Noise Contour Map of Plant and Residential Noise

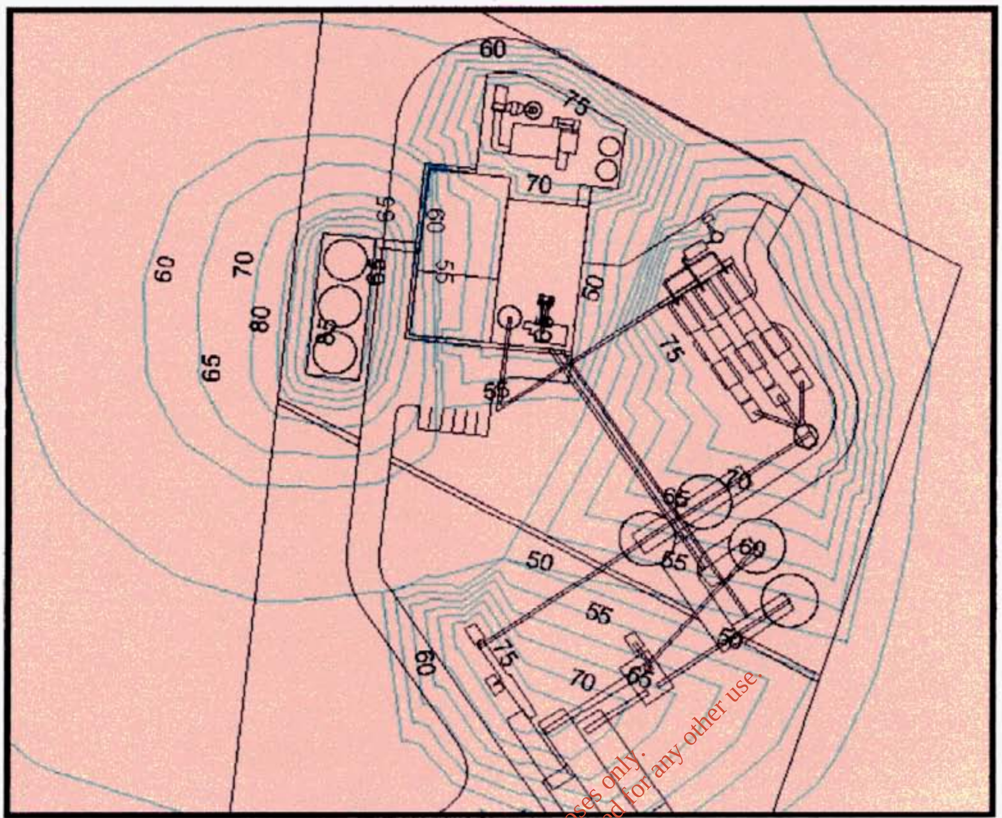


Fig 5.4 plant noise contours

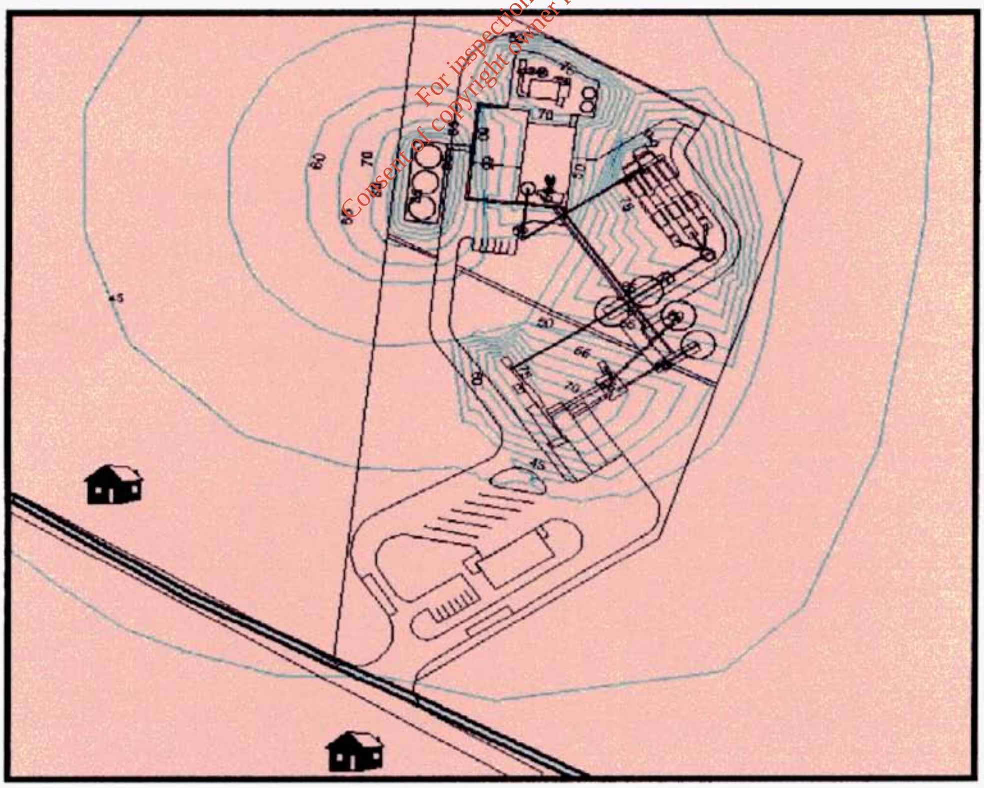


Fig 5.5 Residential Noise Contours

Residential Nois[redacted]

In dwellings, the critical effects of noise are on deep, annoyance and speech interference. To avoid sleep disturbance, indoor guideline values for bedrooms are 30 dB LAeq for continuous noise and 45 dB LAmax for single sound events. Lower levels may be annoying, depending on the nature of the noise source. The maximum sound pressure level should be measured with the instrument set at *"Fast"*.

To protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should *not* exceed 55 dB LAeq for a *steady*, continuous noise. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound pressure level should *not exceed* 50 dB LAeq. These values are based on annoyance studies, but most countries in Europe hare adopted 40-45 dB LAeq as the maximum allowable level for new developments.

At night, sound pressure levels at the outside facades of the living spaces should not exceed 45 dB LAeq.

Depending on the local situation, the noise emission requirements for power plants can differ widely. According to the *TA-Lärm* (Technical Instructions on Noise Abatement) in the Federal Republic of Germany, the following mise emission limit8 (guide values) should be complied with:

Table 5.11 Noiw Emission Limits

Site characteristics	day dB (A)	night dB (A)
Areas containing only non residential buildings	70	70
Areas containing primarily non-residential buildings	65	50
Areas containing non-residential and residential buildings	60	45

5.7.1 WHO Guideline Values

The WHO guideline values in Table 5.11 are organized according to specific environments. The guideline values represent the sound pressure levels that affect the most exposed receiver in the listed environment.

The time base for LAeq for "daytime" and "night-time" is 10 h and *8* h, respectively. No separate time base is given for evenings alone, but typically, guideline value should be 5 —*10* dB lower than for a 12 h daytime period. Other time bases are recommended for schools, preschools and playgrounds, depending on activity.

The available knowledge of the adverse effects of noise on health is sufficient to propose guideline values for community noise for the following:

a. Annoyance.
b. Speech intelligibility and communication interference.
c. Disturbance of information extraction.
d. Sleep disturbance.
e. Hearing impairment.

The different critical health effects are relevant to specific environments, and guideline values for community noise are proposed for each environment. With regard to this development only the following are relevant:

Table 5.12 Guideline values for community noise in specific environments

Specific environment	Critical health effect(s)	LAeq dBA	Time hours	LAmax, fast IdBI
Outdoor living area	Serious annoyance, daytime and evening Moderate annoyance, daytime and evening	55 50	16 16	
Dwelling, indoors	moderate annoyance, daytime and evening	35	16	45
Inside bedrooms	Sleep disturbance, night-time	30	8	
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

5.8 Additional Sources of Plant or Development No

5.8.1 Road Traffic

The noise from road traffic can be calculated for most situations by using the procedure described in 'Calculation of Road Traffic' [7] and by reference to BS 5228:part 1:1997 section D.3.5.2. Noise levels can be calculated at the nearest residence to a haul route by the equation:

$$LAeq_{(1hour)} = LWA - 33 + 10 \log_{10} Q - 10 \log_{10} V - 10 \log_{10} d.$$

Where LWA = sound pressure level of modern truck
Q = is the number of vehicles passing per hour
V = is the average speed (km/hr)
d = is the distance of the receiving position from the centre of the haul road.

The sound power level for a modern truck =102 Db(a), Q = 7 truck movements per hour, V = truck speed of truck 20 km/hr, d = 175m from haulage site and 20m from public road.

Calculation 1.

$LAeq_{(1hour)} = 102 - 33 + 10\log_{10} 7 - 10\log_{10} 22 - 10\log_{10} 175 = 42.5$ dB(A).

Calculation 2.

$LAeq_{(1hour)} = 102 - 33 + 10\log_{10} 7 - 10\log_{10} 22 - 10\log_{10} 20 = 56$ dB(A) .

Once the LAeq is calculated the next stage is to calculate the percentage of assessment period for which the activity takes place. In this instance the time period is ten hours.

The Laeq, (10 hour) = 42.5 –4 = 38.5 dB(A) for fuel handling haulage on *site* and

The Laeq, (10 hour) = 58 – 4 = *52* dB(A) for roadside noise.

Additional Calculations

It this study a comparison of monitored noise levels was undertaken on a quarry haulage route in a rural site on third class roads in Co. Limerick. In this example in a 45-minute period approximately eleven heavy vehicles passed within one metre of the noise meter located on the roadside edge. A summary of the monitoring results in included in table 5.13 below.

Table 5.13 **Summary of** Monitoring Results

Alongside Quarry				
Daytime	Leq dBA	Lmax dBA	L10 dBA	L90 dBA
Average	56.8	78.1	53.3	33.0

In this example the background noise levels or the L90 were not significantly affected by the passing traffic even though the vehicles were carrying heavier loads of aggregate that would produce higher noise levels and with a higher concentration of heavy vehicles travelling on the haulage route.

5.8.2 Management of Noise

The preliminary stages of undertaking an assessment of releases arising from the activity have highlighted the main noise sources. The following sections are largely referenced from the Technical Guidance Note, IPPC H3, Integrated Pollution Prevention and Control (IPPC), draft horizontal guidance for noise Part 2 – Noise Assessment and Control.

Emphasis should be on:

- Good process design or redesign. Utilising "low noise options", i.e. design the problem out rather than relying on "end-of-pipe" abatement to deal with a noise problem;
- Good operating and management practice backed up by an environmental management system.

5.8.4 Noise control at the Planning Stage

For a new facility the obvious time to consider noise control is at the initial planning stage. Similar opportunities may arise during the lifetime of a facility when planning an extension or when old plant is being replaced. At this stage potential noise problems can be "designed out". This approach is usually more effective, costs less and can be integrated into other elements of IPC, such as energy efficiency.

