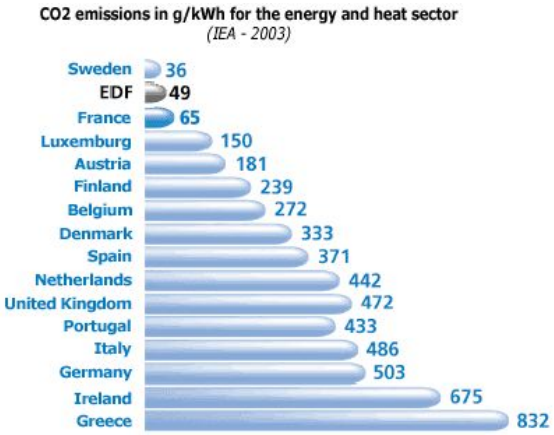
Ballycragh Community Centre

1 A sustainable approach to building in the neighbourhood

The basic condition of sustainable development is seen to be the preservation of biodiversity and the adaptation of human activity to natural global resources and natural tolerance (Anon 1994).

Building Sustainability

Buildings generate 44% percent of Ireland's CO2 emissions. There is a need for an approach to building to dramatically reduce this while limiting both embodied energy, and that used over the life of the building. The level of permanence required balanced against the embodied energy and maintenance required should inform the design of the building in its context. Many of the green building systems require constant upkeep. The effectiveness of individual green building approaches has to be considered in relation to how the building will be used. Continued investigation of the incorporation of such elements has to be considered through out the detailed design of the building.



Comparable figures on CO2 emissions in Europe

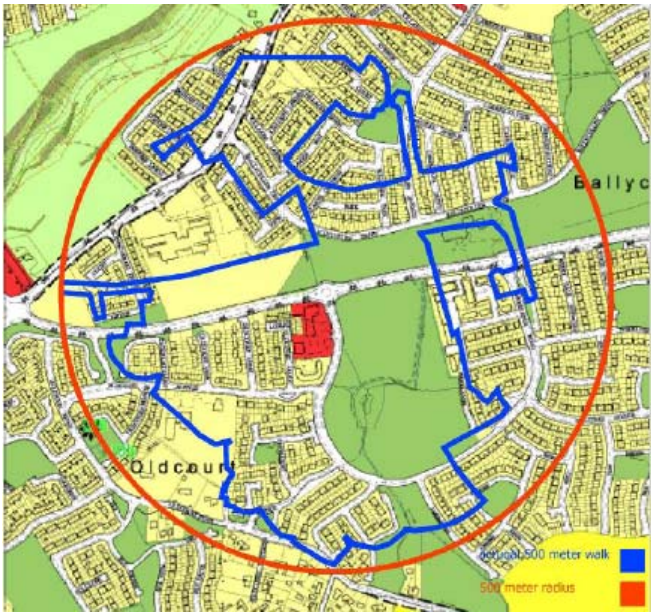
Due consideration will be given to those aspects raised in chapter 15 of "Sustainable Development a Strategy for Ireland" the government guidelines on green building design states: "*Green Design - Sustainable Building for Ireland*, *The basic principles of sustainable design are quite straightforward: minimise artificial lighting, heating and mechanical ventilation; avoid air-conditioning; conserve water; use site and materials wisely; recycle where possible. A great deal can be achieved by intelligent design and without using untried technologies."*

Sustainable buildings must optimise energy performance and reduce CO2 emissions through, for example; orientation to maximize use of natural light and heat, good thermal insulation, and energy-efficient space and water heating; use renewable or recycled materials, reduce use of non-renewable materials, and avoid the use of synthetic materials which affect indoor air quality or comfort; promote lower consumption of resources through the use of efficient components and fittings, such as low water consuming flush toilets, and water recycling

systems; be designed flexibly to facilitate adaptation to changing uses in the interests of maximising lifespan; and encourage reuse of existing buildings, and of demolition spoil.

