 1987 (as documented in the deeds office) it would be appreciated that a selling price in 1992 of R18000.00 is a giveaway. Stands are available, in abundance, countrywide and we will negotiate the purchase of these with the relative owners, at the best possible price, in the near future. State owned land is now being made available and we will endeavour to obtain as much of this as possible.

I have to stress that the cost of installing services on vacant land is increasing all the time so we have to secure as much land now and have it serviced as soon as possible to achieve the lowest possible selling price to the prospective home-owner.

Alternatively stands could be sold to prospective clients and a pre-fabricated house could be erected by the new owner which, once again, reduces the cost by a substantial amount. This method, however, could result in structures failing due to clients trying to save money and not fixing all parts securely.

A further alternative is to sell the stands only to a prospective developer or organisation wishing to do a specific type of development thereon.

As can be seen the possibilities are unanimous and all specific offers made to the company will be considered, always keeping in mind what the goal of the project is.

SOME FACTS ABOUT TIMBER-FRAME

1. In most foreign countries up to 90% of houses are constructed by way of timber-frame.
2. Timber-frame homes are not the fire hazard people believe them to be, in fact research has proved that there is a much higher safety standard in timber-frame construction than in other construction methods.
3. Timber-framed homes are better able to withstand the rigours of earth-quakes, tremors or movement, cyclones, snowstorms or temperature extremes.
4. Modern technology ensures that the Timber-frame construction method is fire-restrictive as well as weather-resistant.
5. Most South African municipalities and the new National Building Regulations accept timber-frame as a high standard construction method.
6. It is often impossible to tell the difference between a conventional and timer-frame home without looking inside where the only 'tell tale' clue will be found, **the timber-frame home has a far superior finish.**
7. It takes an average of only 20% of the conventional home construction time to build a timber-frame house.
8. Rapid construction, cost effectiveness, design scope alteration versatility and space saving properties of this method underscore heavily the opportunity facing new homeowners in this country.

COST OF IMPLEMENTATION

The cost in implementing phase one of this scheme would be:

1. Purchase of 216 stands	R3 888 000.00
2. Building of 216 houses	R14 040 000.00
3. Total	R17 928 000.00

This amount is based on 216 houses of equal size (100 m²) being built. Should the sizes vary so would the cost of building.

To implement this concept it is envisaged that either an investor with sufficient funds available will be offered a percentage of the profits realised by the company, or a loan would have to be secured with a financial institution, or the monies set aside by the various Government bodies and other institutions would be employed.

Conclusion

The boundaries of this venture are unlimited and could be extended beyond the borders of South Africa to any neighbouring state or in fact to any African country on the continent.

All Governments have money set aside to assist the homeless, if this money is channelled into timber-frame housing we would not have to bear with the inconvenience of unsightly shacks being erected all over the countryside.

Creation of a multitude of job opportunities, by using this method, is now a reality and not a possibility.

More houses can be erected in a shorter period of time with the same amount of money currently available.

With a workforce of approximately 500 people the housing crises can be virtually eliminated within a period of 5 years.

To accelerate the pace of construction even more a factory could be set up and all plans selected could be pre-fabricated and transported to a site anywhere in the world for erection. In brief the export opportunities, with the value of our currency being what it is, are beyond comprehension if one considers the cost of labour and materials in other parts of the world.

All points considered, with some boldness and imagination, we can now build houses for the rich and the poor on any stand anywhere in the world no matter what the complexity of the plan.

If one should have part of the community that could not afford a house at the present moment assistance could be given till such time as the person would qualify to purchase the home, by means of letting the property to the prospective home owner at an agreed upon rate with the option to purchase and when this person is at a level where he could afford to purchase the property the necessary bonds etc. could be applied for.

An Affordable home that would fit comfortably into the budget of the prospective home-owner could be erected and extended once he has a salary increase, or his financial position improves. As can be seen the options of how to help the people can be adjusted to suit the needs of each individual, as and when the need arises.

We are living in a time of change in South Africa and the time of beaurocratic red tape is over Let us **help** our people to live more for less and at the same time build a brighter future for the generations to come.



be achieved escalating in time in comparison with a conventionally constructed home. These savings allow the addition of an extra room, or better quality finishes, a pool or sauna — luxuries made affordable through timber-frame construction.

The demands of the future will increasingly enhance the attraction of timber-framed homes. Quite simply, it is a question of higher standards, and maintaining a better way of life at a more realistic cost.

A MORE VERSATILE, INTERESTING HOME

From the conventional design, right through to the architect-inspired masterpiece, the timber-

frame system offers incredible versatility. Not only are features possible which would cost a fortune if done conventionally, but design flexibility, impossible in a conventional home, can be applied.

Consider, for example, 'pocket sliding doors,' easily incorporated in the 'natural' space within the wall of a timber-framed house. Or the use of vertically angled walls, and ceilings, as well as acute corner angles. Mezzanine and varying floor levels are much more easily, and economically, achieved.

In addition, a much tidier structure is ultimately possible, with all the service pipes concealed in the walls. It is also much easier to 're-arrange' the interiors than it is with conventional homes, because

construction methods.

- Timber-framed homes do not detract in appearance or value when compared to conventional homes. From the exterior, it is often impossible to tell the two kinds of homes apart. The only 'tell-tale' clue is on the inside, where the timber-frame home is far better finished!



WHY IS TIMBER-FRAME CONSTRUCTION SO POPULAR?

Besides the escalating costs faced by potential home-owners when considering a conventionally constructed home, factors such as a shortage of skilled labour, declining standards of workmanship, high maintenance costs and expansive soil conditions cannot be ignored. In this booklet, we outline some of the other important issues which have made timber-frame construction the most popular home-building method in the world today.

Rapid construction, cost-effectiveness, design scope, alteration-versatility and the space-saving

properties of this method underscore heavily the opportunity facing new homeowners in this country.

COUNTING THE COST ADVANTAGE

In real terms, timber-framed homes cost less to build. However, this is not achieved by applying materials in the construction which may be perceived as 'inferior'. The completed structure is competitively priced and substantial savings in other areas make timber-frame construction an exceptionally cost-effective method.

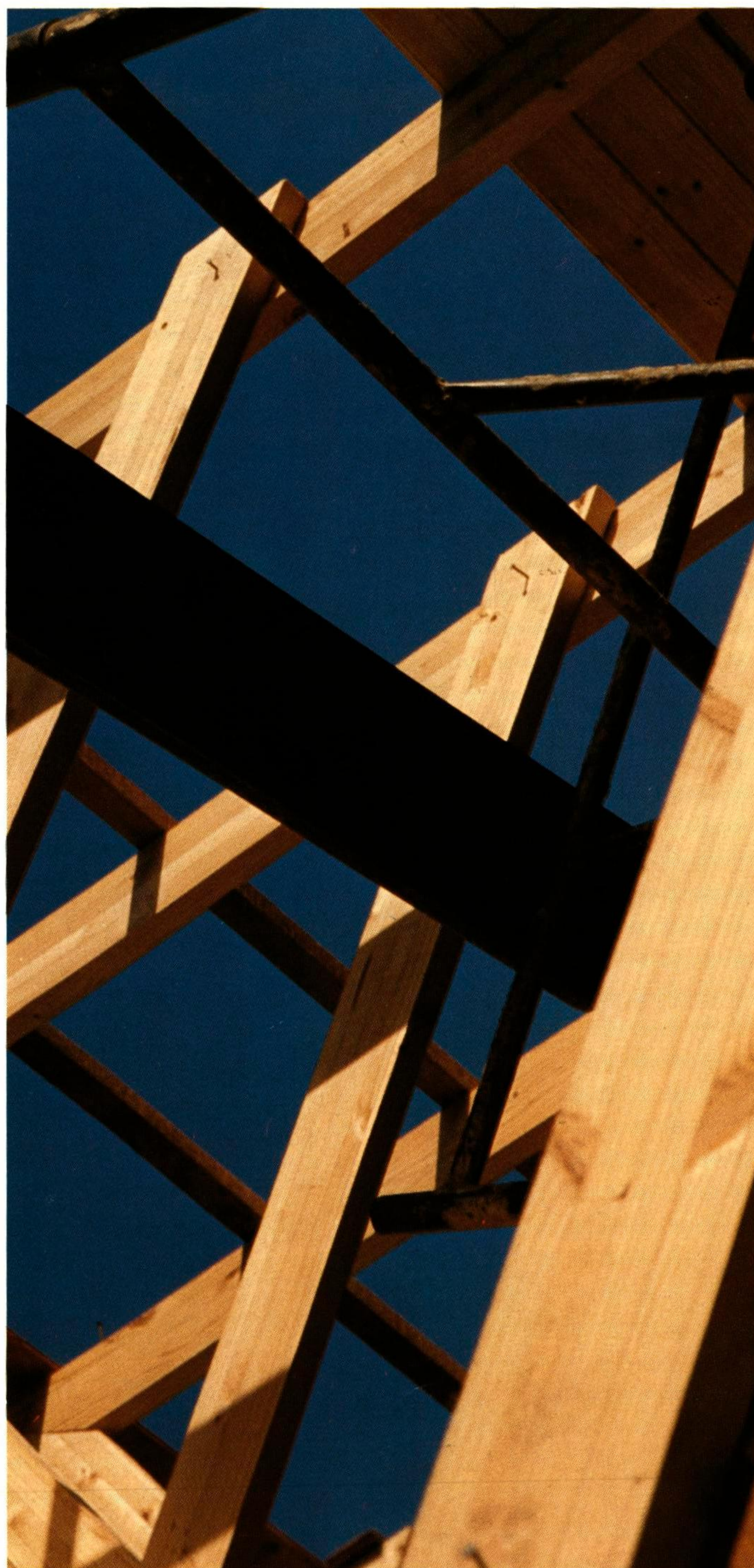
REDUCED CONSTRUCTION TIME

It takes an average of only 20% (4-5 weeks) of the conventional home construction time to build a timber-framed house. The frames, trusses and roof-cladding can be completed within a few days once the initial slab has been laid. This is a great time-saver, as work can now commence under cover of the roof, unaffected by weather conditions.

The new owners of a timber-framed home will save greatly on occupational rent and interest on capital payments during construction, and avoid the inconvenience and frustration of waiting to move in, and perhaps having to arrange alternative accommodation for this period. Another factor to consider is the escalating costs that can occur during a construction period of 6 to 8 months — up to 10% is not uncommon.

Right at the design stage you start saving money, as a modular grid system allows creative but efficient utilisation of materials. The functions of electrician and plumber are made easy, as these services are conveniently placed in the natural wall cavity. Greater flexibility and simplicity in the location of electrical points, telephone jacks, TV and intercom cabling also contribute to reducing time and costs, and alterations and additions are much easier and consequently cheaper to effect.

Consider other areas too — such as less building rubble to be removed, reduction of expensive on-site labour and supervision, reduced ongoing maintenance and energy costs (better insulation), and overall immediate savings of up to 10% can



With increasingly bold steps, the timber frame revolution is gaining momentum in South Africa. The harsh realities of rising conventional building costs have persuaded the homebuilder to seek more attractive and efficient methods. The growing awareness and realisation of the other enormous benefits of the construction method are fast dissipating the myths and misconceptions that surround timber-frame homes.

As in other parts of the world, South Africans are now recognising the fact that a timber-frame house is equal or superior to the conventional home, and is in fact a method which really does 'Let you live more, for less'.

SOME FACTS ABOUT TIMBER-FRAME CONSTRUCTION

One of the reasons that timber-frame homes have taken so long to become the tradition in South Africa is the early lack of suitable indigenous timber. Now, however, with greatly improved forestry and milling techniques, a much higher quality of locally grown structural timber has made this construction method not only feasible but extremely attractive too. Now that the majority of South African municipalities, and the new National Building Regulations, accept it as a high-standard construction method, there is little doubt that timber-frame homes will fast become the obvious choice for new homebuilders.

- Every year in the USA, more than 1,2 million homes are built. Nearly 99% of them are timber-frame constructions.
- Timber-framed construction constitutes over 90% of all new dwellings in Australia, Canada, New Zealand, Japan and Scandinavia.
- Timber-framed homes are better able to withstand the rigours of earth-quakes, cyclones, snowstorms or temperature extremes.
- Modern technology ensures that the timber-frame construction method is fire-restrictive as well as weather-resistant.
- Timber-framed houses do not burn more easily than conventional ones, and in fact research has proved that there is a much higher safety standard in timber-frame construction than in other

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the non-load bearing walls require no internal foundations. The original panels can be quickly dismantled and re-used where desired. Only the wall finish might require re-touching, though if the job is done carefully, even this chore can be avoided! Thus, there is the advantage of superior 'living conditions' whilst alterations are underway: in a conventional home, you've got all the dust and furniture-spoiling problems of smashed-down brick walls, re-built foundations and a home full of rubble!

It is possible to radically re-design and alter

the interior of a timber-frame home quickly and cost-efficiently. Should additions and home-extensions be required, the same principles apply. This versatility is totally unrivalled by any conventional method.

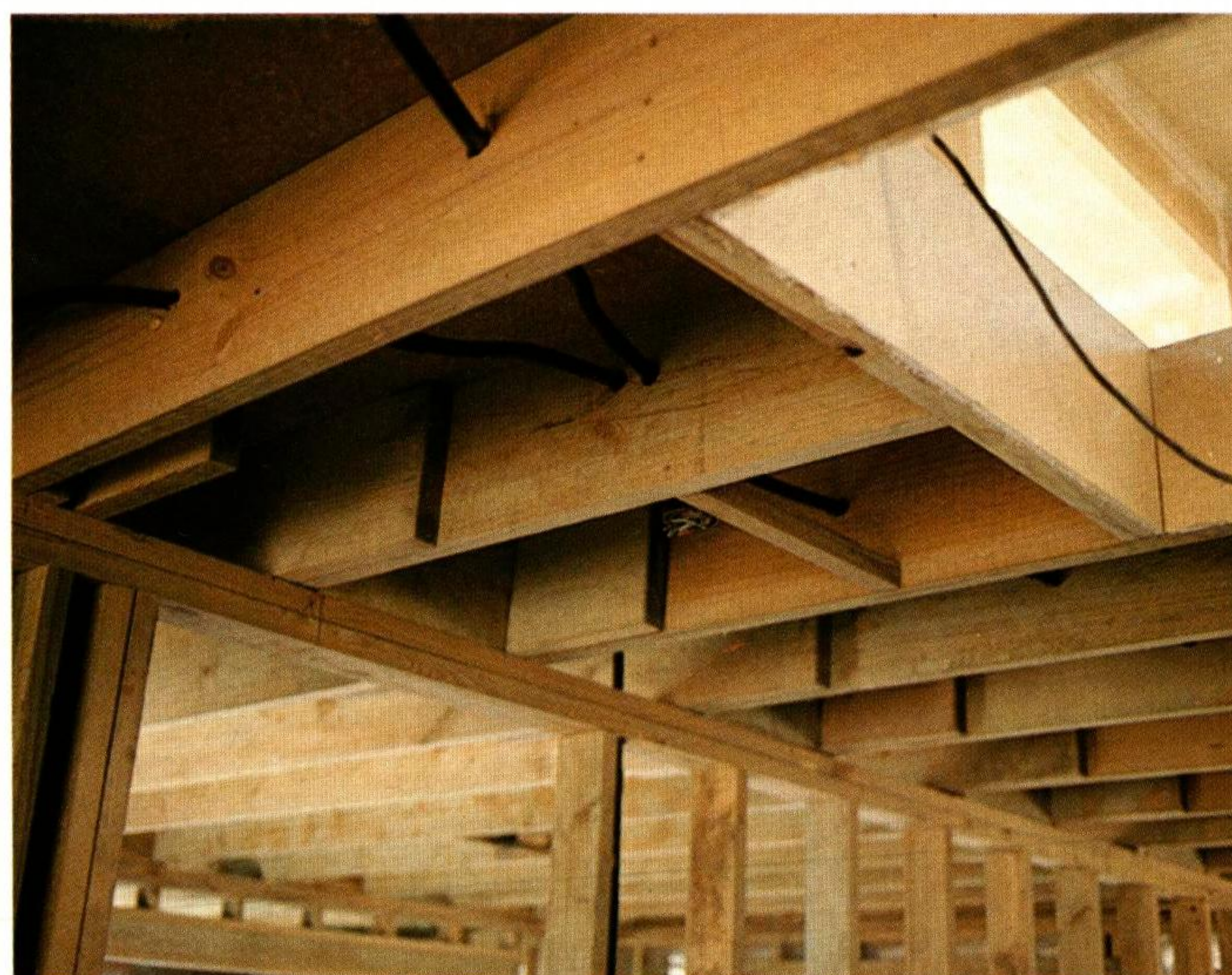
Ultimately, the timber-framed home holds the promise of being more aesthetically interesting, easier to alter and extend, and neater in appearance.