In some cases there will be planning restrictions governing what can be done on the site and these can limit the options for noise control, but in general consideration should be given to the following general principles:

- Use of inherently quieter processes
- Selection of inherently quiet plant or 'low noise options";
- Site layout to maximise natural screening, screening by buildings, and separation distances;
- Orientation of directional noise sources away from sensitive receivers; and
- Noise barriers and bunding.

5.8.5 Examples of Noise Management Techniques

For some operational facilities there are effective ways of reducing noise simply by being aware of its presence as an issue for the site, and by adopting appropriate procedures when carrying out every day activities. Such procedures can be collectively called "noise management' and can be particularly important where substantial noise control has been incorporated in a plant design.

5.8.6 Routine Maintenance of Plant

Noise generated in mechanical plant by the interaction of moving or rotating parts can increase over time, as these parts tend to wear. Specific acoustic attenuators may also degrade and wear out. The following are just a few examples:

- Fans can go out of balance;

Bearings can wear and become noisy;

- Ducts can start to rattle;
- Internal combustion engine silencers can break down and bum out;
- Acoustic doors may distort or the seals become wam;
- Resilient linings to hoppers may be eroded away and
- Acoustic enclosures (induding building panels) may become damaged.

All of these sources of increased noise could be avoided by ensuring a satisfactory standard of maintenance.

5.8.7 Good Operational Site Practices

There are a number of common sense procedures that can help to reduce noise emissions. Although these tend tu be specific to operations at a particular facility some common examples are listed as follows:

- Closing doors and windows in noisy buildings and acoustic enclosures;
- Ensuring that generator or vehicle engine hatches are kept closed;
- Locating mobile plant away from noise sensitive receivers where possible;
- Careful siting, use and volume control of public address systems;
- Considerate behaviour by the workforce, especially at night, to avoid or minimise shouting, whistling etc;
- Arranging delivery or on site vehicle routes away from sensitive receivers and
- Use of 'smart" reversing alarms, which produce sound at a volume that is relative to the background level, i.e. 5 or 10 dB above, rather than at a fixed volume.

Although the noise reduction benefits of these practices can be difficult to quantify, they should form a routine part of best practice to reduce overall noise emissions.

5.8.8 Restricting Operating Hours

The sensitivity of neighbouring areas to noise impacts will vary with the time of day and on different days of the week/weekend. More stringent standards may be applied for the evening (generally taken as 1900 to 2300 hours) and night (2300 to 0700 hours) than for the daytime.

The Irish EPA PC licensing guidance on noise is in line with other guidance in suggesting a 10 dB differential between day and night in the absence of more detailed information.

Restricting the operating hours of noisy activities can be an extremely effective way of mitigating community noise impacts and is often used, to great effect, in planning conditions for new facilities. Restricting operating hours may reduce productivity and create operational difficulties, but it need not necessarily require a complete cessation of all activity on the site. In some cases it will be possible to schedule noisy operations to the less sensitive daytime, weekday periods in order to keep noise emissions to a minimum at night.

In terms of pollution control, the restriction of operations should be regarded as a secondary form of control as it does not address control at source. For some operations it may however be appropriate.

5.8.9 Control of noise and vibration generated by machinery and industrial processes

This section highlights a range of noise sources and outlines ways of reducing noise by design or operation or by use of noise abatement equipment.

5.8.10 Aerodynamic- flow noise

Noise is generated by turbulence in the flow of gases, and fluids, in pipes, ducts or vessels. If solids are moved, for example in dust or waste extraction, they may cause impact noise in addition to noise caused by the air movement.

In general terms the greater the turbulence the greater the noise hence reducing the turbulence by smoothing the flow, reducing velocities and pressures can be effective at reducing aerodynamic noise.

i)High pressure releases such as blow-down, exhausts, emergency pressure relief or dump systems can produce very high noise levels for short periods due to strong turbulence in the area where the emerging jet meets the surrounding air. This type of noise is broadband in character with peaks at frequencies which are determined by the velocity and size of the jet. Attenuation can be achieved by using a vent silencer that forms a shroud around the area of maximum turbulence and absorbs the energy as a result of repeated internal reflection.

About 18dB reduction in output (sound power) can be achieved, with the higher attenuation efficiencies occurring at higher frequencies. The design will need to take into account not only the efflux velocity and the frequencies at which maximum attenuation is required, but also the permissible pressure drop. It is likely that a high-pressure drop or other restriction to the flow would be unacceptable on an emergency relief system or similar. An alternative is to reduce the velocity of the jet (where this is feasible), by increasing the diameter or reducing the pressure. Reducing velocity reduces the turbulence and hence the noise, so increasing the diameter of the source can reduce the noise; BUT this could give rise to another noise source. Alternatively, if the expansion is located somewhere back in the system and remote from the atmospheric vent, steps can be taken to absorb the noise energy before it reaches the outlet. Again, this may not be suitable for an emergency relief system.

Sometimes it is possible to duct the air stream away to a remote location or to a dump tank where buildings and distance may provide some degree of attenuation or, where control of timing is possible, discharged at a time least likely to cause annoyance. The health & safety implications, both to workers and also relating to environmental impad of the release, will need to be considered by the Operator as well as the frequency of occurrence; frequent operation of an emergency system may point to a need for process changes.

ii)Movement around restrictions or obstructions in ducts may also create noise. Obstructions or sharp bends can produce turbulence and lead to formation of vortices that produce noise at frequencies determined by the size and shape d the obstruction relative to the flow speed. A any of the noise peaks coincide with the resonant frequency of the system. then amplification can occur and much greater noise levels can result. The solution lies largely in system design, materials of construction and the velocity of air movement, although absorptive lagging applied to pipe work may provide some degree of attenuation.

iii)Gas control valves used on steam, gas or air systems can generate noise in the valve throat particularly if supersonic flow conditions are achieved by the combination of flow and orifice size. Reduction of pressure Is similarly better undertaken in small graduations, using several valves if appropriate, to avoid supersonic conditions. 'Low noise' valves are commercially available which contain a filter of porous material that serves to slow the velocity and reduce the turbulence around the jet.