Location

Thinking globally and acting locally are basic strategies in green design**.** Suburbs are in danger of supporting unsustainable lifestyles in terms of their environmental impact, current patterns of land use, travel behaviour, and excessive energy consumption. Changing demographics in Ireland contributed to by economic circumstances and modern life styles has led to existing neighbourhoods becoming unsustainable by way of a reduction of the average national house hold size. The dependence of many suburbs on car-use is a particular source of concern. Ballycragh is fast becoming such a neighbourhood.

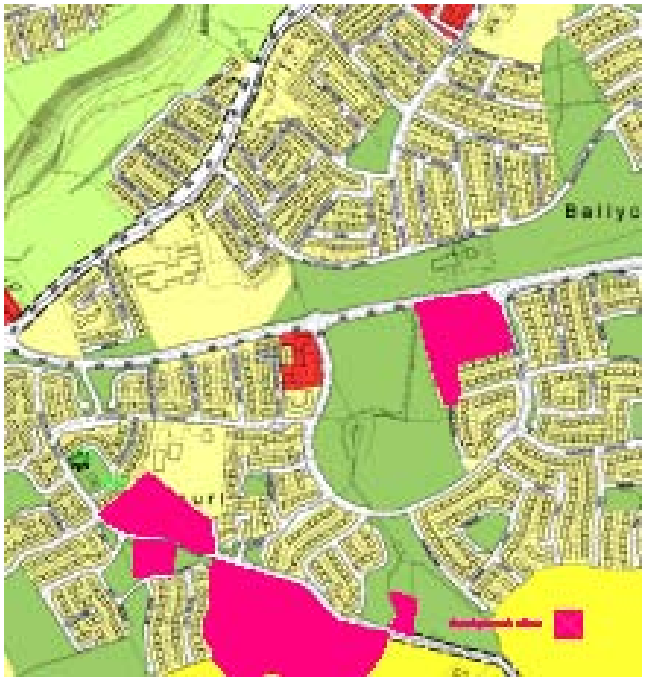


Gross to net pedestrian sheds indicating a 5 minute walk from Neighbourhood Centre

The sustainability of a building is not primarily placed in the materials used and mechanisms incorporated to service the building. It is essential that these elements cater for the users needs while minimising the building's impact on the environment however the location of the building plays a major role in how it will be used and how it will contribute to the sustainability of the given place in this case the Ballycragh neighbourhood. Of considerable importance is the access it allows to people with out having to travel by means which are harmful to the environment, the car.

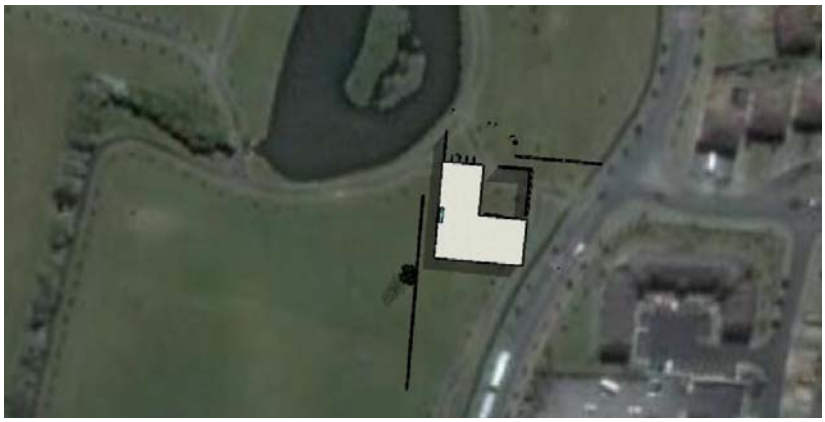
The location of the site is bounded by neighbourhoods of varying densities and age. There are still a considerable number of sites within the catchments of the proposed location of the building that have not been developed to their full potential (SDCC are currently preparing a LAP for the area). The majority of houses in the neighbourhood are less than ten years old. As a housing estates age a common pattern is that the population becomes more mixed in

age tenure and background. The combination of these factors implies a degree of uncertainty in the future form this neighbourhood will take.



