Primary and Distribution Infrastructure - Rather than simply relying on grid supplied gas and electricity, the mix of developments provides opportunities for local energy production via combined heating and power (CHP) or combined cooling, heating and power (CCHP), which provide carbon efficiencies over standard plant and grid connections, particularly if based on renewable energy sources.

Further studies should investigate the financial and technical opportunities for cogeneration on the site and how this might extend beyond the site boundary to other buildings. Key considerations include:

- Business case and commercial arrangement, such as with an Energy Service Company (ESCo)
- Size, location and access to the energy centre
- Flexibility and adaptability to change to 100% renewable energy supply over time to allow the Ouseburn Central Area to become carbon neutral in building energy use.
- Supply chain for bio-fuels if they form part of the energy supply mix
- Distribution infrastructure for electricity, heating and cooling
- Billing

At the very least, the opportunity to link to the Byker district heating scheme should be investigated.

Buildings - The choice of building form & materials, designing for natural ventilation for when the weather is appropriate, reducing solar gain by using external shading, improving minimum standards for insulation, air tightness and glazing and installing low energy demand HVAC systems & components plant will have a significant impact on the energy and carbon target.

Building-Integrated Renewable Systems

Intent

To increase the speed of integration of renewable energy systems into buildings in Newcastle and to ensure the Ouseburn Central Area provides a demonstration of what is required and what can be achieved in the urban environment.
Requirement
Provide 10% of each building and dwelling’s total building annual energy use using building-integrated renewable systems. If site wide CHP or CCHP is provided, then the building integrated renewables are to be electricity generating systems only and not heat generating, to minimise the installed capacity required of the CHP/CCHP.

The carbon saving resulting from the installed renewable energy system on each building can be counted towards the carbon saving required by the Building Regulations enhancement set out above. The total energy use shall be estimated initially and monitored once the building is in operation. If the building is found to use more energy than that estimated, the amount of building-integrated renewables would have to be increased.

For buildings with very large electricity use, such as buildings with large IT servers or bank dealer floors, an alternative would be to fund renewable sources of energy elsewhere, to provide the required amount of electricity generation.

Possible Strategies & Technologies
This requirement can be photovoltaic solar panel (PV) or micro wind turbines. In practice, for most buildings, a combination of micro wind turbines and PV will be required because although turbines are more cost effective, there is likely to be insufficient roof space to hold the required number of turbines.

Building Fit-out

Intent
The size-fit-out of a building has a major influence on the building’s energy use. For certain building types, the energy due to the fit-out can be as much as 60% of the overall energy use of a building. Given the target to reduce carbon emissions, it is important to ensure the fit-out reflects the energy aspirations of the Ouseburn Central Area.

Requirement
Any fit-out must not compromise any aspect of the energy performance of the building form, fabric and systems.

Possible Strategies & Technologies
The building developer/landlord has an influential role to play in ensuring that an appropriate fit-out is designed and installed. In particular, the legal contracts between developer/landlord and fit-out/occupant should include legal terms to ensure the fit-out is suitable.

There will be buildings where the plot developer/landlord will be responsible for installing the fit-out alongside the basic building and systems. In other cases, fit-out design and installation teams may need assistance to understand their obligations because the low energy design innovation is something they will not be familiar with.

Energy Metering & Billing System

Intent
For simple reasons of operational efficiency and most importantly, to achieve the carbon saving objectives for the Ouseburn Central Area and to move towards carbon neutrality, it will be essential to influence occupant lifestyle and building operation choices by way of an intelligent energy metering and billing system. The design requirement is for a centralised CHP or CCHP system, operated by an Energy Service Company (ESCO), and the ESCO will wish to manage the billing of electricity and thermal energy. Otherwise, if standard grid supplied electricity, and gas is provided, then the electricity and gas meters should still provide the features described below.

Over time, the metering and billing system can be used to educate energy users about the finite nature of energy availability and to encourage them to select consumer products and lifestyle choices that reduce their energy needs. The aim must be to encourage occupants to understand that they have a right to a certain amount of energy at a reasonable charge, but if they exceed this consumption, their energy cost will rise very significantly.

For carbon neutrality it is essential that the billing of consumers reflect the full environmental cost and the importance of energy to society together with its finite availability. Without a fair and transparent pricing mechanism, energy use would spiral up as standards of living rise, making it impractical for renewable sources to meet the demand. Experience worldwide shows that, where low energy measures have been installed, very often energy use does not fall as intended, because occupants then tend to buy more appliances and run systems longer and harder as part of perceived higher lifestyle opulence. Consumers must be able to understand that they benefit from keeping their energy use low.