MORE LIVING SPACE

The inherent ability of the timber frame method to accommodate spaciousness (i.e. lofted ceiling areas, bigger free spans) is attractive to the designer and architect. For the occupant, it provides an open, airy lifestyle. Livable area can be increased both vertically and horizontally without the weight and stress confinements of traditional construction.

Because wall thickness is reduced on single skin structures, the internal floor area is increased by up to 8%.

Plumbing, which is situated within the walls, allows bathroom and kitchen fittings to be mounted flush, thus also saving space. The simple installation of 'pocket' sliding doors and windows (in the 'natural' wall cavity) further contribute to better space utilisation.



SAFE AS HOUSES!

It is a total misconception that because combustible materials are used, timber-framed homes are significantly less secure in this respect. In reality they are perfectly safe and comply to all the fire and safety standards of current legislation.

'Rhinoboard' cladding in 12,7 mm thickness for walls, protects the timber frames. It is a non-combustible material capable of restricting a fire



to the area of ignition. Rhinoboard is in fact characterised by its exceptionally low heat transference properties. Regarding the actual timber frame: in the unfortunate incident of fire, a structure must be able to maintain its load long enough for the fire to be extinguished without risk to the firefighters. This wood can do — and more!

Despite the reputed flammability of timber, it's interesting to note that it out-performs steel (has 10% of original strength at 760°C), and aluminium (melts at 660°C), in burning buildings, where temperatures can rise as high as 925°C! Mortar, whilst incombustible, rapidly loses strength as dehydration and cracking occur at temperatures above 315°C, thus weakening and often causing severe structural damage to brick and mortar buildings.

Wood, on the other hand, ignites at 260°C if oxygen is present, but actually retains its strength for a much longer period than the other materials mentioned. This is because wood is a very poor heat conductor; while the surface area burns, the interior of the wood heats up far more slowly, thus decreasing the original overall strength at a slower rate. In addition, the build-up of charcoal on the surface further insulates the interior, inhibiting the penetration of oxygen.

Enough of facts and figures! To dramatically illustrate the above, here's a true story that happened one Sunday morning at 14 Neville Street, Brackendowns — a suburb of Alberton, right here in South Africa.

The owners of the house were busy in their back garden while their two small children played in a bedroom of their timber-framed home. It was a chilly May morning, and an electric fire was heating their room. No-one knows quite what happened next, but a neighbour reported smoke, and the parents met the children running out of the burning house. It is thought that the electric fire must have set the bedclothes on the double bunk alight. The bedroom itself was ablaze, the curtains and bedding adding fuel to the fire. By the time the fire-engine arrived, the fire was under control, the neighbour and owner having doused the flames with 2 garden hoses through the broken windows. The firemen were amazed at the way the fire had been restricted to the bedroom alone.

Obviously there was some damage to the home: the plastic airvents had melted throughout and the walls were smoked and required cleaning and re-decorating.

In the children's bedroom, all the furniture was destroyed, the electric wiring insulation had melted, carpets were damaged by the water, the windows and fanlight had to be re-glazed, and then the skirting, cornices, and all wall and ceiling boarding, door and door frame replaced. Externally, there was slight smoke damage to the enclosed eaves' paintwork. When the fire-damaged Rhinoboard cladding of the walls and ceiling was removed, the timber-frame beneath was absolutely unaffected.



The total cost of repairs was less than R10 000.

On discussing the fire with the Alberton fire-chief and his team, a comparison was made to a similar fire in a comparable — but conventionally built — house.

Here, the fire damaged the house substantially, and the repair costs were assessed at over R40 000!

STRUCTURAL SUPERIORITY

In the first instance, timber has a better strength-to-weight ratio compared with most building materials. That includes concrete and steel. However, the ability of a timber-framed home to withstand soil movement without damage is of prime importance. The rigidity of solid masonry buildings renders them prone to cracking, and even severe structural damage with only slight soil movement. Combined with an outer brick veneer which is articulated (i.e. built in small detached areas, each able to move independently and thereby absorb movement without cracking), timber-frame structures simply absorb the move-

ment created by unstable soil. Timber-framed homes can consequently be successfully built in areas where soil movement is prevalent. In many areas of the Reef, this building method would be far more successfully applied than a conventional one, where soil movement occurs because of varying water content.

All timber used in wall construction should be treated against rot and termites. The lightweight nature of a timber-frame structure, in relation to its strength, and combined with its resilience, makes it able to withstand shock and stress which would severely damage a conventional structure.

INSULATION PROPERTIES

This is where timber-frame construction really scores, offering far superior insulation than conventional structures.

The primary reasons for this are:

1. The excellent thermal insulation of Rhinoboard and timber lining.
2. The 'natural' cavity between exterior and interior

walls that incorporates insulating material.

An internal environment is created which resists changes in outside temperatures. For example, a normal brick and mortar wall will absorb heat as a result of direct exposure to sunlight. This heat will be transferred to the interior of the house, often resulting in temperatures soaring in the house several hours later, and causing some uncomfortable nights!

The exceptional insulation of a timber-framed home also contributes to a reduction in energy costs. (Warm in winter, cool in summer.)

EXAMPLES

Timber in itself imparts a feeling of warmth and beauty which suits many traditional architectural styles. However, radical designs are also possible, allowing the architect a much wider scope in the design process.

A-frames, and even two or three storey developments are quite feasible. But it is the exactness and superlative finish that is possible with a timber-





frame house that makes it exceptional. While timber-frame housing has only recently gained national acceptance, a number of early examples such as the 50 year old timber-clad house in Pretoria North (built with S.A. timbers) bear witness to the lasting appeal of this construction technique.

EASIER AND LESS EXPENSIVE TO MAINTAIN

Firstly, the need to continually fill cracks and damage to a mortar surface is eliminated. Even though interior walls are plastered, no cracking or flaking will occur due to soil shift. Secondly, the problem of damp in a brick and mortar structure is eliminated. The brick veneer exterior is separated from the Rhinoboard inner lining by the 'natural' wall space or cavity, so damp cannot be transmitted to the interior. And a brick veneer exterior, if preferred, would also be maintenance free if face brick is used. (Note: other exterior finishes may be preferred according to individual taste, that would require painting or treating from time to time.)

The timber-frame technique is inherently a maintenance-free method, as all structural timber is protected by the cladding, inside and out.

Rhinoboard itself (used as lining) is essentially a weather resistance material. In tests to measure water absorption, Rhinoboard absorbed less than 6% of its mass after total immersion for 24 hours. In the SABS weathermeter it survived a 2 000 hour test whereas a well known replacement roof tile survived only 1 000 hours of testing!

AN UNEQUALLED STANDARD OF FINISH

The timber-frame method demands a higher level of accuracy during construction. Perfectly straight, vertical walls are characteristic of the method, coupled with a neat interior appearance.

There are no uneven areas, particularly on the cladding surfaces, because of its inherent flatness. 'True' edges and corners, perfectly shaped arches, and extraordinary angles are possible. Doors and window frames can be accurately placed, ensured by the preconstruction technique. Ceilings are completely joint-free.

Overall, the impression is one of attention to detail, crisp interior finishes and a solid, precise feel to the structure. All-round, the finishes excel those of conventional techniques.



CHOOSE THE FINISH YOU WANT

The brick veneer finish, in a variety of face brick designs and colours, is by far the most popular choice amongst aspirant homeowners. It consists of a single brick exterior built up to roof level. It is non-load bearing and independently construct-



ed to allow absorption of soil movement. It gives the home a superior appearance to conventional dwellings.

Timber cladding has been popular for many years, particularly in coastal areas, where these dwellings have proven the durability of this finish. There are many variations of horizontal bevel siding, drop siding, ship lap boarding and vertical siding which give a home that lasting quality timber look.

Extensive research and technical development have resulted in high quality exterior grade particle and composition boards which have been proven over the last 30 years.

Fibre cement is another attractive exterior cladding alternative and can be used in a variety of ways — in sheet form, as ship lap, or in the recently developed woodgrain finish which looks exactly like the 'real thing'!

Many other suitable but less frequently used options include exterior plywood, composite board, blockboard and hardboard. Widely used elsewhere too is aluminium and plastic siding. A huge variety of plaster finishes are also possible over a mesh-covered Rhino shield exterior.

Faced with such a range of finishes to choose from, both designer and owner are able to achieve

their desired effect through a great combination of possibilities.

METHOD OF CONSTRUCTION

Whilst the method of construction allows savings in erection time, the structure itself does not lack anything in terms of strength and durability. It is a thorough, well-planned method, as can be seen...

Firstly, the building site is cleared of any obstructions likely to hinder access during or after construction.

CONCRETE SLAB AND FOUNDATIONS

The foundations are far simpler than those required for a conventional home. Only the load-bearing exterior walls require shallow (150 x 400 mm) strip foundations. The remainder of the house is erected on the concrete slab, which is cast to occupy the entire area within the foundation walls. This slab is usually reinforced with mesh, and is carefully floated to provide a very smooth and level finish.

An economic alternative may be used if the site is level. This is the raft foundation slab which comprises the slab and a perimeter thickening cast as one unit. This saves on strip foundations and under-building brickwork.

FRAMEWORK

The framework is then erected on the slab, using SABS approved structural timber. Two different kinds of frames are used: Load bearing frames (which support the roof) and non-load bearing frames, which are mostly used for the interior walls. All the window and door frames and lintels may be incorporated in these wall frames, which can be pre-constructed in a factory environment, to speed up site erection time.

ROOF TRUSSES AND CLADDING

With all the load-bearing framework in position, the roof trusses are erected. More often than



not, these are pre-constructed and delivered ready to erect, thereby saving more time.

The roof is then covered with a specified roof-cladding, and from this stage on, all work may continue under cover and uninterrupted by poor weather!

BRICK VENEER OUTER WALL

A single-brick thick external wall is built and attached to the framework with metal 'ties'. After only a couple of weeks the house is looking almost complete from the outside!

SERVICES

Before the internal walls are lined, all plumbing and electrical service pipes are installed within the natural wall cavities.

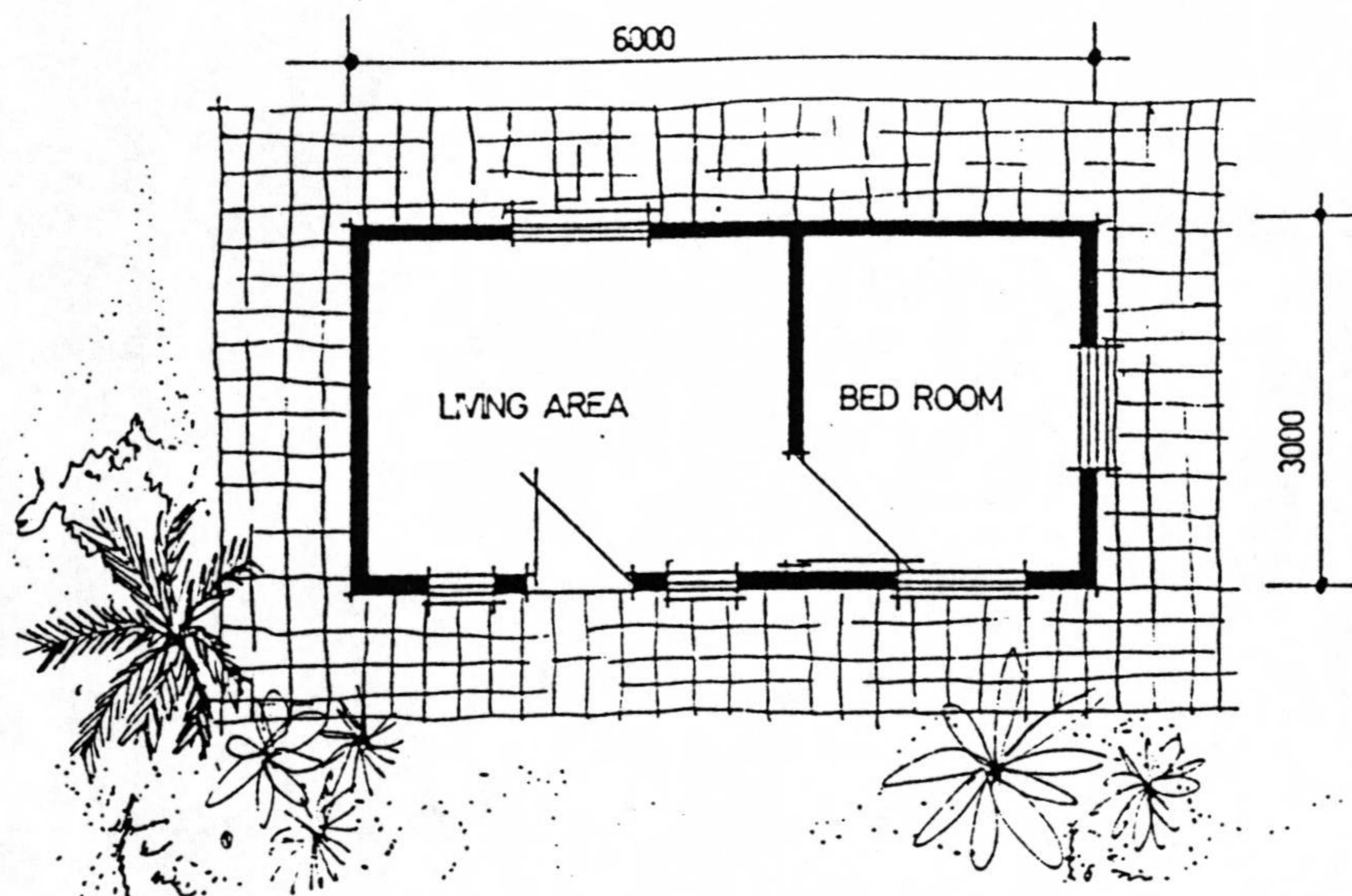
INTERNAL LININGS

Plasterboard lining is then applied to all the internal walls and ceilings — providing a flat consistent finish. The outer corners are protected with a metal angle bead, and inner corners with paper tape.