In addition to the radiation of mise directly from the valve, associated vibration can be set up in upstream and downstream pipe work and attached structures, and can lead to noticeable "ringing" at the resonant frequency (ies) of the system. Reduction can be achieved by exterior fagging of pipe work with a combination of materials with damping and Insulating properties.

iv)Noise produced by cooling jets can be reduced by using a larger diameter, lower velocity jet to move the same volume of air. Good practice would be to optimise the combination of mass flow rate, timing, and direction of flow. Low noise nozzles are commercially available but may suffer a degree of loss of thrust.

5.8.11 Fan noise

Fan noise is a commonly occurring environmental noise problem; tonal, whining or beating noises can be produced and these may be may be particularly noticeable at night.

Noise is produced primarily a5 a result of the turbulence produced by the fan blades and is a function of the number of blades and the fan tip speed. This can be confined to quite a narrow frequency spectrum, and hence can be tonal in nature but random frequency aerodynamic noise may *obscure* the prominence of tones.

The frequency generated by Uta passing blades is known as the blade pass frequency and is determined by:

$$F = nr/60$$

Where f = the blade pass frequency

and r =fan speed (rpm)

n = the number of fan blades

Noise also arises fmm casings, motors and from vibration set up in the associated ductwork. Where fans are connected to an exhaust stack the fan noise can be radiated further field. Where batteries of fans are operated together, a "beating" noise can arise as a result of slight variations In speed. Lack of maintenance or loss of balance due to build up of deposits on the blades can Bead to onset of a noise problem on an otherwise satisfactory fan.

There are several aspects to fan noise control and manufacturers can often offer solutions discussed below. Although some of the techniques are straightforward some solutions will *require* careful design and implementation and them is no substitute for careful design and experience when it comes to selecting the right option(s) to reduce noise.

I)Fan design and selection

Ideally the fan and *its* installation should be designed as a complete package for a specific task and consideration of noise minimisation should indude the effect on adjacent structures.

Fans generally produce less noise if operated at the optimum efficiency relative to their characteristics; this point varies according to the type of fan. It may be difficult and expensive to subsequently modify a system for lower noise output after installation. Nearly all fans produce tonal peaks, w h i i can sometimes be reduced very easily by altering the speed. In many *cases* simple engineering solutions can be identified following investigations.

Where fans are exposed to high dust levels, erosion or imbalance can occur so shafts should be short and maintenance procedures strict.

Fewer, larger fans operating *at* lower speeds produce less mise than smaller high-speed fans. *As* continuous operation *may* cause less disturbance *than* intermittent, *the* advantages of running fewer fans continuously rather than many fans intermittently should be considered. This *may* be quite important for night -time operations. as relays that start fans can be very noisy.

If fans can be located at low level, i.e. on sidewalls, rather than at rooftop level other buildings, vegetation, local topography etc. will far more readily reduce the noise transmission.

ii)Resilient mounting of the fans and ductwork

Anti-vibration mountings *may* be required on fans to prevent noise being transmitted through the structure and re-radiating elsewhere. Ducts also may have to be resiliently mounted, especially if they are to be fixed to steelwork and similar structures. Connections should be made using flexible connectors where necessary to avoid the transfer of noise via pipe work and other services.

The use of sheet metal or other materials of construction that may vibrate when located in dose proximity to the fans should be avoided since the vibration may be transmitted to other parts d the structure. The use of smooth noise reflective surfaces will allow noise levels to build up in and around the building, whereas softer surfaces such as wood and straw will absorb sound

iii)Silencers

A range of silencers are available and it may be *necessary* to insert in-duct silencers both Noise control upstream and downstream to prevent radiation of fan noise through ductwork. These should be located as close to the fan as possible (but not so close as to lead to a non-uniform air flow velocity across the face of the silencer) and where this is not possible the intervening ductwork should be acoustically lagged. It may also be necessary to enclose or lag the fan. Where fans am used to push *gases* up a stack, silencers containing absorbent material can sometimes be mounted directly on top of the *stack* although where gases are hot wet or dirty the infill may need to be protected.

Acoustic louvres on exhausts and inlets can greatly reduce environmental noise. However, their performance can sometimes be disappointing if their installation increases backpressure or the velocity.

iv)Avoidance of turbulence

The flow *of* air or gas into a fan should be as uniform as possible and sharp right angle bends should be avoided In ductwork. The resistance at the inlet and exhaust should be as low as possible to avoid placing unnecessary loading on each fan. Changes of direction should be curved; silencers. *fans and* junctions sited away from bends and junctions themselves should be designed to go with the direction of flow. Conical or bell mouth inlets and outlets can help to *ensure* smooth airflow. Dampers and louvres may also create turbulence and can be significant sources of noise unless they have carefully designed, installed and maintained.

v)Maintenance

Regular maintenance of systems is very important. Many noise complaints hare been traced to worn bearings, imbalance due to erosion or damage, dust and deposits on the impeller and in the adjacent ductwork. Additionally silencers may be damaged, erode, corrode or become clogged and flexible connectors may become brittle or stiff.

vi)Active noise control

This technique could be considered in some circumstances and can be particularly effective for in duct solutions. A microphone is installed in a duct that relays the signal to a microprocessor, which then generates the same sound signal as the source. The new signal is 1800 out of phase with the original so it cancels it out. (In other words the peak of the new signal coincides with a trough of the old one and hence. theoretically, the effect is no pressure change) This signal is then played through loudspeakers (often 4) into the duct. The effect cancels out the noise and reductions as high as 20 dB(A) have been reported.