The Requirement
Install intelligent broadband connected energy meters in all homes and all public buildings and sub-tenancies.

The meters are to provide the ability to remotely perform time-of-day, maximum demand, and banded consumption differential rate energy billing. Real-time feedback to the occupants on their energy use shall be provided. This could be by telephone, email and prominent internet based display in each consumer’s premises, perhaps as part of a consumers internet ‘home page’. This feedback advises them how much energy they have used, whether they are on target to keep within this, if their peak energy demand is higher than normal and what to do to reduce it, and online contact information for further help.
The Billing System must provide interfaces with the Primary Infrastructure to establish the supply costs of electricity and heat at different times of the day or year.

The Billing System must interface with all metered homes, buildings and tenancies by connecting with the electricity and heat meters in every building, residence or tenancy, depending on how the buildings are occupied.

The energy distribution company will undertake to provide the end users with electricity and heat at agreed conditions, e.g. voltage for electricity, flow temperature and water flow rate for heat. The building and residential developer(s) must ensure that the Distribution System connects with all the end users and that it will provide constant supplies of electricity and heat with the appropriate metering. The end users must have easy access to the meters and the meters must be visible, to give them instant feedback about how much energy they are using at a given time.

One of the duties of the Billing system is to provide all consumers with monitoring and feedback services, providing advice and guidance on how their individual energy use can be reduced each year.

### Energy Metering & Billing System

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13.3 Access Networks and Transport Systems

Introduction

This section provides guidelines for the development of a more sustainable transport system in the Ouseburn Central Area. The guidelines support the fundamental objectives for delivering a sustainable movement culture, which are to:

- Reduce the need to travel;
- Reduce travel distances; and
- Encourage sustainable and energy efficient modes of travel.

Walking and Cycling

Intent

Provision of Ouseburn Central Area's walking and cycling network

Requirement

Provide the site wide elements of the walking and cycling network for the site, including access to external links.

Design Strategy

The requirement must provide:

- level, step free access across the network;
- crossings within the walking and cycle network and with the road network to be made at grade level;
- tactile pedestrian crossing facilities, with audible alarms with automatic volume control relative to local ambient noise level, at all junctions with the primary and secondary road network and at all junctions of the primary or secondary road network with the tertiary road network;
- safe, well lit routes;
- cycle routes with a minimum 4m width;
- walking routes with a minimum 3m width;
- high quality surface treatment, which is clearly understandable, well constructed, durable, safe and consistent throughout the network.

Public Transport

Intent

Provision of Ouseburn Central Area's public transport network.

Requirement

Provide the public transport interchange/network for public buses coming onto and through the site. Complete a feasibility study for the possible provision of a Metro station to serve the site at the top of the bank, to the east of Manors.

Design Strategy

The requirement must provide:

A link to the proposed public bus route extended from the Quayside and other possible future public transport routes into the site.
13.4 Information and Communications Technology

Introduction
The fundamental ICT objectives for a sustainable urban environment are:

- Providing the right information to match the needs of area and its population;
- Provide a multi-dimensional communications experience to the residents, public and commercial users;
- Promote through strategy, design, regulatory and commercial methods the sharing (common use) of physical assets that support fixed and wireless communications. Physical assets are defined as ducts, containment, cabling, antenna masts & poles, antennas, and switching centres that are of common use;
- Promote through strategy, design, regulatory and commercial methods the sharing of electronic transmission assets that support fixed and wireless communications. Electronic transmission assets are defined as network switching points that are supporting common protocols and present common use interfaces to multiple service providers; and
- Promote the use of sustainable components and materials to ensure that negative environmental impacts are minimised.

Site Wide Infrastructure

Intent
Provision of site-wide telecommunications infrastructure to support multiple services over a single shared physical network.

The Requirement
The physical telecommunications infrastructure (pit and duct network) shall provide capacity for a number of operators. The number of operators will be different depending on the level of infrastructure provision and will be a function of the split between residential and commercial/public use.

Possible Strategies & Technologies
A neutral host company or organisation could be established in the Ouseburn Valley who can administer and manage the physical infrastructure to ensure public and cities interests are safeguarded above any monopolistic interests of any single telecommunications operator.

Flexible Infrastructure - Regulations

Intent
Telecommunications infrastructure design to be flexible to accommodate a changing regulatory environment.

The Requirement
The physical infrastructure shall be able to support both a single operator as well as multiple operators.

Possible Strategies & Technologies
The default design shall be for a physical infrastructure design to support multiple operators but using BT design standards.