Potential Development Sites in the Neighbourhood

Ballycragh neighbourhood also benefits from having a great variety of house size and type with in the catchment of the neighbourhood centre. This leads to mixed social and economic circumstances that can, given the appropriate spaces, contribute to a vibrant public realm. The building proposed to service this neighbourhood must be capable of responding to both its needs in the short term as well as embodying the uncertain needs of the future.



Arial view of Proposal in Context

The context of the building, placed on the edge of a neighbourhood centre and at the boundary of a large park can do much to contribute to the life of the centre. The building is intended to act as a gateway to the park while integrating fully with the neighbourhood. The building is will be inclusive, clear generous and inviting. To encourage as much participation

by the local community a square or plaza has been included to be used for community activities, such as farmers markets, school exhibitions, and what ever activities the community see fit. Activities in the community that might be otherwise happen behind closed doors can be performed in public space. The building aims to contribute to the community beyond providing a basic shelter for activity. It is envisaged that the building will be a generator of a more pedestrian friendly neighbourhood centre, with increased activity thus contributing to a more village like atmosphere in the neighbourhood. The open nature of the building will be inviting and encourage use of the park by acting as a gate which encourages access rather than being difficult to find. The presence of people will make for a safer place for children's

activity and play.

Future development will further lead to diversity in behaviour of the inhabitants. It is not clear therefore who will be the eventual users of either the building or how it will be used. The building must be built to allow the life of the building to be extended far into the future. The most practical way to cater for unanticipated need is to build in maximum flexibility, in other words to achieve a good level of social sustainability. The materials used must reflect this need for longevity while having a minimal ecological footprint in its construction.

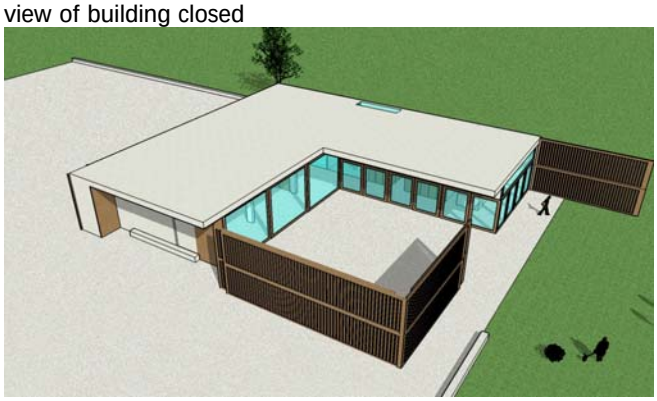
Flexibility

The goals of a functional 'loose fit' and also of flexibility conflict with the goals of saving material and energy, because the former tend to increase the extent of the project, and the latter to decrease it. In every project, a conscious estimate must be made whether an investment in generous dimensioning or flexibility will increase the potential service life of the building to the extent that the investment becomes worthwhile in terms of environmental as well as economic impacts – normal service life (a minimum of 60 years), and long service life (a minimum of 120 years) will be sought as the building is seen as generator or seed building to reinterpret its present context to a quality neighbourhood village centre.

A building, its components, or systems may, because of the general development of society or technology, become functionally obsolete or lose its serviceability, or its economical duration of use comes to an end. This will occur when current or future activity does not suit the building; or spaces are inappropriate; building systems are expected to have more modern performance characteristics. The technical serviceability, however, ends because of damage, or wearing out. The durability and flexibility of the building therefore play a major role in its sustainability in the long term. From the environmental viewpoint, one must aim at the correspondence of service life and duration of use requirements and not build from materials that are chosen particularly for their embodied energy. Such choices must be balanced against the functional requirements of a hardwearing community centre.

Community image will be enhanced by way of the involvement of the neighbourhood in the design of the building and placement of the building to be the incubator of a well-designed neighbourhood centre.

view of building closed



view of building half open

view of building open

2 Design approach

The following principles to sustainable design will be adopted during the detail design phase of the project.