5.8.11 Combustion Noise

The noise associated with combustion processes is largely due to the unsteady burning of fuel and the gas velocity involved. In addition there can be noise from the induced draught fans. The design of burners and boilers is a very specialist area but with careful thought and design noise can be reduced at source and suitable silencers installed.

5.8.12 Hydraulic Systems

The main source of noise in hydraulic systems Is the pump, or compressors used to pressurise the system. The hydraulic mechanisms themselves are usually quiet. Pump and compressor houses can often be enclosed, with acoustic louvres being used at any air i n k and outlets.

6.8.13 Machine Noise

Machinery noise can come from many sources. The machine itself may be inherently noisy due to gears, bearings. motors or cooling fans. Additional sources may be in the material being worked, such as saws, grinders etc. The reduction of machinery noise can be a specialist area; with solutions ranging from correctly designed enclosures to the type of saw blades.

5.8.14 Impact Noise

Impact noise can be divided into three types In terms of the means of production:

- Impulsive action produced as a part of the operation of a machine - e.g. presses, drop hammers;

- Incidental to machine operation - e.g. hoppers, vibrating conveyors, screens;
- Operating procedures, e.g. dropping steel plates, timber.

This type of noise often comprises many frequencies and the solutions may range from operational ones (reducing drop heights) to mechanical ones (using resilient linings)

5.8.15 On-going management of noise - Noise Management Plan

On some sites that are large, or complex and on others where there is a significant noise issue then the development of a Noise Management Plan can be a very effective tool in ensuring that both the Operator and the Regulator adequately address noise issues.

5.9 Conclusions and Noise Mitigation Measures

The existing soundscape is one with minor to moderate, heavy vehicular traffic (trucks), moderate mechanised agricultural traffic, moderate residential traffic and regular commuting traffic noise. The plant will alter the acoustic soundscape of the site itself and introduce new noise sources to the locality. The impact of plant noise will largely be on a microscale (i.e. immediate vicinity of operations).The proposed development will alter the existing soundscape whereby the concentration of heavy vehicular heavy traffic will increase to moderate or marginally significant heavy traffic. Marginal increases in commuting traffic will result from employee movements. The impact on background ambient noise levels (L90) will be negligible, however increases in the continuous equivalent noise level (Leq) will occur. The impact of the development on existing noise levels is subjective and will largely be from traffic noise associated with fuel delivery and not the power plant development. The fuel delivery traffic is not continuous and the implementation of a traffic management plan will assist in reducing traffic noise associated with the development. The noise associated with traffic will be localised, sporadic and concentrated along the main communication or access mutes. Increased traffic on Irish infrastructure in recent years has been significant with subsequent increases h ambient noise levels abng communication mutes. The total number of vehicles increased by 54 per cent during the 10 – year period between 1988 and 1998. Private cars accounted for the major part of this increase but heavy goods vehicles increased by 58 per cent in the same period. The impact of traffic must be seen in the larger context and weighted against the environmental benefits of such a development.

The likely future noise emissions arising from the new development and the equipment used have been predicted and the total amount of noise which would be emitted from the site determined. In addition the amount of noise from the site which would be received at the noise-sensitive property or area identified in the survey has been predicted.

The following noise criteria, targets have been considered for this project:

Day time (07:00 - 24:00) 55dB(A)

Night time (24:00 - 07:00) 45dB(A)

These criteria relate to emissions from the development as measured at the nearest or any private residence. Building design will be such as to achieve these criteria. including the incorporation of noise suppression materials into the building fabric as required. In the case of other significant noise sources, such as compressors or blowers, these will be located within bid-built structures where similar design standards and specifications Will be applied In order to ensure that these targets are achieved. Other measures that will be applied, as necessary, to meet these targets will include silencers on compressors and blowers, noise absorption panels, double doors and double glazing.

Safety regulations and good practice require that warning sirens be employed prior to starling up or operating particular types of equipment such as conveyors, mills and overhead wanes. Alarm bells or sirens will also be an integral part of the fire alarm system and will require occasional testing. AH such noise sources, which will, by their nature, be intermittent and will be so located and screened to minimise noise emissions to the external environment.

In Ireland several power stations are situated in cities and towns, where noise pollution, and community noise levels are important considerations.

Table 5.14 Thermal Power stations in populated areas in Ireland (lase).

Station	Fuel	Location
Poolbeg	Gas/Oil	City Centre
Aghada	Gas	Near Town
Manna	Gas	City Centre
North Wall	Gar	City Centre
Shannonbridge	Peat	Rural
Lanesboro	Peat	Rural
Caherciveen	Peat	Rural
Bellacorrick	Peat	Rural

It is reasonable to assume that similar noise emissions levels can be achieved at this location as with any of the above plants.

6.0 Landscape and Visual Assessment

6.1 Methodology

This report examines the impact of the proposed development on the existing landscape character and the visual impact on major roads, minor roads, residential dwellings and designated views and amenity areas, as listed in the Monaghan County Development Plan 1999.

A description of the existing appraisal method is given before an examination of the existing landscape character and the impact of the proposed development is examined.