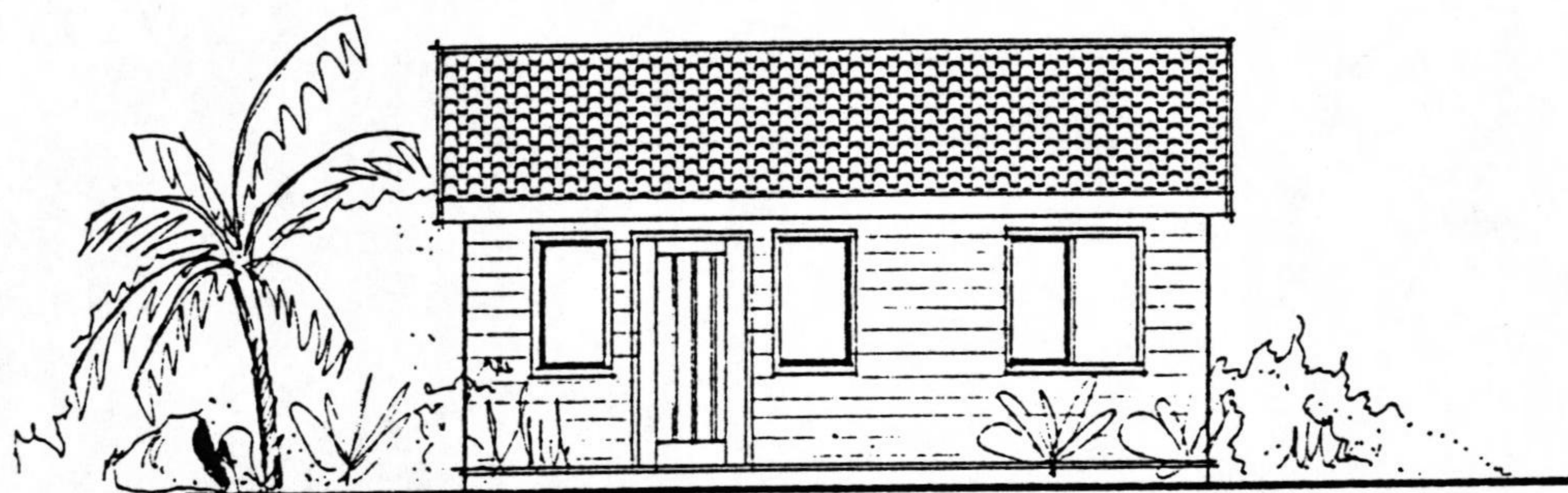
All joints are then smoothed off with plastic filler, and the house is now ready for painting, carpeting and other finishings.

Your Dream Home is complete after only 6 weeks!