Flexibility

Capable of responding to the community needs to the extent that the building offers the ability to cater for any social activity or gathering. Coupled with the large plaza space the building acts as a backdrop to a stage, or speaker corner. The building itself can act as the back stage when required for specific events**.** The inherent flexibility of the building will add further to the contribution the building makes to the community and thus its sustainability. It will also ensure that the building is used to its fullest capacity by catering for different size groups dependent on the activity required at any particular time of day.

Energy/CO2 Minimum Standards

Heating, lighting, hot water and all other energy systems will be identified as to their ability to achieve as close as is practical 'zero carbon building standard. Biomass boilers, heat recovery, and total energy systems or combined heat and power will be considered in the detailed design of the building.

The use of ground and air heat pumps are of economic value, but may prove to be of no global benefit in carbon emission terms as the majority of electricity generated in this country is by fossil fuel operating at only 30% efficiency. As such there may not be an over all gain in energy efficiency on a notational basis. Systems that deal with emissions within the site can produce energy on a more sustainable basis.

Solar water heating will be considered to the level to provide a reasonable economic and environmental return to the extent that it can provide for the hot water requirements of the building.

Cycle storage provision will be made for the safe, weatherproof and secure storage of cycles. No car parking provision will be made. This will encourage travelling to the building other than by car and will contribute to reduction of the carbon footprint of the neighbourhood as a whole.

The form and aspect of the building with generous south facing glazed elements will allow for a considerable amount of passive heating of the building which will have considerable impact on the design of the heating system.

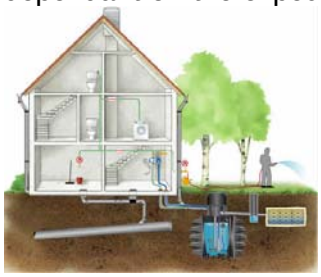
Image showing extent of south facing glazing

The cost in use factors and capital cost for all forms of sustainable energy will be considered more fully at the design stage of the project to asses their benefits and their overall contribution to sustainability.

Water

Specifically grey water systems will also be considered to minimise the impact on the public water supply and thus lessen the burden on the infrastructure. Internal potable water consumption will further be kept to a minimum by the use of rainwater harvesting. Any excess surface water run off will either be dealt with by way of soak ways or discharged into the river subject to an environment/ ecological impact assessment.

The rain water run off from the building surfaces will be managed in a manner which respects the existing ecology and will be disposed of on site where possible, and will also be used to supplement and or replace the grey water system should detailed design dictate. This will be dependant on the expected water use requirements of the community building.



Rainwater harvesting system

Materials

Minimum standard codes will be used to source materials for use in the construction of the building. The performance of materials in reducing emissions of the building in use will be weighted against their embodied energy in relation to the design life span of the building. Responsible sourcing of both primary and secondary building element and materials will inform the final materials used for the core of the building other wise the timber moving elements will be sought from local renewable sources where they are fit for their purpose.

Waste /Pollution

All insulating materials will avoid the use of substances that have a global warming potential and Ozone Depleting Potential in either their manufacture or composition. Nitrous Oxide emissions from any space heating and hot water systems will accord with the best standards for the given system. The use of resins and glues, which are harmful to the environment, will be avoided as mush as possible.

Health and well being

The quality of day light in the building has been designed to allow every space achieve well in excess of the minimum average daylight factor required by any European legislation. All rooms will have a view of the sky and will be designed in their detail such that they can receive direct sun light at all times of day. Sound insulation between the spaces will be to maximum possible standard while still retaining the flexibility of the building.

Passive surveillance of the outdoor enclosed space and the general public domain will be high either by perception of occupation or actual occupation. The ability of the building to adapt to varying degrees of connection with the public domain will give rise to the opportunity of maximum surveillance of the semi public spaces by the non participant.

The building will be accessible to disabled people and will achieve in excess of the legislative requirements. The single storey aspect and flat approaches will allow wheelchair bound people access all areas of the building on an equal footing with able-bodied people. Sensory signs will be included in the completed building to allow ease of access for the visually impaired.