The landscape and visual impact is estimated based on:

- the existing landscape assessment for the *study* area,
- the level of visibility of the proposed development,
- the visual burden or visible attributes of the facility,
- the estimation of visual envelope and the actual visual impact.

andscape and Visual Assessment Method

The *Draft guidelines for Planning Authorities on Landscape and Landscape Assessment* published by the Dept. of Environment and Local Government in June 2000 are used as the basis for the landscape assessment. These are discussed in detail in Appendix 6.

The guidelines recommend the classification of landscapes according to the following framework:

1. Landscape Character;
2. Landscape Values; and
3. Landscape Sensitivity

The above aspects of the landscape should result in the production of an overall assessment of the study area comprising of the following:

- A map, or series of character maps and photographic and written descriptions which represent landscape character areas;
- Overlay of values; and
- Overlay of sensitivity

6.2.1 Landscape Assessment of Existing Environment

6.2.1.1 Site Context

The *site* for the proposed biomass plant is located in a rural setting approximately 4 km west of Emyvale. It is situated in a rolling drumlin style landscape characterised by small hills and valleys.

The site is accessed off a small third class road which joins third class roads connecting to the N2 in the east at Emyvale and ?heR186 in the south west.

The site is used for rough cattle grazing. the lower ground on the north side of the site is wet and is overgrown with rushes. The site is divided into four fields with a total area of approximately 3.5 hectares. The land to the north, east and west of the site is used for cattle grazing. There is a large poultry farm located south ofthe site.

There are no significant landscape or visual features on the site. The visibility of the site in the surrounding area lo low due to the location of the site in the valley.

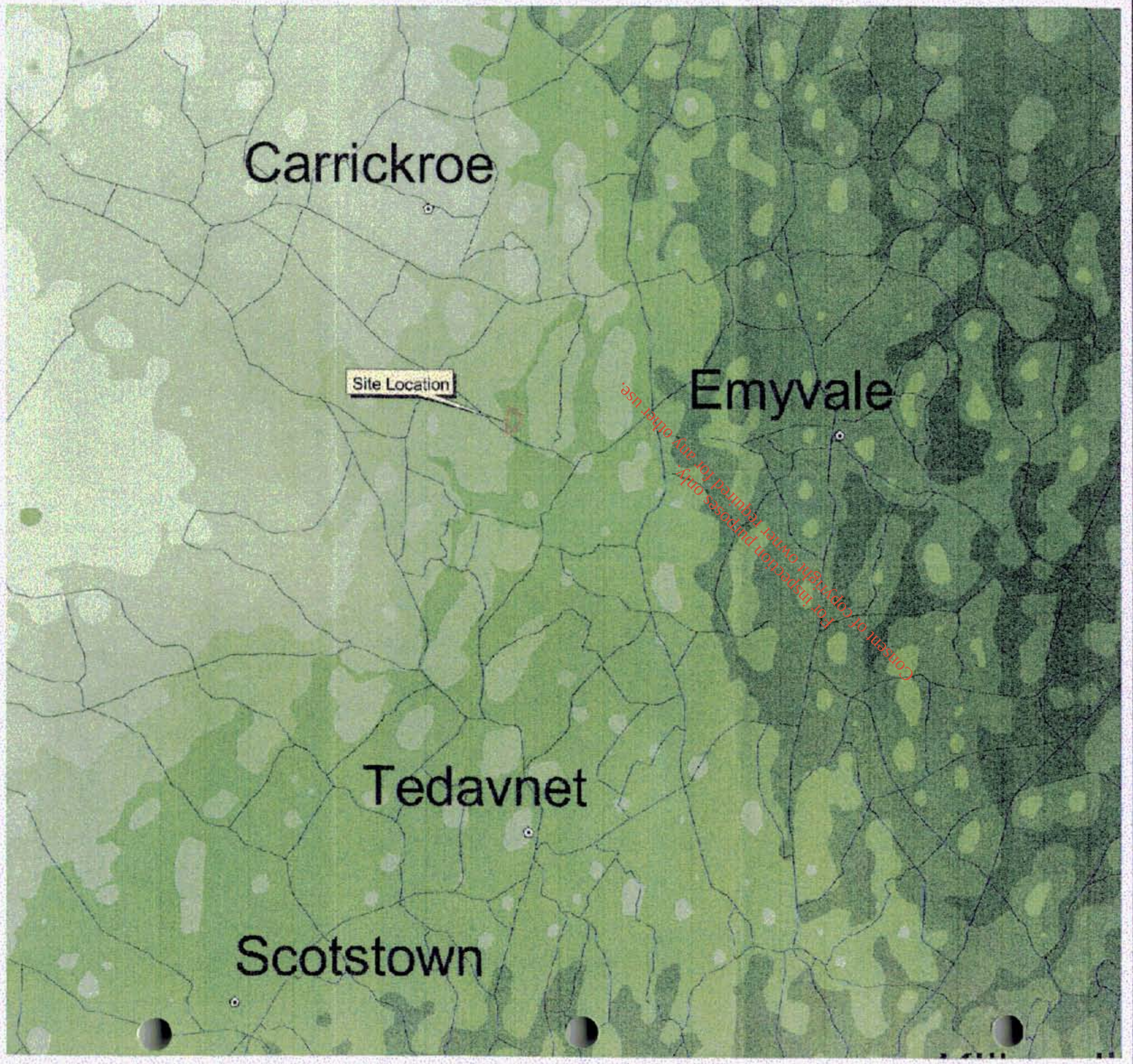
6.2.2.1 Character

Co. Monaghan has evolved mainly as an agricultural county, but in recent times there has been a growing emphasis on agri-industry development.