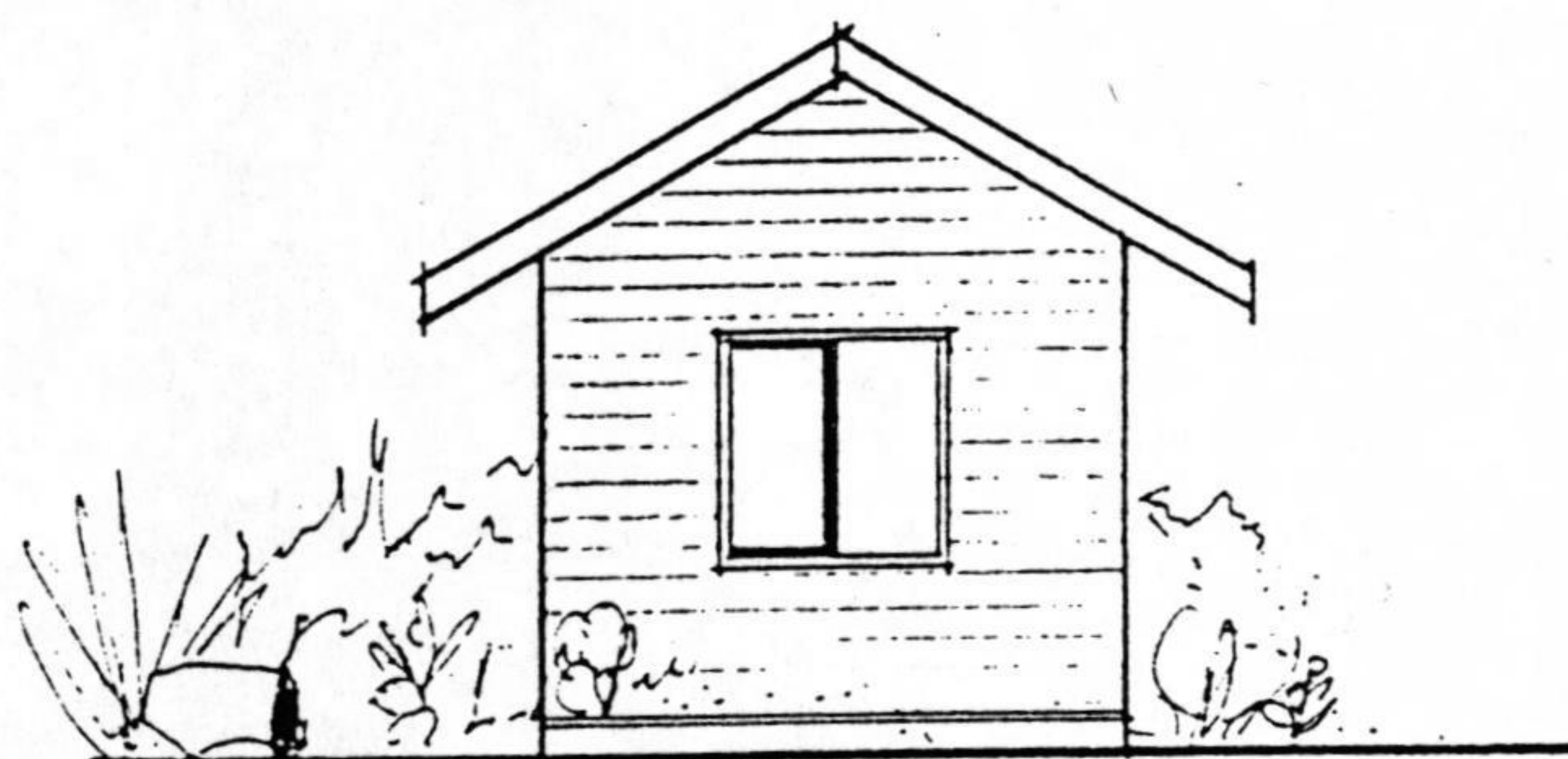




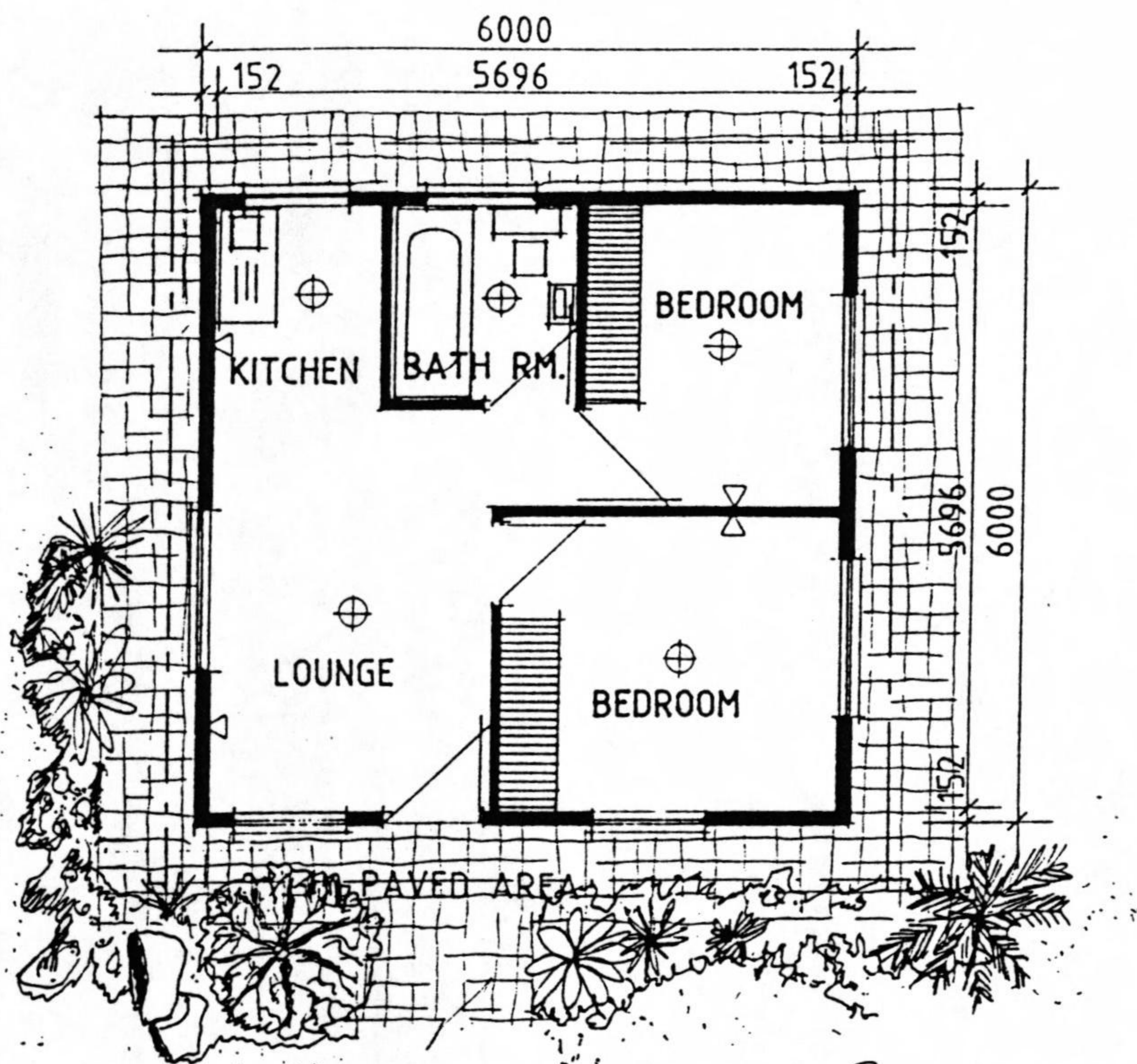
FLOOR PLAN 18m²(shelter) scale 1:100



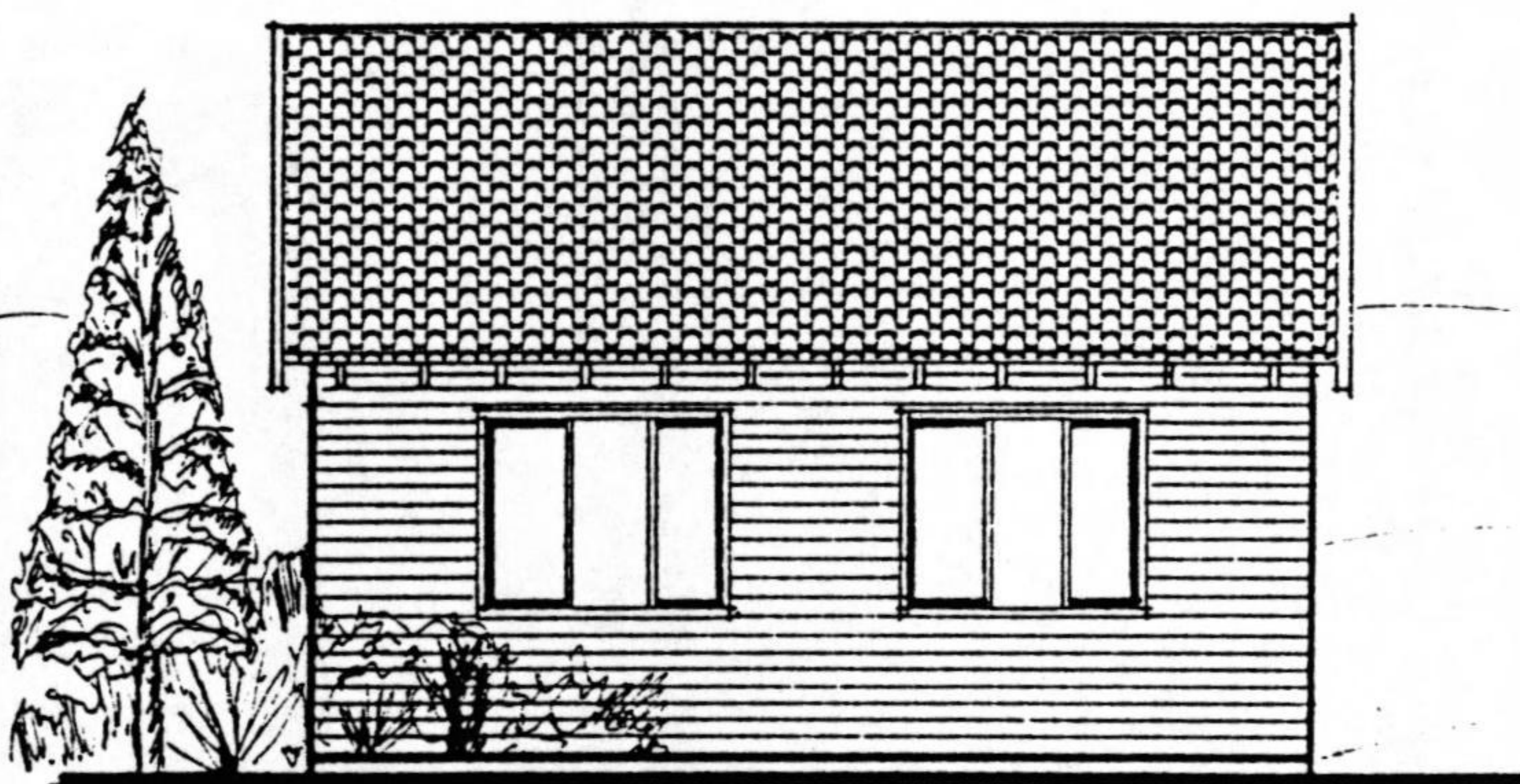
FRONT ELEVATION scale 1:100



SIDE ELEVATION scale 1:100



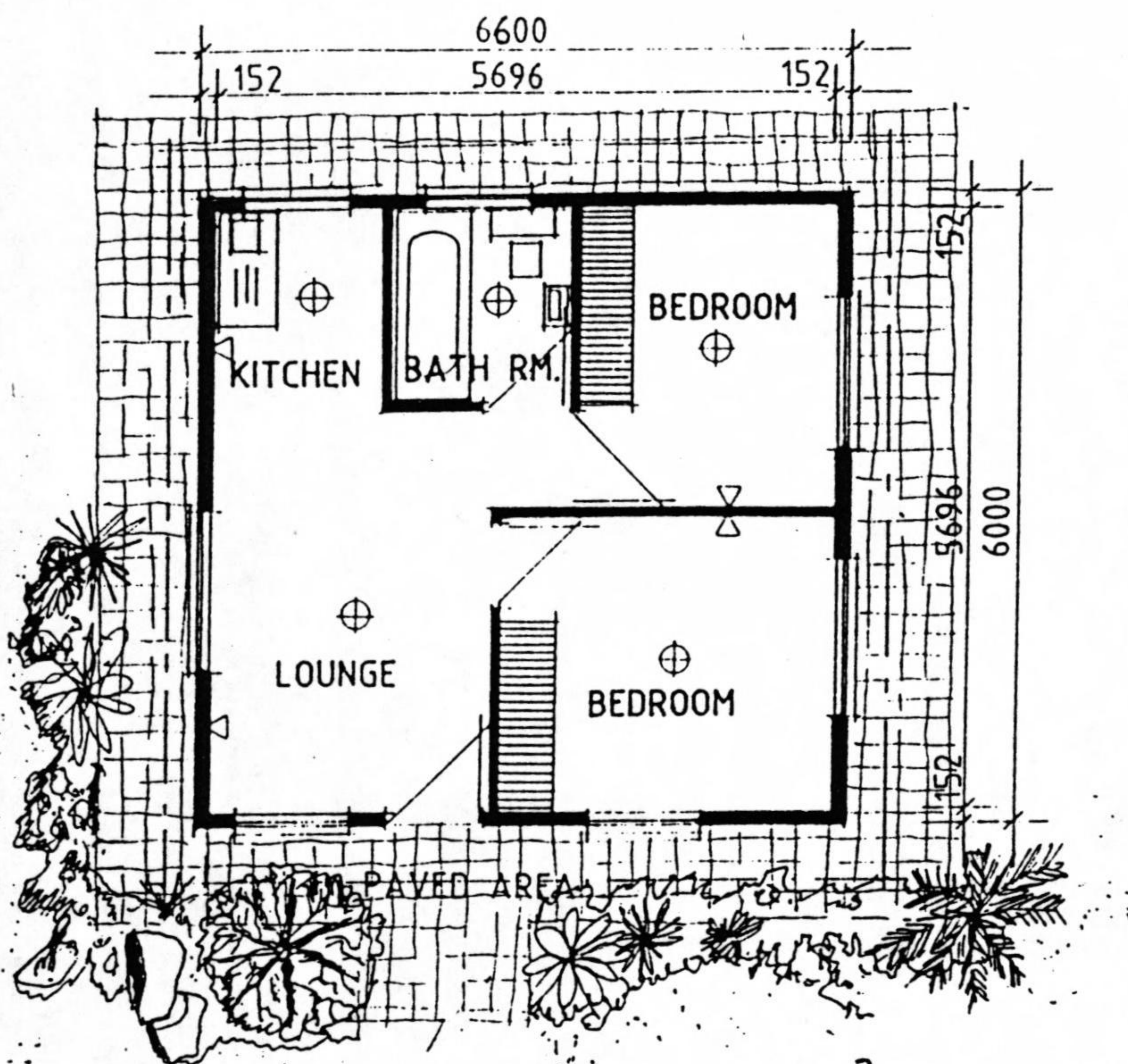
FLOOR PLAN 36m² scale 1:100



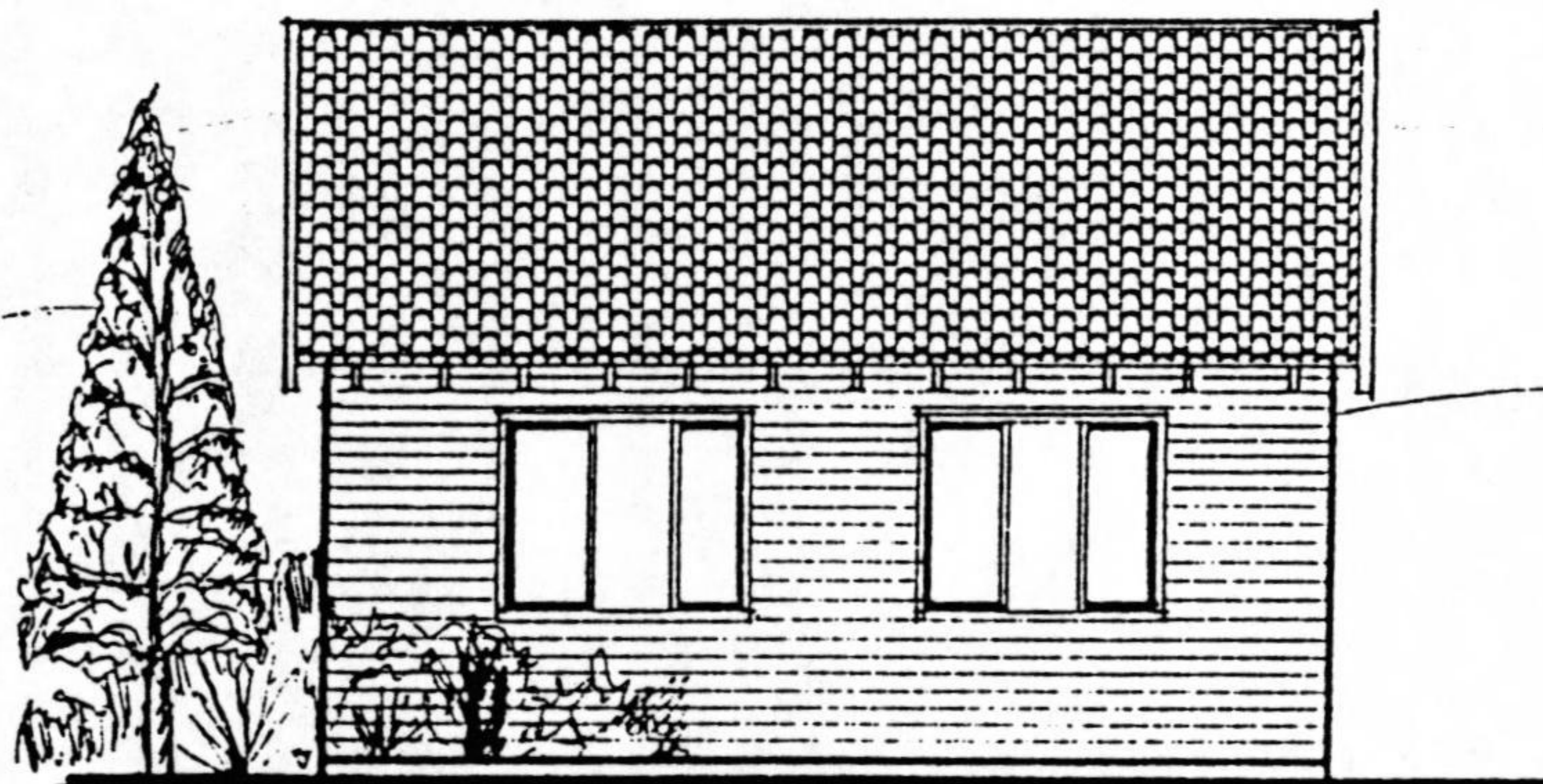
SIDE ELEVATION scale 1:100



FRONT ELEVATION scale 1:100



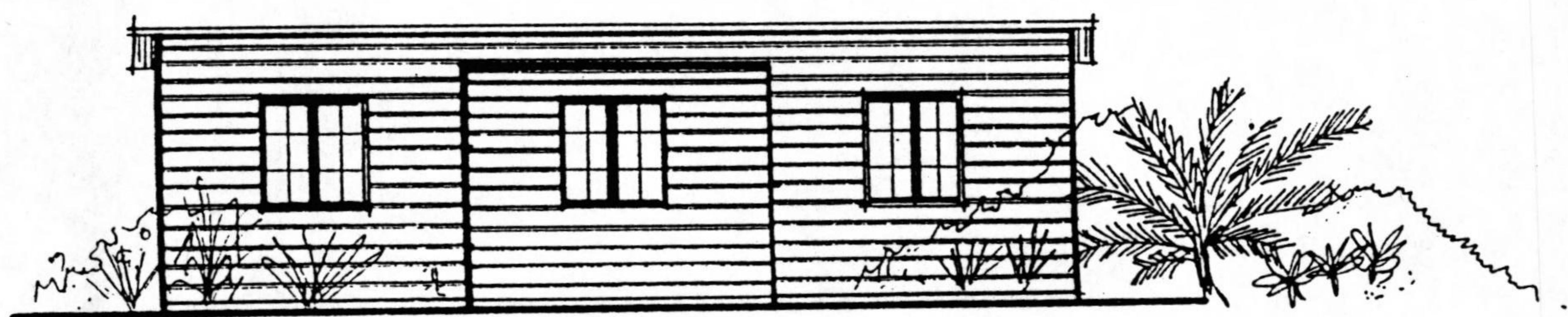
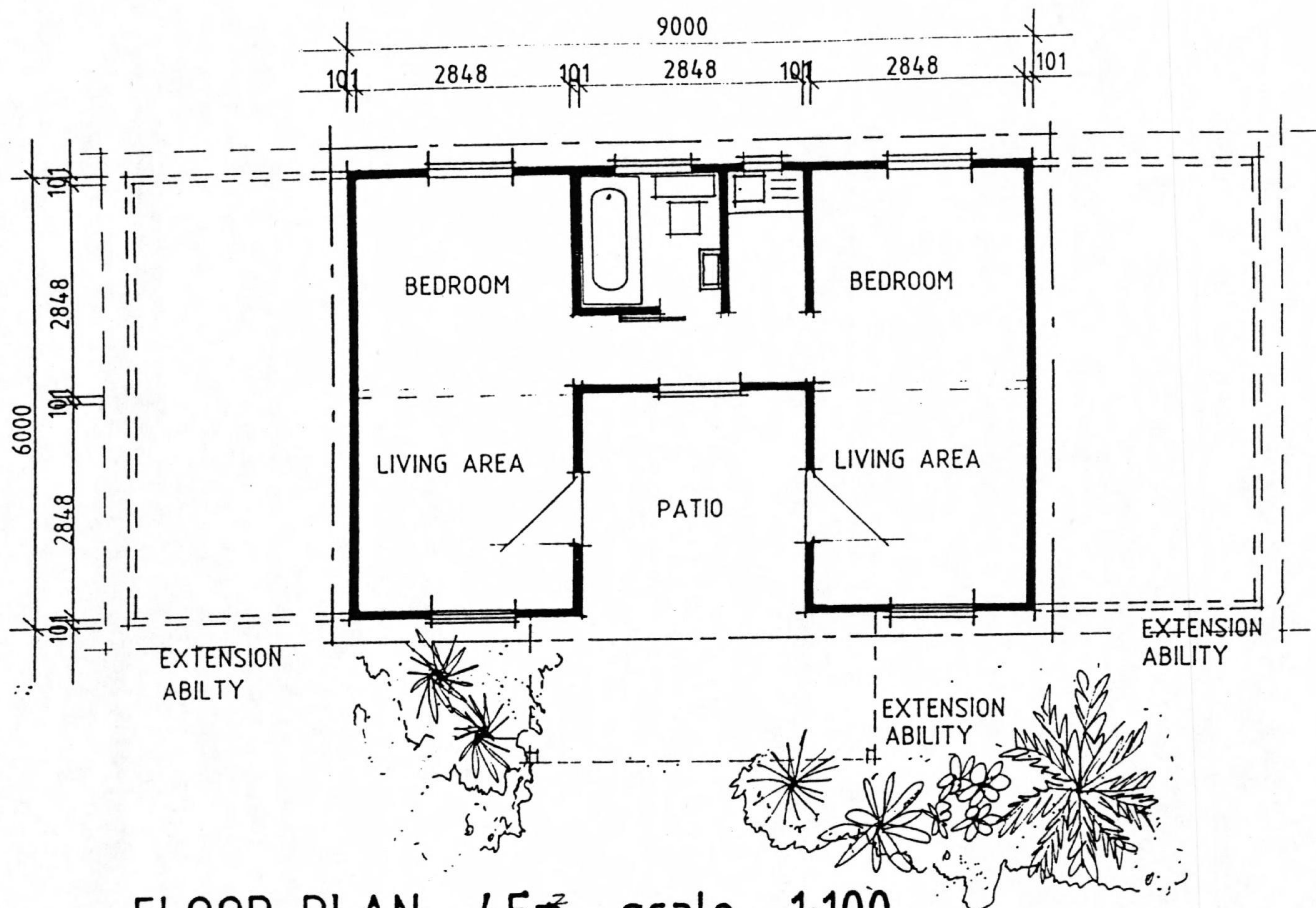
FLOOR PLAN 40m² scale 1:100