Flexible Infrastructure - Technological Change

Intent
Telecommunications infrastructure design to be flexible to accommodate changing user demands for technology and services over the life of the physical infrastructure.

The Requirement
The physical infrastructure shall be able to support technology refresh. The physical infrastructure shall be able to have a minimum 100% spare capacity in all areas.

Possible Strategies & Technologies
The physical infrastructure design to assume a hierarchical and layered structure of Core (central exchanges), Distribution (metro) and Access layer. The fixed network part of the physical infrastructure at all layers ideally to be optical fibre based.

CT has a Sustainability Enabler

Intent
To find ways in which ICT technology makes a positive impact on energy consumption and sustainability.
The Requirement

ICT network design including the choice of components shall support the metering and billing strategy to enable overall energy reductions to be made.

Possible Strategies & Technologies

The use of a centralised fibre optic based architecture where the quantity of distributed active switching equipment is minimised will provide energy savings over and above a conventional copper based architecture. The combination of using fibre optic and wireless technology as transmission methods together with low energy consuming devices at the user end could produce some interesting sustainability propositions for the Ouseburn Central Area.

The Billing System must provide interfaces with the Primary Infrastructure to establish the supply costs of electricity and heat at different times of the day or year.

The Billing System must interface with all metered homes, buildings and tenancies by connecting with the electricity and heat meters in every building, residence or tenancy, depending on how the buildings are occupied.

The energy distribution company will undertake to provide the end users with electricity and heat at agreed conditions, e.g. voltage for electricity, flow temperature and water flow rate for heat.

The building and residential developer(s) must ensure that the Distribution System connects with all the end users and that it will provide constant supplies of electricity and heat with the appropriate metering. The end users must have easy access to the meters and the meters must be visible, to give them instant feedback about how much energy they are using at a given time.

One of the duties of the Billing system is to provide all consumers with monitoring and feedback services, providing advice and guidance on how their individual energy use can be reduced each year.

13.5 Water and Waste Water

The following guidelines are aimed at water conservation, reducing total water consumption and dependence on potable supplies because this is the most effective way to:

- Reduce the impact of development on precious fresh water resources
- Reduce impacts on the environment generally
- Reduce energy use; and
- Reduce infrastructure requirements and costs

Reducing Demand for All Water

Intent

Reduce the demand for water by reducing consumption in buildings, in community areas, and in industrial developments.

The Requirements

All water supplied for inside services shall be metered so as to encourage water saving whilst reflecting the real costs of water supply and environmental impact. All meters shall have electronic output for remote monitoring by the building user and water supply authority.

Possible Strategies & Technologies

For All Buildings

Apply water conservation measures in all buildings by installation of appropriate water using fitments including:

- Dual flush toilets using the non-potable supply main (water use rating 6 litre / 3 litre or 4 litre / 2 litre dual flush)
- Water efficient (low flow) fixtures in all showers and taps (water use rating < 10 litres per min and < 5 litre per min respectively)
- Water efficient domestic appliances such as washing machines using non-potable water (water use rating < 8 litres/kg)
- In appropriate circumstances and buildings the following may also be installed:
  - Waterless urinals
  - Urine separating toilets
  - Composting toilets
  - Grey water reuse for non-potable applications
  - Cooling/heating system water recycling
  - Wastewater recycling for non-potable applications

Public and Private Landscape Water Uses

Select water efficient landscaping and water features. Use water sensitive design principles including use of appropriate, water efficient water features, planting species selection and landscaping design.
Use of Water of Appropriate Quality

**Intent**
Reduce reliance on potable water supplies by providing a non-potable (rainwater) water supply in each building unit.

**The Requirements**
Provide internal plumbing to supply rainwater for inside service uses such as toilet flushing and washing machines.

All building roofs shall be fitted with rainwater harvesting devices such as rainwater butts for use in garden watering and cleaning.

Provide external plumbing to supply rainwater for general cleaning and garden watering supplementary to rainfall collection.

**Possible Strategies & Technologies**
Use of proprietary rainwater management systems.

Safeguards must be in place in accordance with the water regulations.

changing user demands for technology and services over the life of the physical infrastructure.

**Flood Risk and Surface Water Runoff**

**Intent**
To ensure that the site use, layout and levels are based upon appropriate consideration of existing and future flood risk, including possible climate change and that the surface water runoff is dealt with in an appropriate manner including considering use of appropriate Sustainable Drainage Systems (SUDS) and use for non-potable water supply purposes within the development.