The landform for the area was categorised using the Digital Elevation Model, Relief Energy Class and Slope maps for the area shown in Figures 8.1 – 6.3 respectively. The county is dominated by the rolling drumlin style countryside as can be seen In the DEM map for the region. Moving ivv moulded the surface into innumerable elongated hillocks and ridges. In some areas the drumlins have seriously disorganised the drainage patterns and as a result small and some large lakes are located between the drumlins. Each drumlin possesses varied soils; cultivation possibilities are dependent on the steepness and the land is best used as pasture of meadow. Field patterns are closely adjusted to the terrain with the main boundaries running across the drumlins. Thii is a fragmented. introverted landscape favouring small territorial units, townlands and farms.

A relative strong sense of enclosure Is created by the hills arwnd the site, whkh range in elevation from 125-130m at the highest points. The site itself ranges in elevation from approximately 90m at the north side ofthe site to 105m at the south ofthe site. There is a general undulation from the road on the south ofthe site to the lower parts of the site on the northern side. A small stream runs along the western boundary of the site. This flows into the River Mountain Water at a distance of 1Km from the site. This is an eroding upland river, whkh is a tributary of the river Blackwater with their confluence approximately 10Km to the east of the site boundary.

Figure 6.1: Digital Elevation Model



Project: CHP Biomass Plant
Client: Renewtech Ltd.
Date: December 2001
Prepared by: KOD
Approved by: SH/DW