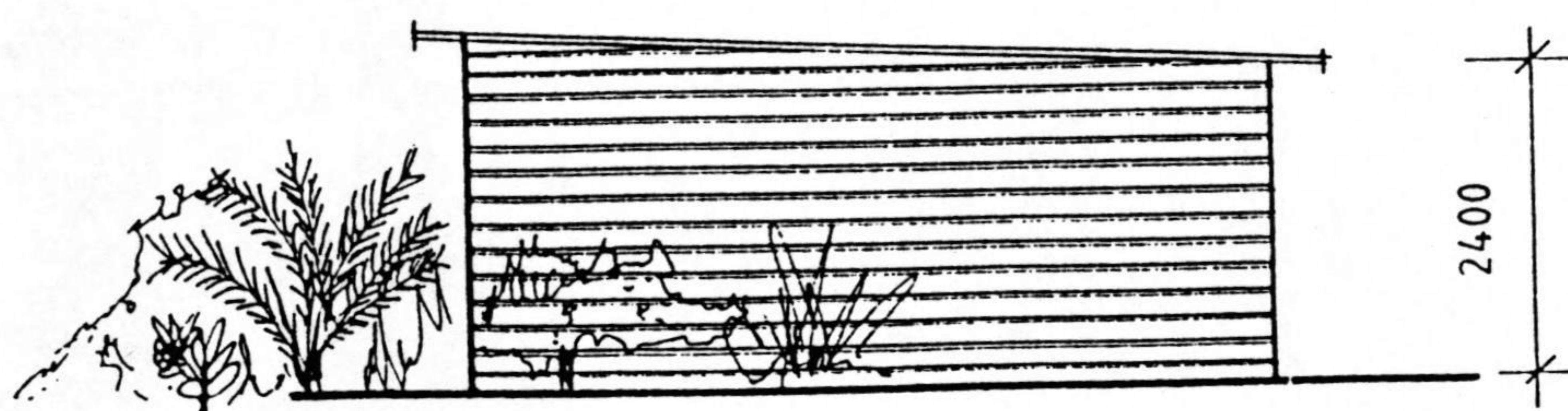
SIDE ELEVATION scale 1:100



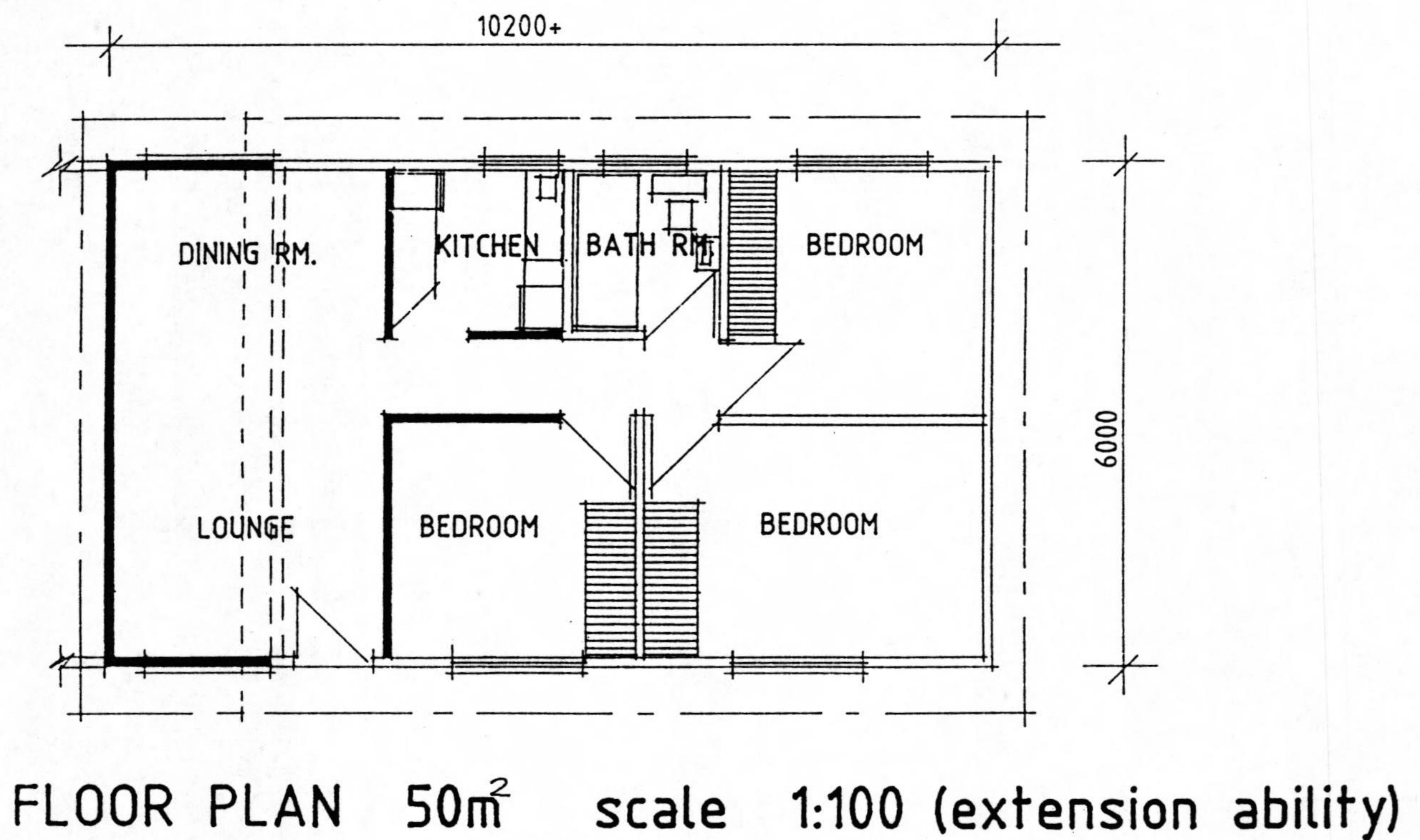
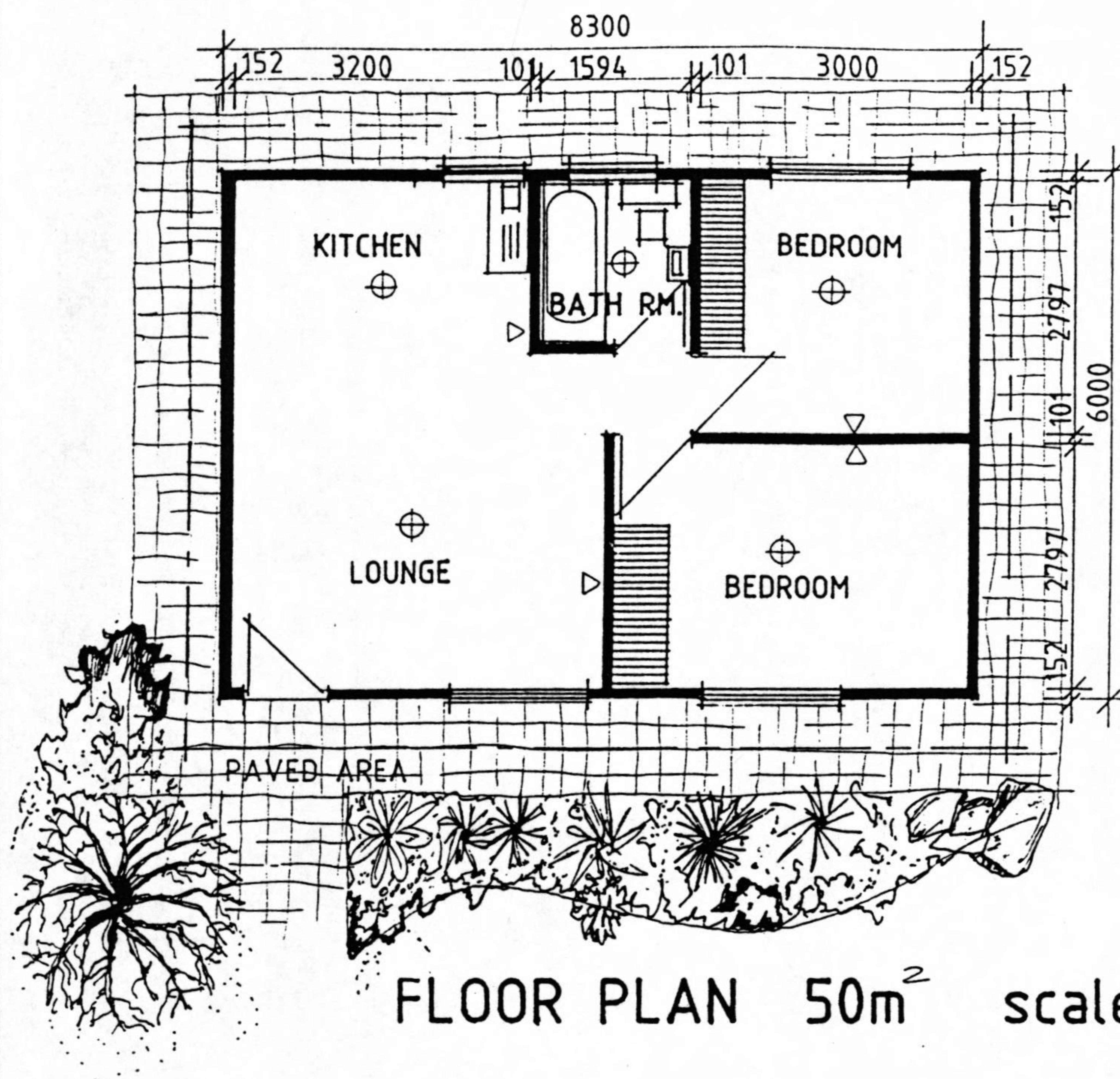
FRONT ELEVATION scale 1:100