**The Requirements**
To identify if there is any existing Flood Risk Assessment (FRA) for the site and, if there is, to review if it is appropriate for the proposed development (a FRA prepared before December 2006 in accordance with PPG25 would require updating).

If there is no FRA, or if the existing FRA is not appropriate, then to prepare a FRA in accordance with PPG25 Development and Flood Risk (December 2006). The FRA will gather existing data on flood risk and carry out additional studies if required so that the flood risk of the site is understood.

It can then consider the types of development proposed and whether or not they are appropriate (as defined in PPS25) for the flood risk. This should be carried out as soon as possible so that inappropriate developments are not considered for the site and so that the “Sequential Test” as defined in PPS25 can be shown to have been applied in both site selection and determination of the site layout.

Determine the surface water runoff management strategy for the proposed site layout. This will incorporate the requirements identified in the FRA, and other relevant legislation including EA guidance, Building Regulations, etc. The opportunities for Sustainable Drainage Systems (SUDS) to reduce peak flows, manage water quality and provide amenity shall be considered. The opportunities to reduce water demand through use of rainwater harvesting might be considered.

Design Strategy

The design strategy must include discussion with the Environment Agency (EA) and Newcastle City Council (NCC) whilst preparing the FRA including reference to the Strategic Flood Risk Assessment produced by NCC. Liaison with Northumbrian Water Ltd (NWL) regarding existing sewer networks would be required.

The design of the surface water runoff system would reflect the strategies identified in the FRA, the appropriate use of SUDS techniques and any strategies for use of surface runoff identified as beneficial to the project.

**13.6 Waste**

**Introduction**
For the Ouseburn Central Area, waste will be considered to be a resource and an integral part of the cyclical flow of materials into and out of the Ouseburn Valley. Careful consideration of the management of these materials is central to the successful development of a sustainable resource and waste management strategy for the Ouseburn. The philosophy of a circular economy and the principles of the waste hierarchy have been applied in developing these design requirements. These design requirements actively contribute to the economic, social and environmental goals of sustainable development.

**Internal Waste Segregation and Storage - Residential**

**Intent**
Source separation of dry recyclables (e.g. paper, card, plastics, glass), food waste, household hazardous waste (batteries, WEEE, chemicals) and residual waste. These bins shall be stored in a suitably screened position within each dwelling e.g. designed into kitchen cabinets.

**Possible Strategies & Technologies**

Examples include:

Two way waste and recycling lockers i.e. one door opens into the dwelling and the other into the corridor. The collection crew can collect the containers/bags out of the locker using the locker keys and return them to the locker after emptying.

Examples of storage containers that can be integrated into kitchens to source segregate materials. All kitchen waste can be placed into a compost bin which is supplied with an activated carbon filter. A biodegradable sac can be provided in order to keep the collection unit clean after emptying.

**Internal Waste Segregation and Storage - Commercial & Industrial**

**Intent**
Source separation of dry recyclables (e.g. paper, card, plastics, glass), food waste, hazardous waste (batteries, WEEE, chemicals) and residual waste.
The Requirement
Safe, secure well marked (e.g. colour coded) and easy to use bins shall be provided. Waste storage capacity shall be provided in accordance with NCC’s requirements.

Possible Strategies & Technologies
Separate bins for white paper and coloured paper.
Bins for plastic waste (left) and glass waste (right)
Bins for small WEEE etc (e.g. calculators, ink cartridges etc)

Communal Waste Storage/Treatment Prior to Collection - Residential

Intent
Communal storage of source separated materials.

The Requirement
A secure, well ventilated and easily accessible storage area with good drainage and flushing facilities shall be provided to store source separated materials from all dwellings prior to collection. Storage volumes shall be provided in accordance with NCC’s requirements. Bins of suitable volume should be provided to store each source separated material, including a food treatment (composting) system.

A storage room for bulky items should be provided.

Possible Strategies & Technologies
Storage provided internally to the building.
Storage provided externally.
A dedicated area can be provided to house a food composting system such as The Rocket. The food waste is composted in 14 days and used locally on flower beds and gardens. (Web link: www.elcrp-recycling.com)

Communal Waste Storage/Treatment Prior to Collection - Commercial & Industrial

Intent
Communal storage of source separated materials.

The Requirement
A secure, well ventilated and easily accessible storage area with good drainage and flushing facilities shall be provided to store source separated materials from all commercial and industrial operations prior to collection.

Bins of at least 1,100 litres shall be provided to store each source separated material. At least two days storage capacity shall be allowed for. The total space allowed shall be to the requirements of NCC. In addition a temporary storage room for bulky items shall be provided.