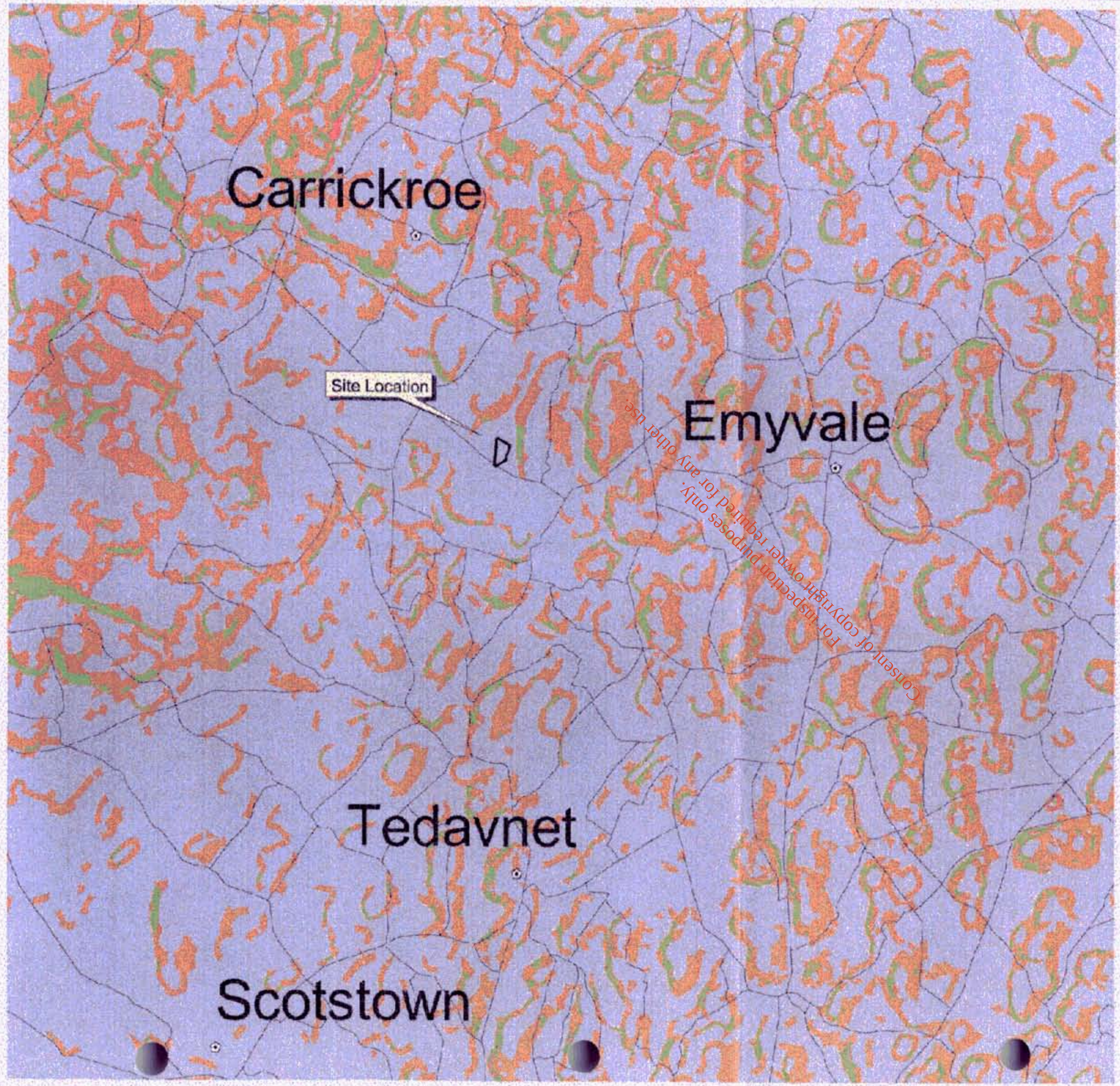


Figure 6.2: Landscape Terrain Model

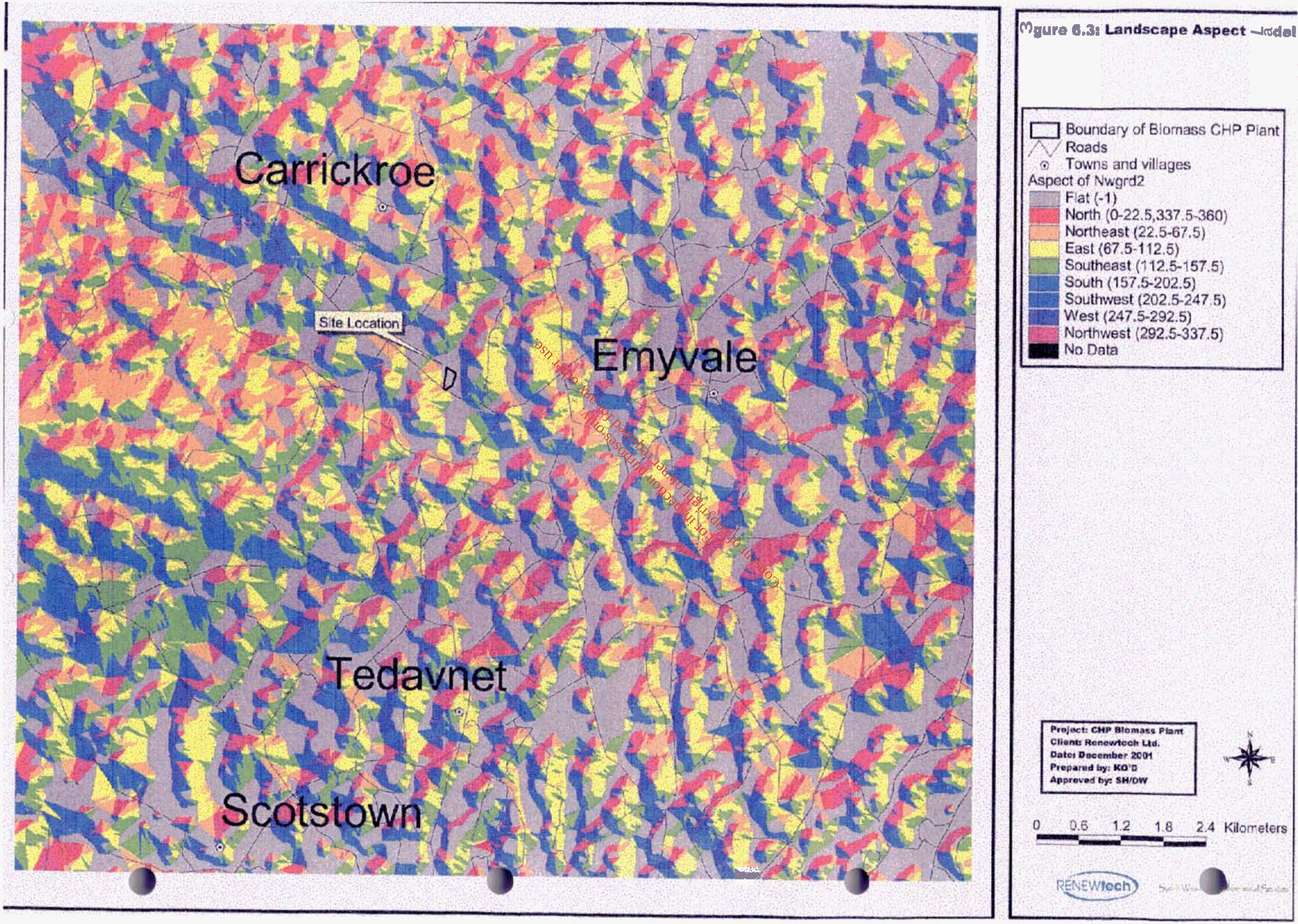
Boundary of Biomass CHP Plant
Roads
Towns and villages
Slope of Digital Terrain Model
0 - 5
5 - 10
10 - 15
15 - 20
20 - 30
30 - 45

Project: CHP Biomass Plant
Client: Renewtech Ltd.
Date: December 2001
Prepared by: K'OD
Approved by: SH/DW

0 0.6 1.2 1.8 2.4 Kilometers

RENEWtech

Figure 6.3: Landscape Aspect Model



Landcover far the area was determined by examining both natural and infra-red satellite images for the region, see Figures 6.4 and 6.5, and developing a landcover map as shown in Figure 6.6. The existing landcover In the site itself consists of grassland in use for cattle grazing, hedgerow and tree planting and rush infested bog. Grass and grass types are covered in the ecological section of this EIS. The hedgerows on site are mature hedgerows, which are overgrown in places.

The landcover In the a m around the site is also dominated by grassland interspersed with reclaimed and marginal fields that are in some cases enclosed with earth ditches, hedgerows or tree-lines. The mosaic field pattern reflects the homogeneous nature of the land and its low fertility. The fields on the north side of the site am very wet in nature and rushes dominate the vegetation in this area.

The lands in the region are used for small-scale dairy and dry stock farmhg, intensive poultry farming and mushroom farms. The poultry and mushroom farms are located throughout the region, there is a large mushroom composting plant approximately 3 km west ofthe site.

There are a number of operating and disused quarries in the area.

Two telecommunication masts located approximately 1 km west of the site visually dominate the skyline for the surrounding area. There is a 38kV electrical substation 0.5 km west of the site beside the third daw road, which passes the site.

settlement patterns in the area consist of one-off houses and farmsteads. Carrickroe is the nearest village approximately 2.5 km northwest of the site.

The landscape in the site and surrounding area is strongly influenced by anthropogenic features with numerous agricultural facilities including poultry houses and mushroom tunnels. Aside from the strong agricultural influences there are other features which detract from the aesthetic integrity of the area. These include ESB and Telecom lines, the telecommunciation masts. the 38kV substation and the significant number of heavy commercial vehicles (HCVs) using the small roads.