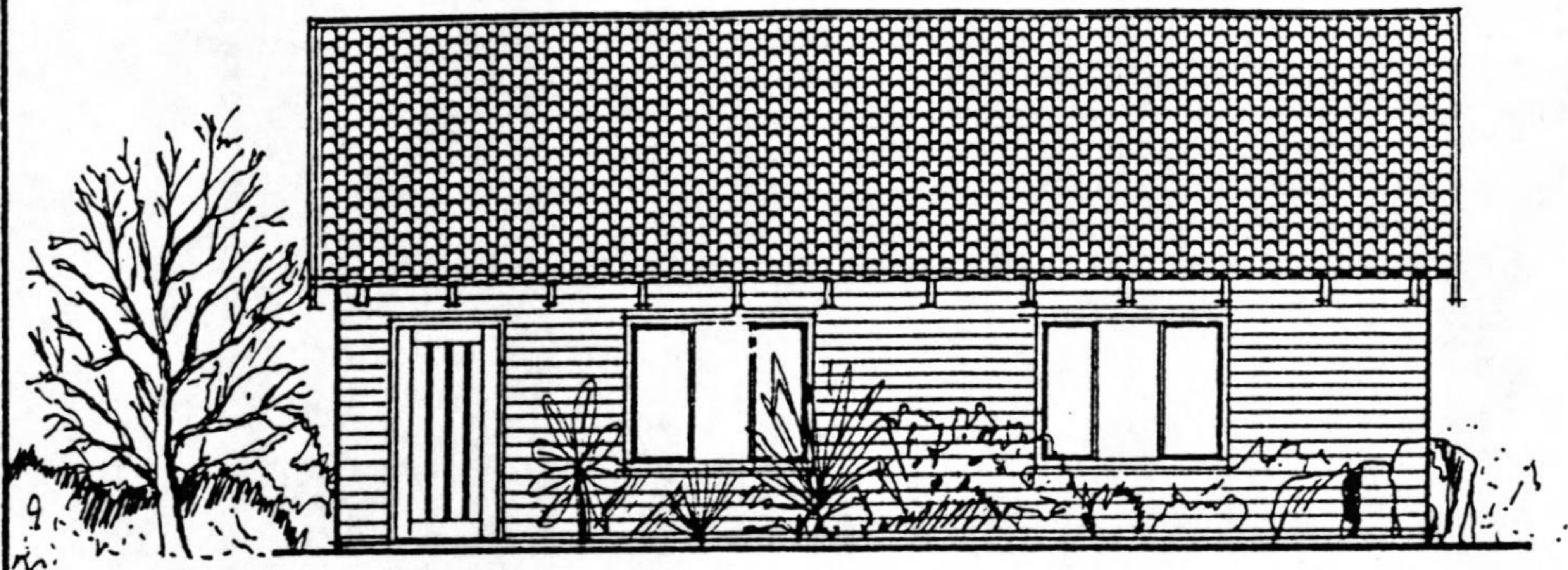


FRONT ELEVATION scale 1:100

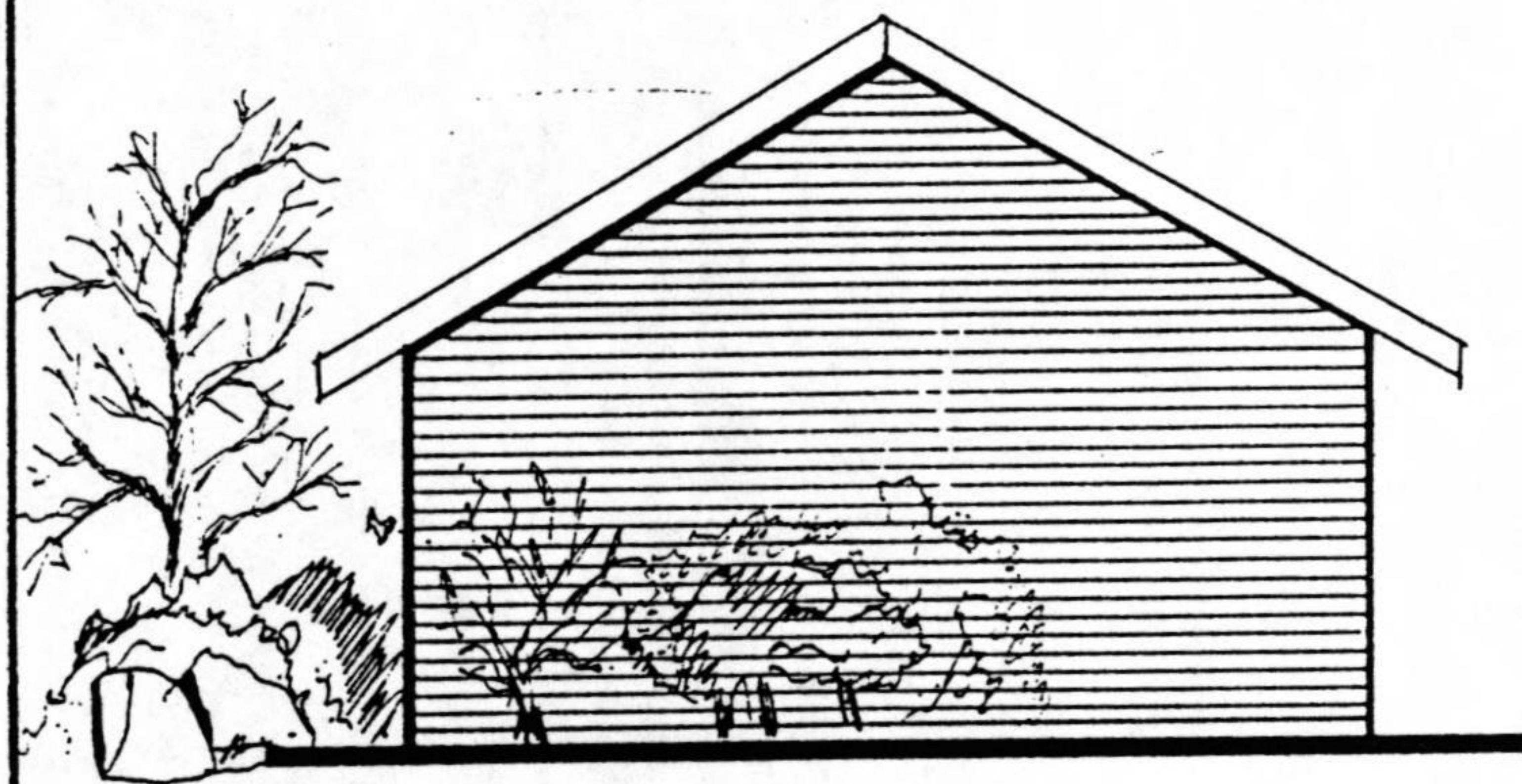


SIDE ELEVATION scale 1:100

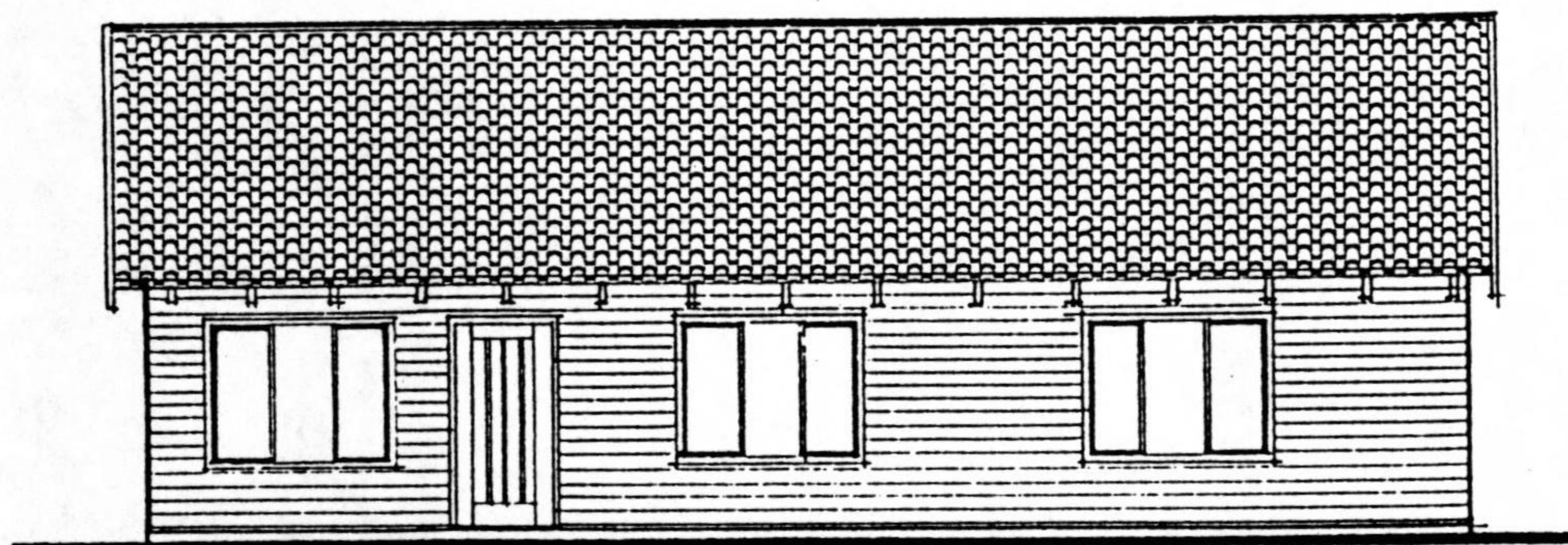




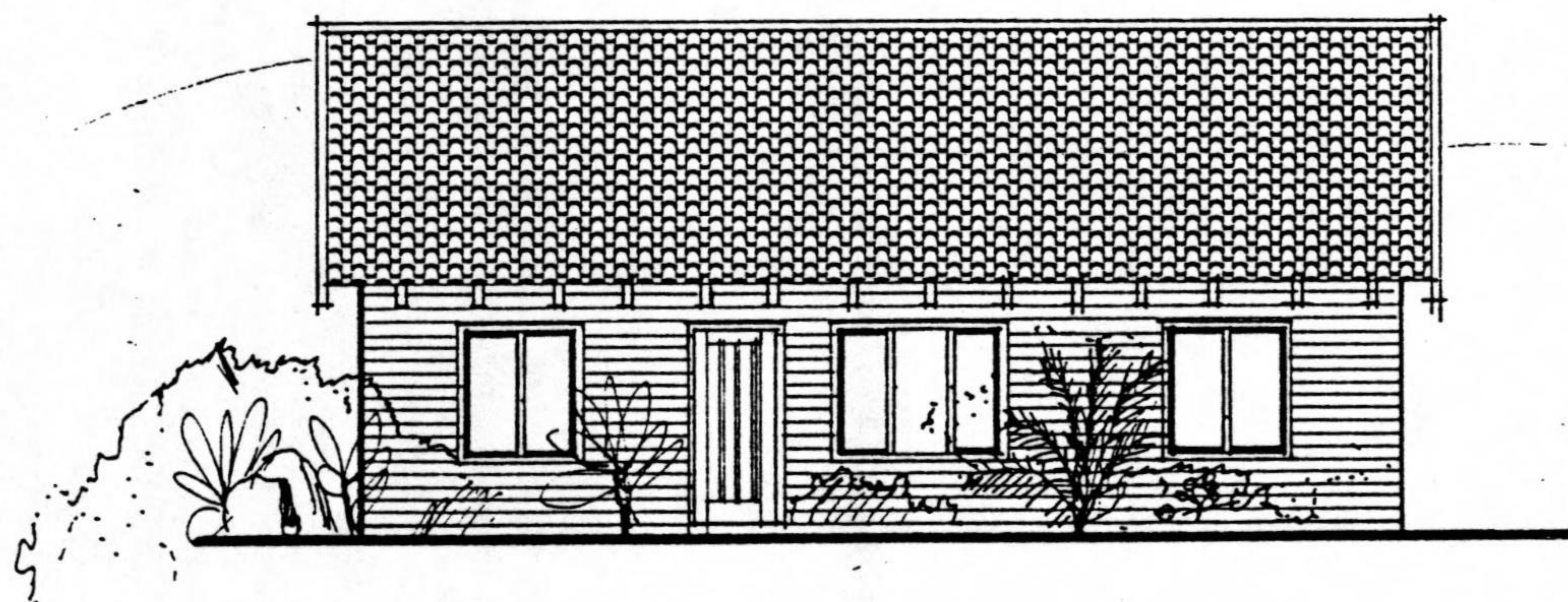
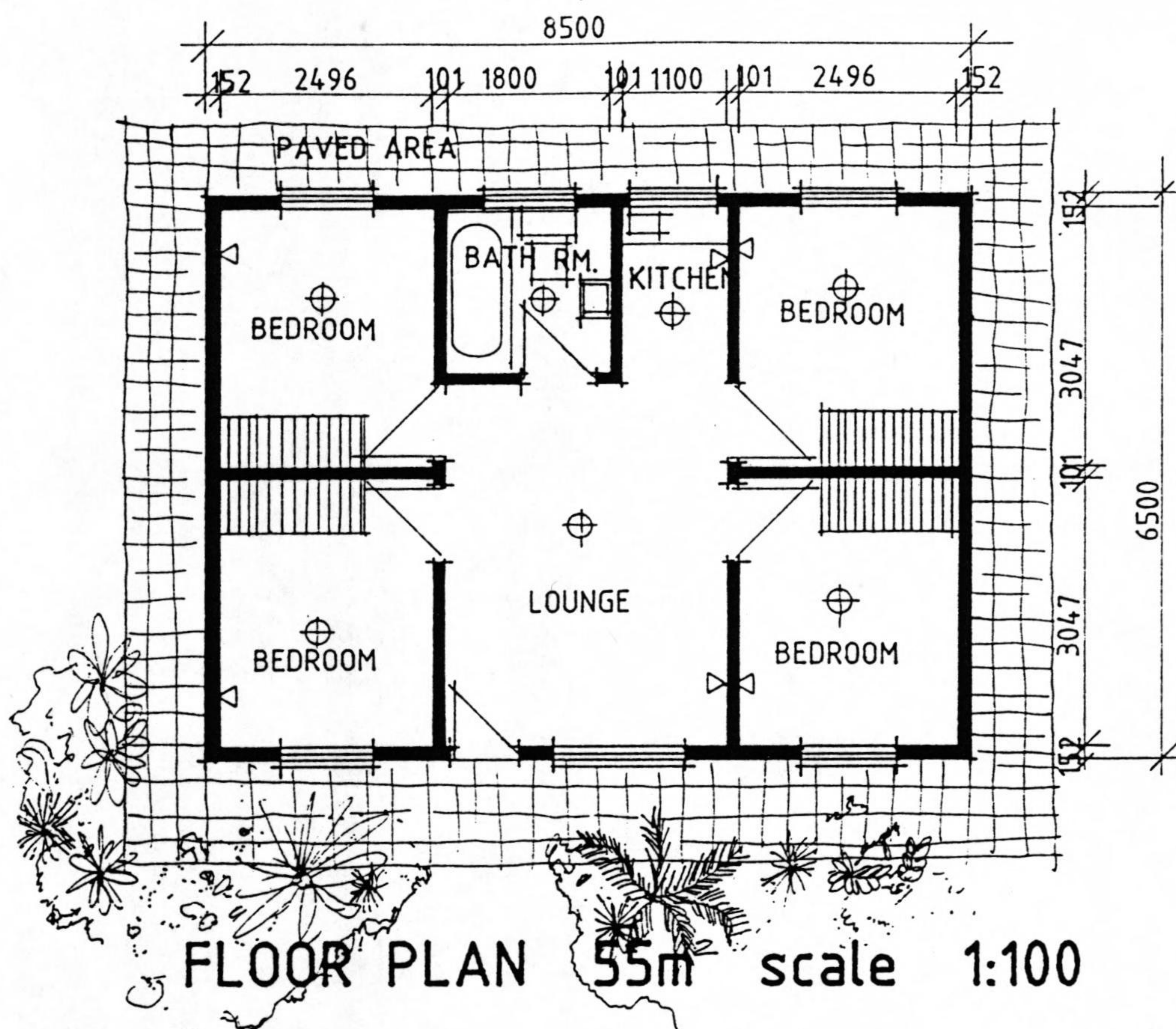
FRONT ELEVATION scale 1:100