Possible Strategies & Technologies
Secure, well ventilated and easily accessible storage areas with good drainage and flushing facilities.

District Collection and Storage of Wastes

Intent
To provide for the temporary bulk storage of separated materials collected primarily from residential areas.

The Requirement
An underground, secure, well ventilated and easily accessible storage system “Island” shall be provided to bulk store source separated materials (e.g. dry recyclables, hazardous wastes and residual waste).

This system shall provide easy access from above ground so that waste can be deposited freely by building management staff or residents.

The bins shall be colour coded to allow for easy identification by users.

Possible Strategies & Technologies
Automated systems that are concealed from view and lift out of the ground, enabling collection crews to easily remove the storage bins for transfer.
Colour coding is an easy and efficient method of ensuring the correct waste is disposed of in the correct bin.

13.7 Materials

Introduction
To minimise the impacts of the use of materials on the Ouseburn Central Area site, the use of materials must become less linear and more cyclic, whereby waste materials are used extensively and buildings, roads, landscape and other elements are designed for future reuse and recycling.

The use of materials in the construction and the long-term operation of the Ouseburn Central Area is a fundamental consideration in its development as a sustainable urban village. An overarching materials strategy must be developed that sets out the requirements for all activities related to materials on the site. It will guide contractors and developers in the principles of reducing materials impacts and ensure that the development meets its sustainable materials targets, using recognised environmental impact assessment methodologies.

Site Wide Materials Strategy
Implications for the type, quantity and source of materials start with the design process and the following guidelines set out the requirements for developers during the design phases.
**Intent**
To ensure commitment by developers to the site-wide materials strategy to be developed by NCC.

**Requirement**
All developers shall commit the overarching site-wide materials strategy, which shall include, but not be limited to, the following:
- Development of materials sourcing and use targets and criteria for all construction on site;
- Central materials purchasing using the volume of materials involved to negotiate better prices and sustainability criteria;
- Central waste handling to maximise the benefits from waste generated during construction and to minimise the costs associated with waste handling;
- Concrete production on site to maximise recycled aggregate content and the use of alternative cements;
- Adoption of the highest environmental standards for aggregates extraction in line with international minerals policy guidance;
- Identification and safeguarding of aggregate resources suitable for extraction;
- Support the development of aggregate recycling facilities in the most appropriate and environmentally acceptable locations, with measures to reduce noise, dust and visual intrusion to a practical minimum;
- Minimise the movement of aggregates by road.
- Selection and supply of materials for exterior landscaping.

**Design Strategy**
Developers to produce individual materials strategies for their buildings, infrastructure and landscaping - see below.

**Materials Selection**

**Intent**
To ensure sustainability in materials selection and use is considered and included in the development process from the earliest stages of design.

**Requirement**
All developers shall produce a materials strategy for all aspects of their developments that demonstrates how the requirements of the NCC site-wide materials strategy will be implemented for their developments. As a minimum, each developer’s strategy shall include method statements for how their designs for buildings, all infrastructure and landscaping will implement the requirements of the site-wide strategy and the following:
- Reduction of volume of materials used;
- Use of recycled material;
- Minimising waste;
- Selection for appropriate durability;
- Low maintenance requirements;
- Design for adaptability and flexibility;
- Design for future reuse;
- Use of impact reduction methodologies;
- Use of materials that grow;
- Use of local materials and components; and
- Specifications for construction that require sustainable sourcing and use of materials.

**Design Strategy**

**Reduce volume of materials used**
Through efficient design and by selecting reasonable loading and other design criteria, the amount of material required for a structure and other built element can be greatly reduced. Loading criteria should be reviewed for the various building types.

**Use recycled material**
This should include the use of recycled structure, elements and materials. The use of recycled structure and elements will depend on what is available within a reasonable distance from the site. A search should be conducted to identify local demolitions or suitable structures for re-use. Materials which can be specified to have a higher than usual recycled content include concrete, aggregates, aluminium, timber board products, plasterboard and carpet. See specific target requirements below.
Minimise waste
Through careful design to ensure the amount of off-cuts on site is reduced, good site storage of materials and segregation and recycling of waste it is possible to reduce the volume of construction materials entering the waste stream.

Select for appropriate durability
Where the in-service life of elements of construction is short, such as partition walls, these materials should be designed and constructed so that they can be easily removed, recycled and are not unnecessarily durable. Conversely, the permanent elements should have the highest life expectancy.

Low maintenance
By selecting materials in the design process that require minimal maintenance the ongoing impact can be reduced. For example, brick or self-finished concrete as opposed to render systems.