The building as viewed from the south, open, half open, and closed

Future proofing of the building is further in enhanced by the combinations and permutations of spatial arrangements that the building will allow. The contribution the building will be capable of making at a community level will enhance its sustainable qualities.

Ecology

The resulting change in ecological value to the site will seek to be a major enhancement rather that interference with any positive ecological values that are identified on the site in accordance with the recommendations of a suitably qualified ecologist.

All existing features of ecological value will be maintained and adequately protected from damage during site preparation and construction works

The concept of an autonomous building contributing to the ecological balance of its context will be embraced in the detail design of the building, and implemented to the level of practical management. Consideration should be given to identifying an area in the park for the growth of copses for fuelling the biomass heating system, should it be deemed appropriate to install such a system.

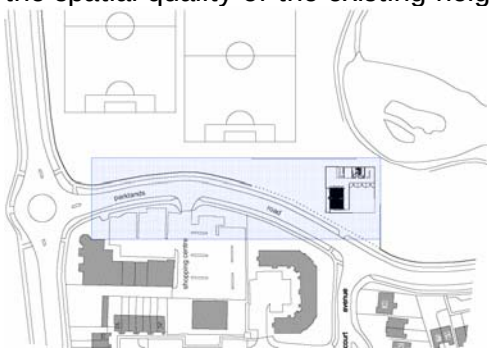
The maintenance of the building in use is a critical factor in the design intent of community buildings. This has been identified that it is an important factor in any Life-Cycle Assessment/Analysis and will be a major factor in the building systems chosen at detail design stage.

3 Designing to respond to the brief

The scheme has been prepared in response to the brief and particularly addresses those issues identified in the written document. The building is designed as a flexible unit that will allow many variations in activity to occur. This is achieved by the degree of movable walls incorporated in the building design. The divisible meeting room will allow for meeting of both large small groups, even while the large hall is in use for other activities, sporting, arts, cultural or other social events.

The building does not provide for any off street parking as such but use this hard landscaped area as Public Square. The building is seen as a generator of a more coherent neighbourhood centre in the future with a view to providing for a greater amount of the needs of the immediate neighbourhood in order to encourage walking within the neighbourhood. The whole ethos of the design is to encourage further use of the neighbourhood centre and the community centre itself by creating a sense of place for use by people rather than cars and thus contribute to the sustainability of the neighbourhood as a whole.

The centre is designed to make a connection between the park and the neighbourhood centre currently occupied by pubs shops and a crèche. The provision of a new square, the plaza, will bring these existing building into a formal relationship with the new building which forms a gateway to the park. The building only takes its foot print form the land of the park and that area reserved as a secure playground. Otherwise all external spaces are left accessible to the public. The centre will not only enhance the existing park, aesthetically, but will also enhance the spatial quality of the existing neighbourhood centre.



Shaded area indicates conceptual plaza

The building has been designed orientated to allow the maximum amount of glazing facing South and West thus providing for the maximum amount of solar gain to assist in the heating of the building. The suitability of active methods of providing carbon free heating will be considered on their merits as the design of the building is developed to a working drawing stage.

High initial costs generally restrain the adoption of green roofing systems. Current technologies, used on modern green roofs, have only been around for 35 years or so and thus have not been fully tested in real world situations. Design calculations would indicate that such roofs if they are appropriately maintained can last longer than modern single ply membrane roofs, some of which have a design life span of 25 years. Real world situations have seen such roofs perform well beyond their designed life span. In light of the initial maintenance period required to bring a green roof to maturity being of a longer time than the

present committee is likely to last, the continued initial maintenance requirement cannot be guaranteed. This coupled with the changing social profile of the neighbourhood demand the incorporation of a robust low maintenance system in the initial stages of the buildings life span. It is therefore proposed that the roof membrane will be of a tradition well tested and tried method, such as asphalt. In some cases green roof maintenance may involve re-waterproofing of the roof membrane, the costs of which are prohibitive.