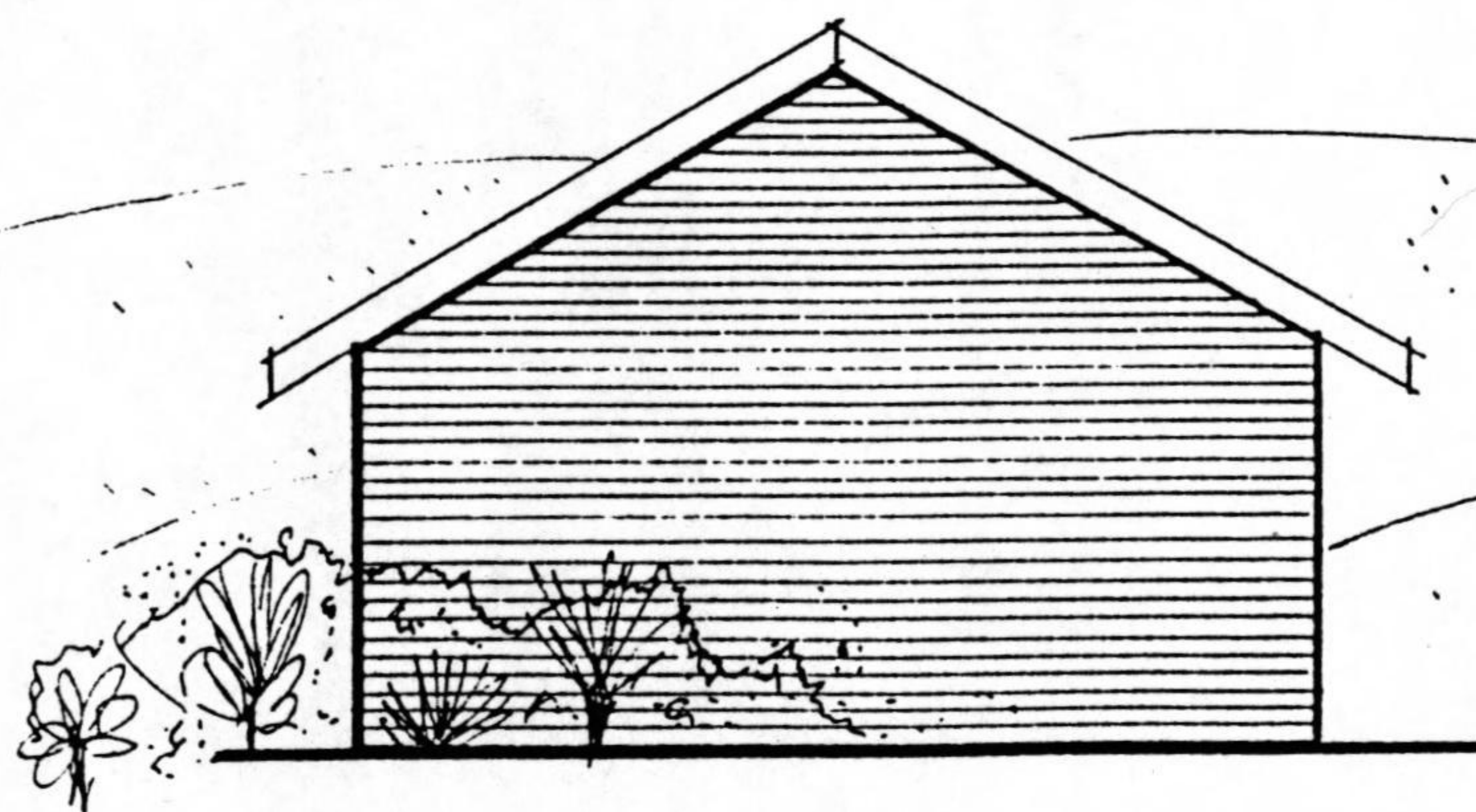
SIDE ELEVATION scale 1:100



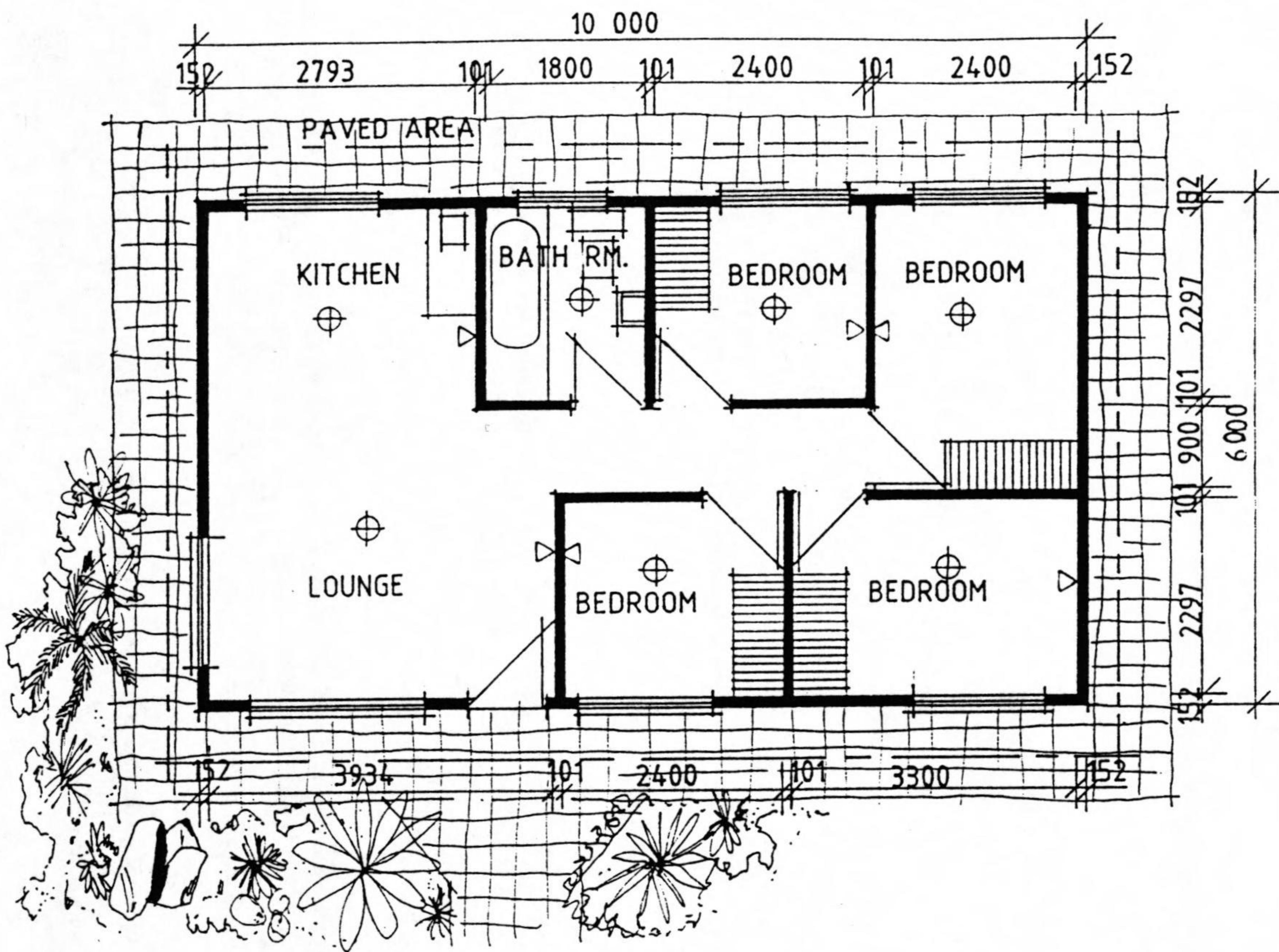
FRONT ELEVATION scale 1:100



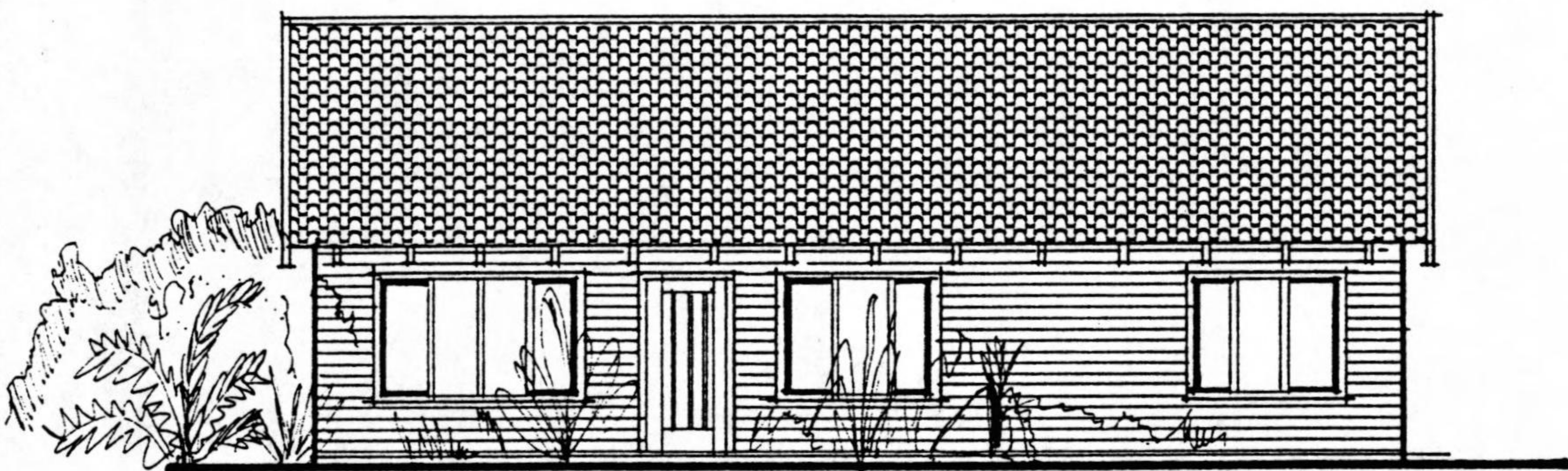
FRONT ELEVATION scale 1:100



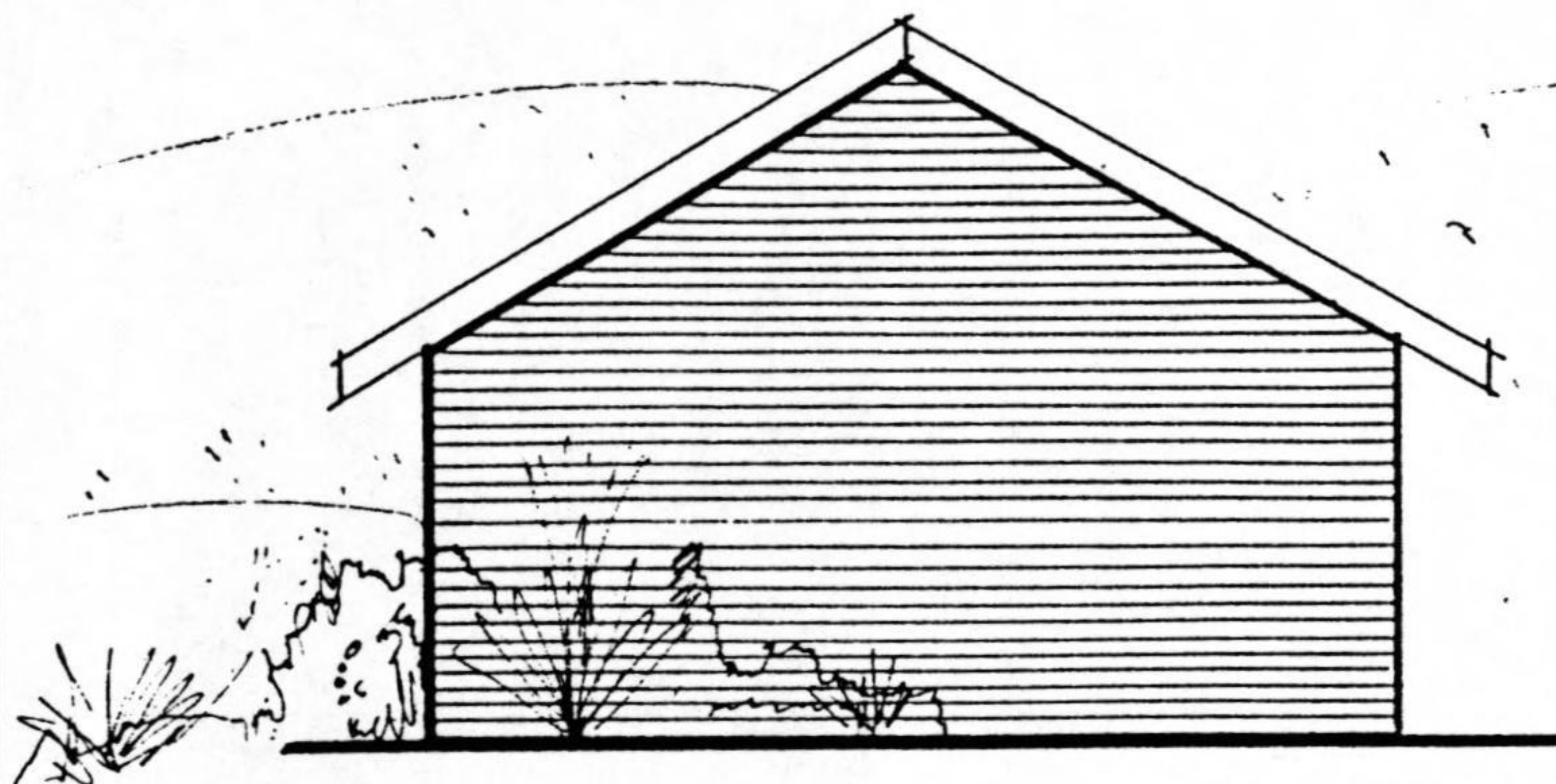
SIDE ELEVATION scale 1:100



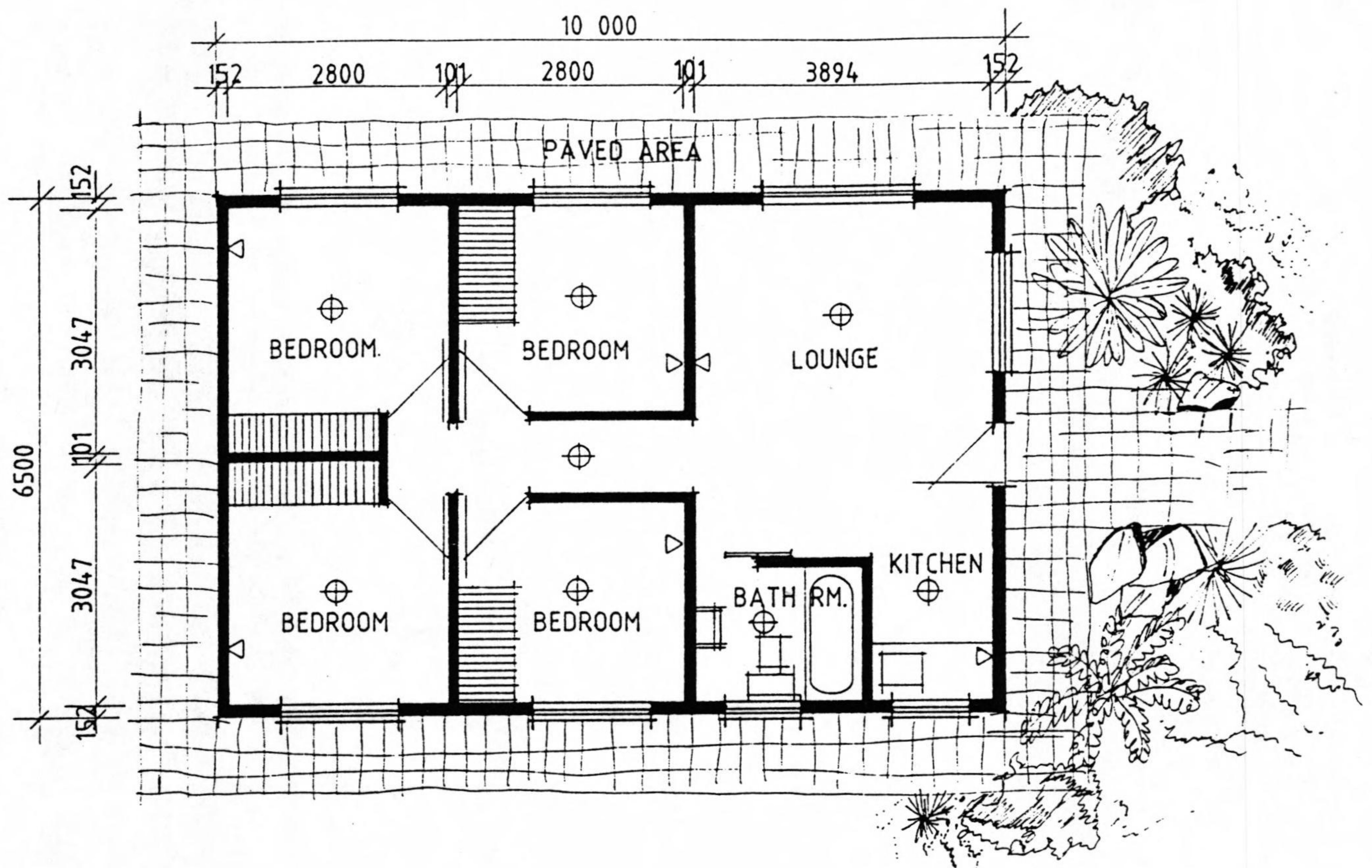
FLOOR PLAN 60m² scale 1:100



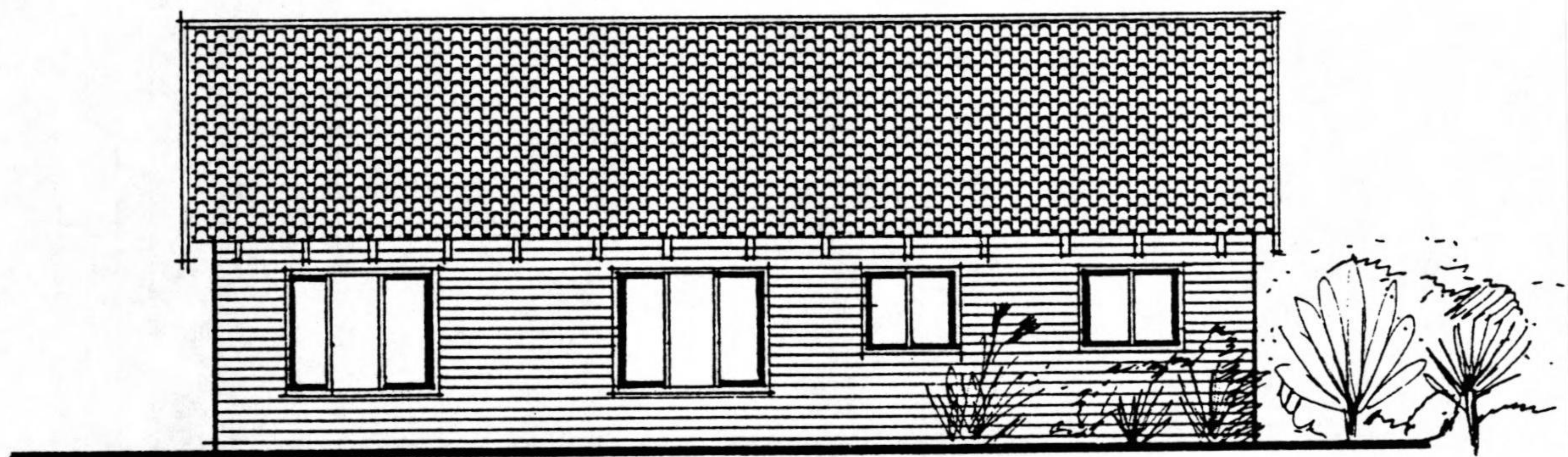
FRONT ELEVATION scale 1:100



SIDE ELEVATION scale 1:100