Design for adaptability and flexibility
Features designed in such as higher floor-to ceiling heights and larger column spacing inherently make structures easier to be adapted for different uses. Other features such as demountable partitions in offices would make them more flexible to respond to changes in organisation of the tenancy.

Design for future reuse
If information about the materials contained in a structure is recorded and kept, it becomes far easier to reuse the various elements of construction in the future. For example, if steel sections are marked along their length with their grade and mill certificate details, their properties and provenance would always be known so they could be reused much more easily. Designing so as to limit the number of steel section sizes in a building also improves the ease with which the elements can be reused. Use of joining methods that can be undone in the future reduces the likelihood of damaging the element when it is removed, and hence increases the possibility of reusing it.

Use impact reduction methodologies
Assessment of building and civil engineering structures using embodied energy assessment or lifecycle analysis during design will give an indication of the key impacts in the structure over its lifetime. Embodied energy is the least complex of these methods and can be used to compare and optimise different design options. Independent embodied energy indicators exist, against which new structures could be compared.

Use materials that grow
Materials that grow are generally renewable, absorb CO2 from the atmosphere as they do so, and use less energy to process. Timber is the main renewable material, but must be specified to ensure that it is harvested legally and from sustainable sources - see requirements below.

Use local materials and components
Use of local materials and components reduces travel impacts and provides employment for the community that will enjoy the benefits and suffer the negative aspects of the development.

Specify sustainable sourcing and use of materials.
To hand over sustainable designs to contractors who will build them as sustainably as intended, it is essential to enshrine the above aspirations and requirements in clear, concise and achievable specification documents.

Recycled Materials

Intent
To maximise the cost effectiveness use of materials recovered from the waste stream - thereby diverting waste from landfill and reducing demand for finite natural resources.

Requirements
At least 20% of the total value of materials used in all construction projects shall be derived from recycled and re-used content in the products and materials selected.

The most effective cost-neutral opportunities to increase the value of materials deriving from recycled and re-used content shall be identified and implemented.

Design Strategy
This can be achieved by using materials that have above-average recycled content, employing both off-the-shelf mainstream products, such as certain brands of bricks, blocks, chipboard and plasterboard, and materials that have been recycled from site or locally-won materials used on the project, such as crushed brick used for hardcore.

Recycled content is the proportion, by mass, of materials in a product, excluding waste material (such as process scrap) reutilized within the same process that generated it. Where a product or material is reused (e.g. is removed and replaced or is moved to another location), then it is credited at 100% reused content by value. The cost of a product is the unit delivered price for the materials, excluding installation costs.

The value of materials deriving from recycled content on a project may be calculated using the following summation across all the products and materials used:

\[ \text{Sum for all products of: (quantity of product A) x (cost of product A) x (% recycled content by mass of product A).} \]

Developers shall provide documentary evidence including a list of the products derived, distance from project to manufacturer and a calculation of the percentage of the total each constitutes.

Regionally Available Materials

Intent
To maximise the selection of regionally available materials in design and hence construction - thus reducing the embodied energy of materials and their environmental impact, as well as contributing to the local economy and employment.
Requirements
At least 50% of materials by mass used in the construction of buildings, infrastructure and landscaping shall be extracted, harvested, manufactured and/or recovered within 500km of the site.

Design Strategy
The quantity of materials deriving from sources within 500km of the site may be calculated using the following summation across all the products and materials used:

\[
\text{Sum for all products of: (quantity of product A) \times (mass of product A) \times (\% content by mass of product A extracted, harvested, manufactured and/or recovered within 500km of the site).}
\]

Aggregates
Intent
To ensure the adoption of the highest environmental standards for aggregates extraction in line with international minerals policy guidance and the identification and safeguarding of aggregate resources suitable for extraction.

Requirement
Designers shall include in their designs and specify the requirement for significant use of crushed aggregate, crushed masonry or alternative aggregates manufactured from recycled materials.

Design Strategy
Crushed aggregate, crushed masonry an alternative aggregates manufactured from recycled materials can be used extensively as fill and road bases and with suitable care of design in building structures

Sustainable Timber
Intent
To ensure that all timber used on site in construction and operation comes from legal and sustainable sources and that all designs are based on this requirement.

Requirement
Developers shall include in their designs and specifications the requirement for all timber products at Ouseburn Central Area, including structural, non-structural and temporary building timber and timber based products to be sourced from internationally recognised legal and sustainable sources that have suitable Environmental Management System certification at the extraction and processing stages.