First the roof loading capacity or maximum dead and live weight loads, determined by a structural engineer will be calculated to establish the additional structure required to support a green roof;. The additional weight means that the building has to be able to hold up under the added pressure. This has an impact on the cost of the frame of the building. Green roofs have certain limits in terms of installation and maintenance. Many roofs aren't designed to have people scrambling around doing regular maintenance, either. Moreover, some green roofs require complicated irrigation and drainage systems. However, technology is rapidly advancing to meet these challenges. The installed system will be considered in relation to its suitability for future incorporation of a green roof system and balanced against the initial capital cost of the building. A cost in use exercise will be undertaken at the detailed design stage to identify the most sustainable approach.

The use of water management systems will be addressed, in order that such systems that are deemed appropriate, and future technologies that we cannot be certain of, can be incorporated. A large plant room area has been allowed to cater for the provision of technologies that are deemed are appropriate by further design development.

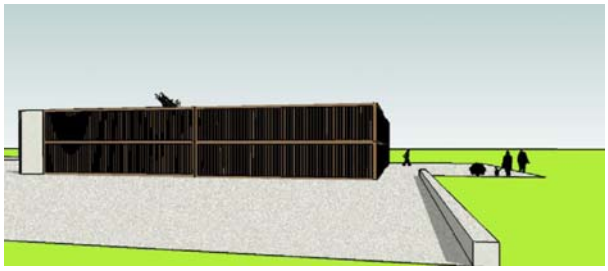
A structured play / activity space is provided at the core of the building in the courtyard. This space is bounded on the East and North by fully glazed doors, which can be open or closed. The edge of the space is seen as a gathering space to allow adult surveillance of children at play. The coffee dock is on the southeast corner of the building and opens both to the central court and the park, encouraging public participation in the building when the large gates enclosing the courtyard are open and allowing for the required passive surveillance identified in the brief. The space provided will enable the provision of a best practice play area, which can be adapted for to other uses as needs require. The coffee dock area will have access to the play area and have full view of the play / activity area.

Reception is incorporated in the office area, which allows for space for two people and day-to-day storage. The reception is adjacent to the main entrance and is enclosed on two sides by full height glazed walls allowing supervision of this space by the reception staff. A meeting room that can be divided into two smaller rooms has been provided behind the reception area.

Views of the main entrance in it various guises fully open half open and closed

The storage space for storage of play and recreation equipment is provided along one side of the large hall. The details of this space will be fully worked to meet the requirements and will be capable of being accessed while the hall is in use.

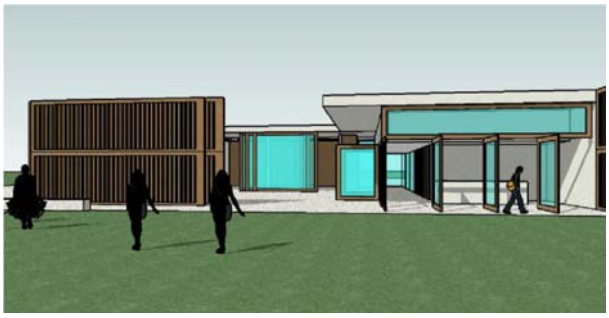
The building is located in the park in a specially designed and landscaped area to provide a gateway between that park and the new square to cater for social activity in the neighbourhood and focus the attention of the residents on the neighbourhood centre as a positive social amenity.



Gateway to the park

The building is designed as an L shaped block while enclosed in a rectangular wall of timber sliding walls allowing the building to be fully open to the public realm or closed, as the specific day to day needs demand. Security has been cited as a major factor in the design of building in the present social climate in the neighbourhood. The nature of the envelope of the building will allow the building to be closed off as a well-secured box while not in use. Open to allow the maximum permeability and passive surveillance of the public realm when in use. The degree of openness can vary dependant on the activity taking place and the sense of security required by the occupants. The enclosing elements are so ordered so as to allow for future expansion of the building by using the same architectural theme enabling reuse of the large sliding gates in future schemes.

Coffee dock closed



and open