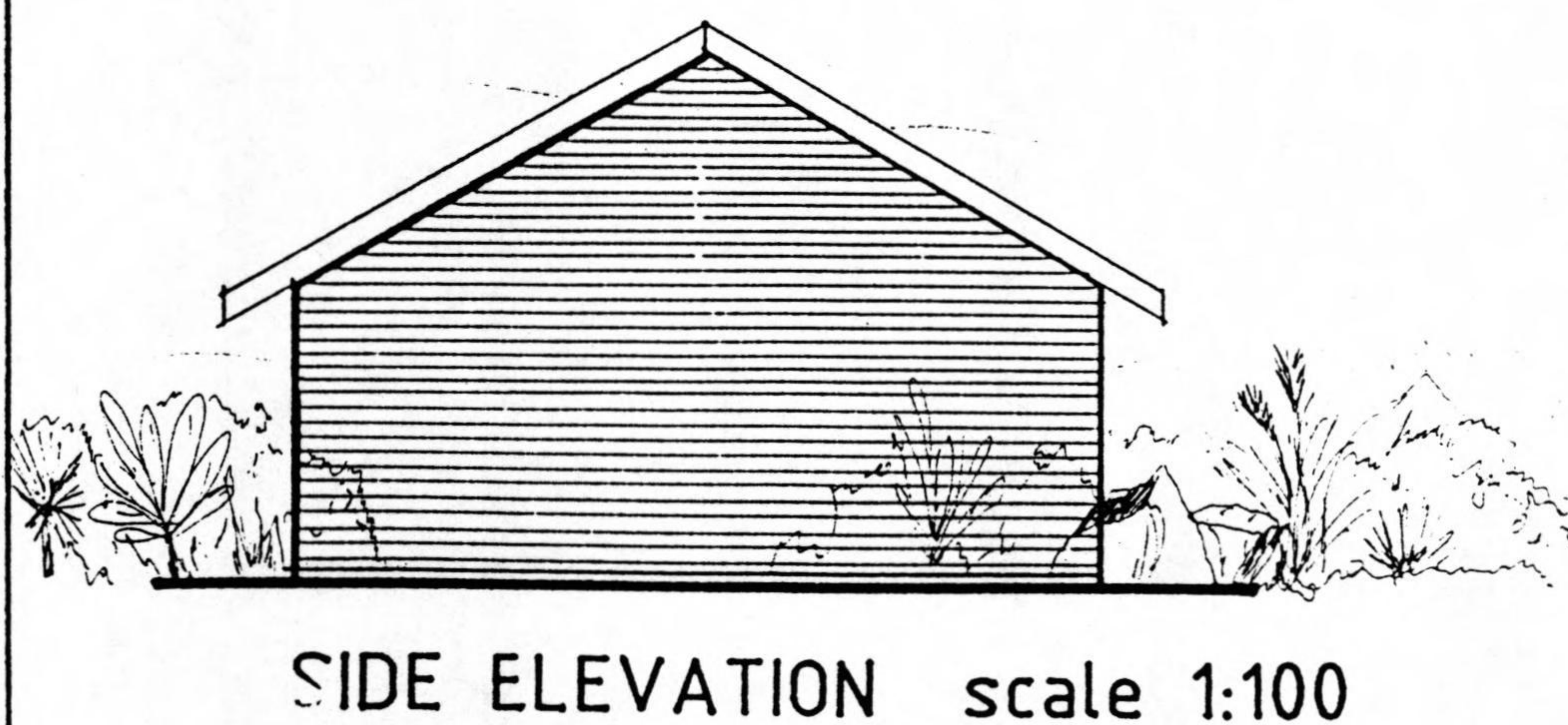
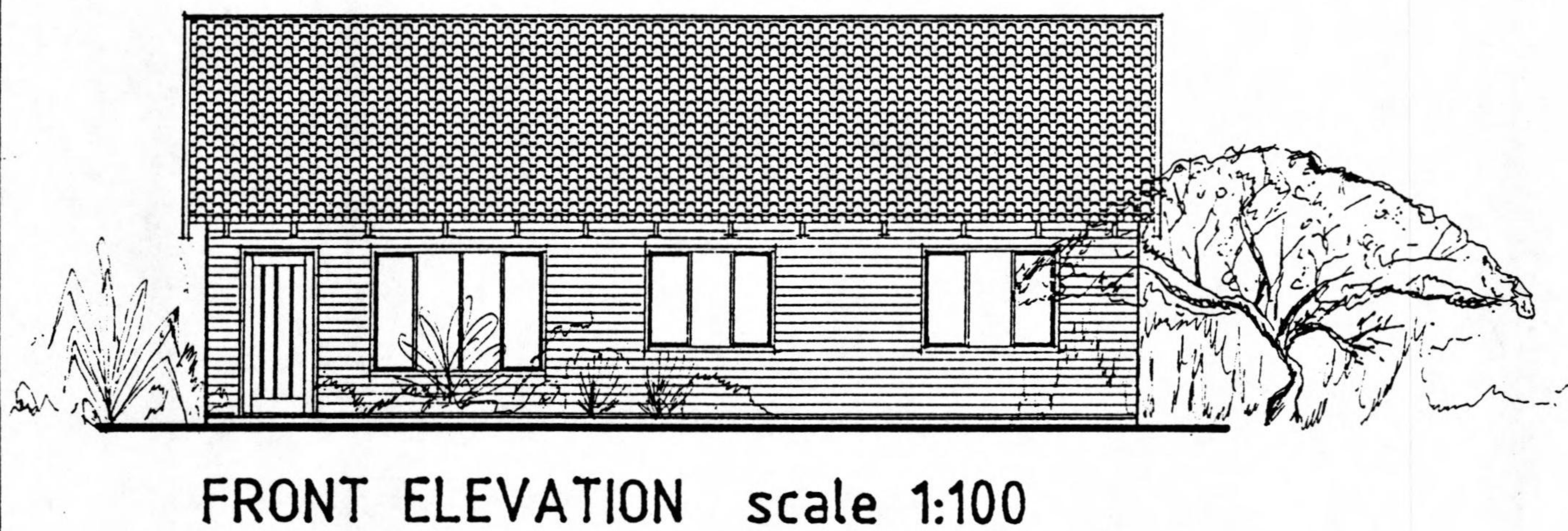
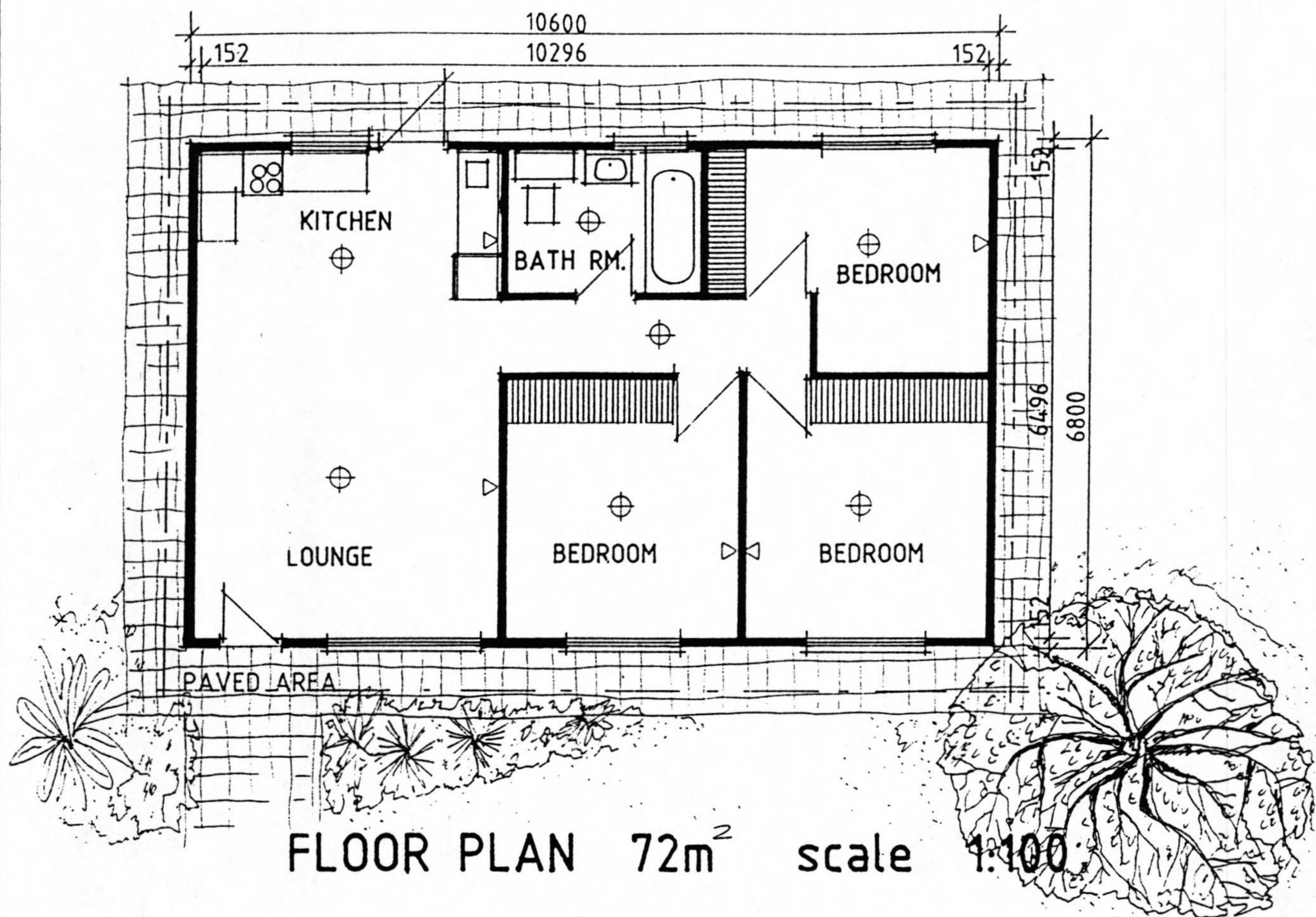
FLOOR PLAN 65m² scale 1:100

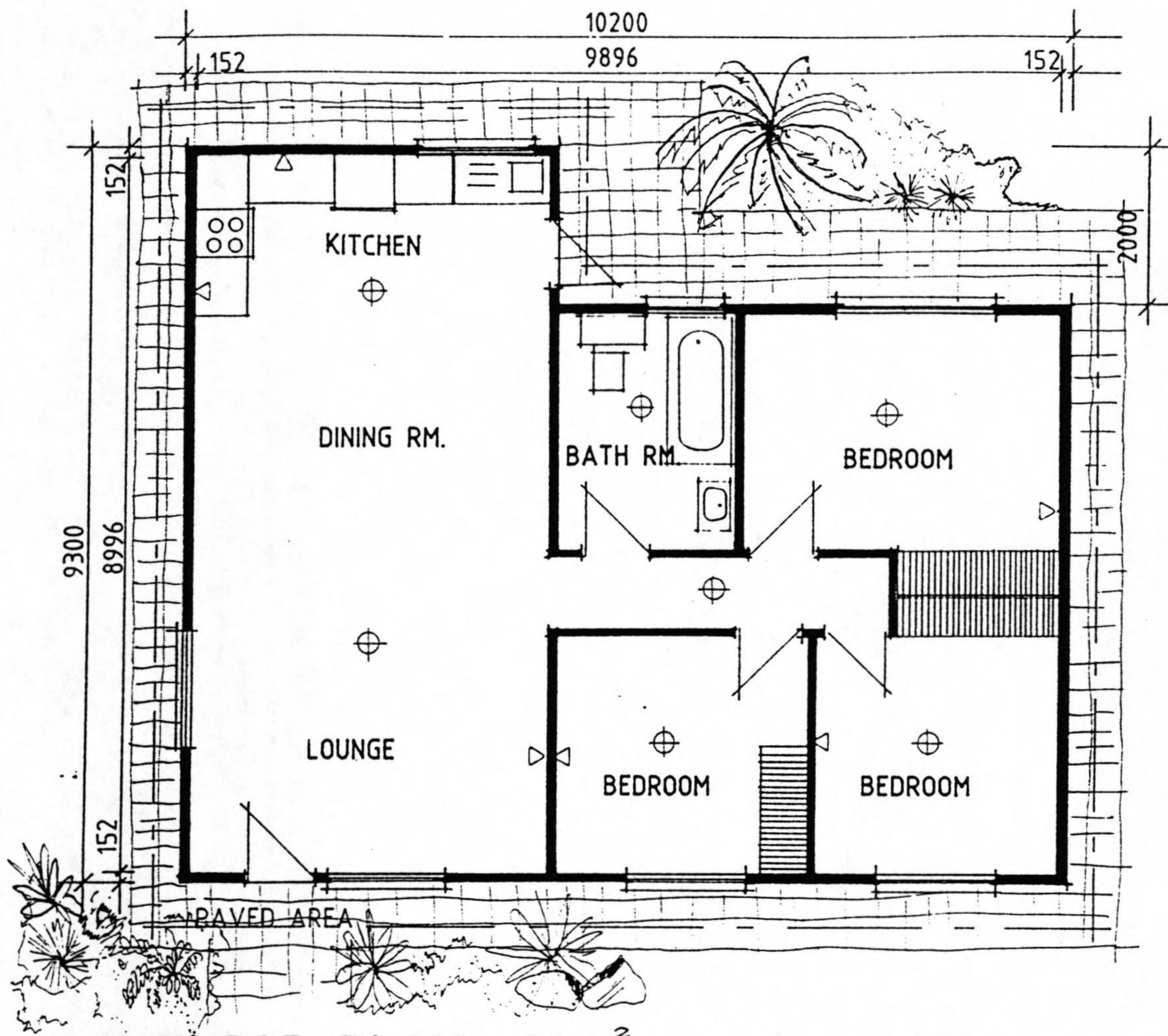


FRONT ELEVATION scale 1:100

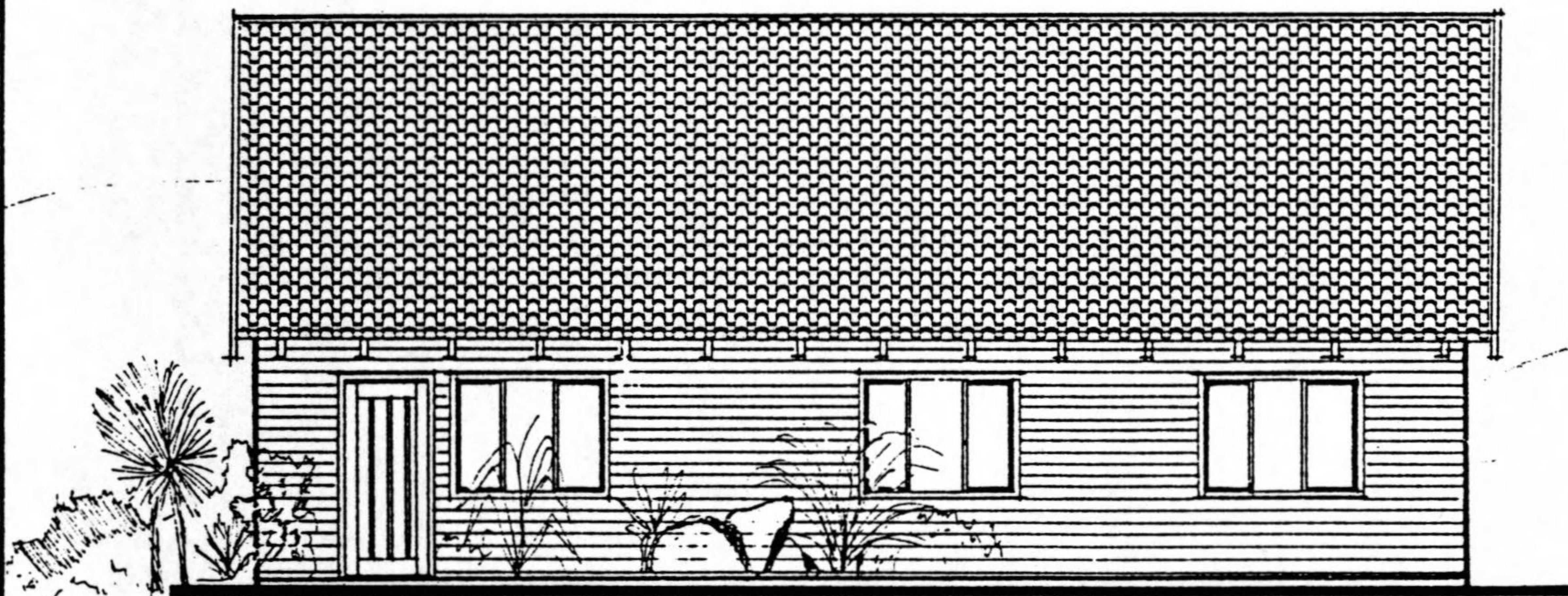


SIDE ELEVATION scale 1:100

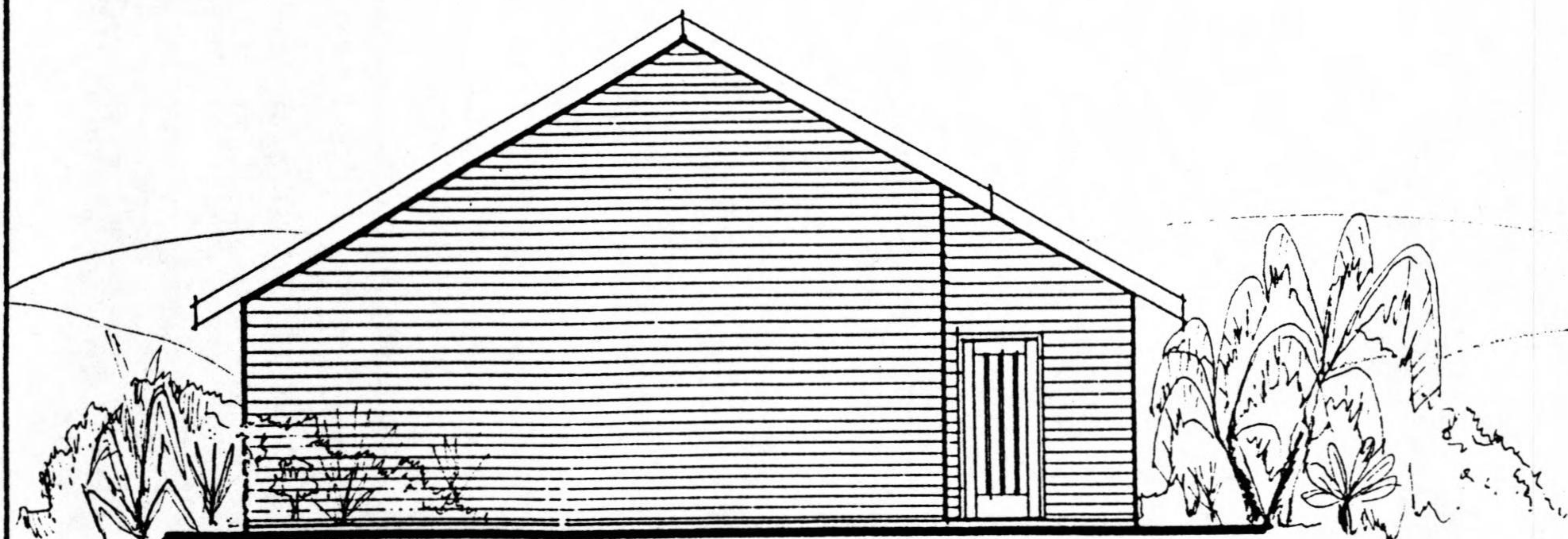




FLOOR PLAN 82m^2 scale 1:100



FRONT ELEVATION scale 1:100



SIDE ELEVATION scale 1:100