Developers shall provide documentary evidence to demonstrate that all timber in their designs can be sourced from sources specified above.

Design Strategy
Suitable timber certification schemes include the Forestry Stewardship Council and the Canadian Standards Association.

13.8 Air Quality

Aim
 Provision of good quality air is an important objective to ensure healthy living in an urban environment. Pollutant sources in the urban environmental are generally dominated by emissions from road traffic but some industrial or power generation sources may also be important. Domestic heating emissions can be controlled by the use of appropriate fuels such as gas, low sulphur smokeless coal and low sulphur oil. Ideally emissions from individual houses from domestic heating can be eliminated by the use of CHP systems.

Design Guidelines
The provision of high quality air is achieved by the followings means:

- Separation between sources of air pollutants and areas where people may be exposed;
- Use of appropriate emission controls;
- Use of appropriate building orientation measures.

Separation of Pollutant Sources and Sensitive Receptors
Once released into the atmosphere exhaust gases disperse into cleaner air resulting in increasingly lower concentrations further from the source. Therefore, by providing a buffer zone between a pollutant source and sensitive receptors better quality air can be achieved. Ideally separate modelling studies should be undertaken for individual areas however, the provision of a 15m buffer can provide an overall level of protection to residential areas. Rail activities do not tend to be significant sources of air pollutants and do not require the same degree of separation, however, where there may be significant activity (such as at a metro station) an air quality study would be required to identify whether a buffer zone was required. This is not an issue for the site presently and should not be even if a Metro station was to be introduced to the east of the Manors station at the top of the Ouseburn bank.
Use of Appropriate Emission Controls

All air pollutant sources on the site should be subject to appropriate emission controls. For motor vehicles this would involve ensuring that only vehicles with a good level of emission controls would be allowed to enter the village. This could be achieved through the creation of a Low Emission Zone (LEZ) as currently being proposed in London.

Emissions from industrial and power generation sources are subject to controls that limit the quantities and concentrations of pollutants emitted. These are aimed at ensuring that good quality air is maintained.

Use of Appropriate Building Orientation

Some building arrangements result in a restriction in the circulation of air. One particular arrangement to be avoided is the street canyon, where a busy road is surrounded on both sides by tall buildings with few gaps to allow air circulation. This arrangement results in pollutants being trapped within the canyon with resulting high concentrations of pollutants.

There is also some evidence to suggest that changing building heights and having an occasional taller building can be beneficial in improving air quality because this results in more ground level turbulence that encourages dispersion of pollutants.

The building layout should also consider the relative location of pollutant sources and air intakes for ventilation systems. For instance, where possible, air intakes should not be located on the side of buildings near to busy roads. Air intakes should also ideally be located well above ground level.

Air Quality Standards

Intent

To provide residents of the Ouseburn central Area with the highest quality air to provide good environmental conditions.

The Requirement

To ensure that air on residential sites complies with UK and NCC air quality standards.

Possible Strategies & Technologies

Housing should be located as far as possible from any primary routes within the development. A minimum separation distance of 15 m between primary roads and the facades of properties is proposed.

Any on-site sources of air pollutants should be reduced or eliminated from the design. Should a centralised CHP system be used, then its location should provide sufficient separation from residential properties (based on dispersion modelling) to ensure that good air quality is maintained in residential areas. All industrial sources and CHP systems should be subject to emission controls to reduce levels of air pollution.

13.9 Noise & Vibration

Aim

Control of the noise climate is an important sustainability objective to ensure residents, workers and visitors can live, work and enjoy the urban village without excessive noise exposure. Appropriate noise standards must therefore be defined for indoor and outdoor residential settings, parks and public amenity spaces, and work places. Excessive noise levels can cause nuisance and potentially sleep disturbance in residential areas. Similarly, high noise levels in outdoor public areas can cause discomfort, thereby discouraging their use. This is particularly the case in parks and public gardens where people may have some expectation of tranquillity. In employment settings, high noise levels can affect working efficiency.

Design Guidelines

The control of environmental noise is generally achieved by the following means:

- minimization of noise at source;
- separation of source and receivers;
- appropriate land-use zoning;
- direct screening of noise source;
- screening by non-noise sensitive structures;
- optimal orientation of noise sensitive buildings;
- appropriate operational practices for noisy activities.

Minimization of noise at source

Reducing noise levels at source in the case of road transport noise is limited to controlling traffic flow and speed, and the choice of road surface. Speed and flow controls are likely to be outweighed by capacity requirements on primary routes. However, there maybe some scope for considering traffic calming speed controls on local roads in residential areas to reduce noise generation in addition to improving road safety. For primary routes with higher speed limits there may be a case for using low noise surfaces to minimise tyre/surface noise.

There is less scope to control Metro noise levels at source on existing lines, given the amount and speed of rail traffic are determined by factors outside of the design of the development.
Separation of source and receivers
Maximising distances between source and receiver is an ideal way of reducing noise impact. In dense urban areas it is often not possible to place transportation corridors far enough away from sensitive locations to sufficiently control noise levels by separation alone. However, the largest possible buffer zone should be used to create as much distance as possible.

Appropriate land-use zoning
As far as possible, noise sensitive locations should be zoned away from noise sources. For example, residential areas and outdoor recreational areas should ideally be placed away from major roads, whereas, car parks or commercial premises are less adversely affected by nearby noise sources. The effect of late-night noise, such as plant noise or entertainment noise can cause noise nuisance to residents nearby. The location of residential developments in these area must be carefully considered to avoid such problems.

Direct screening of noise source
Screening alongside roads or railways is an effective way of attenuating noise. Purpose-made noise barriers or walls occupy a small amount of space between source and receiver. Landscaping measures such as earth bunds take more space but provide a softer, more natural appearance. If the road is depressed in a cutting this will give some additional screening.

Screening by non-noise sensitive structures
As part of land-use zoning considerations described above, the placement of noise sensitive locations behind the shelter of other buildings not only creates distance between source and receiver, but provides screening. The larger the buildings or structures, the more benefit will be achieved. There may be a case for connecting buildings to eliminate gaps between them. Openings between buildings would otherwise provide pathways for noise to propagate further into the development.

Optimal orientation of noise sensitive buildings
Consideration of the most noise sensitive parts of buildings and their positions in the building relative to noise sources is an important factor in the control of noise. If it is necessary for a facade of a property to be exposed to a source of noise, then the least noise sensitive rooms should be located on this side, e.g. kitchen, bathroom, stairs or other utility rooms, whilst living rooms and bedrooms should be positioned on the quieter side.

Appropriate operational practices for noisy activities
Construction processes should be controlled according to best practice guidance to minimise machinery noise and use the quietest construction processes where practicable. The times of operation are also important to confine construction noise to the working day and minimise activities during more sensitive periods. Other noise generating activities such as commercial deliveries, operation of vehicle depots, entertainment noise, operation of machinery, should be operated in a way and at times of the day that will minimise disturbance.

The following examples illustrate a range of noise control objectives and the appropriate standards that should be targeted in each case.

Residential Buildings

Intent
To achieve appropriate internal noise climate inside residential buildings.

he Requirement
To control internal noise levels from external and neighbouring noise to 35 Db LAeq during the day and 30 Db LAeq in bedrooms at night. LAmax noise levels at night should be controlled to 45 Db or better standard if set by NCC.

[World Health Organisation 1999, Guidelines for Community Noise]

Possible Strategies & Technologies
Minimising external noise levels by separation distance between source and receiver and screening structures would reduce the need for building envelope noise insulation. It would also improve the potential for natural ventilation (e.g. open windows and vents) rather than mechanical ventilation.

Adequate noise insulation is required within the building envelope to control external noise ingress. The degree of noise insulation will depend on the intensity of the noise sources (e.g. road/rail/industry) operating in the locality of the building.

Outdoor Living Spaces

Intent
To achieve suitable noise levels in outdoor living spaces.

The Requirement
To control external noise levels to 50-55 Db LAeq during the day or better standard if set by NCC.

[World Health Organisation 1999, Guidelines for Community Noise]

Possible Strategies & Technologies
Controlling noise from transport corridors by distance separation, minimising vehicle noise emissions, use of low noise road surfaces and screening. Minimising buildings plant machinery noise such that it does not significantly contribute to background noise.
Outdoor Public Spaces

**Intent**
Control of noise levels in outdoor public spaces and parks to acceptable standards. To promote enjoyment of these areas and create restful spaces away from noise sources within the urban environment.

**The Requirement**
Quiet outdoor areas should be provided within the Ouseburn central Area and the ratio of intruding noise to natural background sound should be kept low.

[World Health Organisation 1999, Guidelines for Community Noise]

**Possible Strategies & Technologies**
Separation between noise sources and park areas in particular, and screening of nearby transport noise. Use of landscaping to provide visual and acoustic screening and soft ground acoustic absorption. Public spaces may benefit from natural noise sources such as water features to mask unwanted sound. The noise of wind through trees can also be a source of masking noise.