

**Report on Investigations into Planning,
Environmental Compliance and General Nuisances
Associated with a Quarry Operated**

by

**P. McCaffrey & Sons Ltd.
Ballymagroarty,
Ballintra,
Co. Donegal**

REPORT

December, 2000

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TABLE OF CONTENTS

ITEM		PAGE NO.
1	INTRODUCTION AND BACKGROUND	1
2	SITE HISTORY AND DESCRIPTION	2
3	ADHERENCE TO PLANNING REGULATIONS	3
4	ENVIRONMENTAL COMPLIANCE	4
4.1	Dust	4
4.2	Air Emissions	6
4.3	Noise	7
4.4	Visual Impact/Waste Disposal	9
4.5	Flooding and Soil Contamination	9
4.6	Groundwater	11
5	GENERAL NUISANCES	12
5.1	Safety	12
5.2	Damage to Property	12
5.3	Blasting / Vibrations	13
6	CONCLUSIONS	14

FIGURES

Figure 1	Site Location Map
Figure 2	Site Map and Dust / Soil Monitoring locations.
Figure 3	Instantaneous Dust Monitoring Results - (Quarry in Operation).
Figure 4	Instantaneous Dust Monitoring Results - (Quarry not in Operation).
Figure 5	Noise Monitoring Locations



TABLES

Table 1	Dust Concentrations Measured at Ballymagroarty, Ballintra over the period 28/4/2000 to 1/9/2000.
Table2	Noise measurements from Ballymagroarty, Ballintra, Co. Donegal - 18 th and 19 th July 2000.
Table 3	Mineral Oil, DRO and GRO Soil Analytical Results - Gormans, Ballymagroarty, Ballintra, Co. Donegal.
Table 4	PAH Soil Analytical results - Gormans, Ballymagroarty, Ballintra, Co. Donegal.

PHOTOGRAPHS

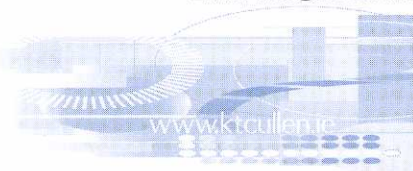
Photographs 1 to 29





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1 INTRODUCTION AND BACKGROUND

K.T. Cullen & Co. Ltd. (KTC) were requested by the Gorman family, Ballymagroarty, Ballintra, Co. Donegal to undertake investigations on their behalf into planning, environmental compliance and general nuisances associated with the adjoining quarry operated by P McCaffrey & Sons, Ltd.

The family home of Mr. Jim Gorman, his wife Mary and five children is located at Ballymagroarty, Ballintra, Co. Donegal. The house is situated on the family farm. The farm immediately adjoins the quarry owned and operated by P McCaffrey and Sons Ltd. The Gorman house is located approximately 250 m to the southeast of the quarry. The site location and layout is shown on Figures 1 and 2.

The Gormans report that they have endured problems for nearly thirty years with pollution from the quarry and the macadam/asphalt plants. In the earlier years of the quarry's operation they complained directly to the management of the quarry of their concerns for their health, and the damage that was being caused to their property from the operation of the quarry. Having received no satisfactory response from the quarry management to their concerns, the Gormans contacted both Donegal County Council and the EPA. To date no environmental or planning conditions have been placed on the quarry. The Gormans have therefore decided to carry out their own independent investigation into the operation of this quarry.

This report is a review of the quarrying operations based on interviews with the Gorman family. The reported situation is discussed with regard to the planning and environmental regime operating in Ireland over the period of reported quarrying.

2 SITE HISTORY AND DESCRIPTION

The Gorman house and family farm is located along the N15, which, is the main Sligo to Letterkenny Road. The quarry owned and operated by P. McCaffrey and Sons Ltd. immediately adjoins the Gorman farm to the northwest.

The quarrying commenced in the late sixties and today the operation consists of three standalone quarries. A detail of the history of each quarry is provided below. The site location is shown on Figure 1.

Quarry No. 1

The lands where the quarry is now situated were at a time owned by a Mr. Frank Mulharter. In the period 1964 to 1967 Donegal County Council leased this land from Frank Mulharter and used it as a quarry for blasting rock during the construction of the N15. No crushing was carried out on the site. Between 1967 and 1969 the quarry remained dormant.

In 1969 P McCaffrey and Sons purchased the dormant quarry. Further lands to the north were purchased and the quarry was extended towards the Lurgan Road. Offices, sheds and garages were allegedly constructed here without planning. A concrete plant was installed in the quarry around 1975. This was subsequently moved to the base of the quarry around 1989 – 1991. The first bitumen plant was installed here in c.1977 followed by further plants in the early eighties and a new asphalt plant this year. Photographs 1 to 4 attached show the layout of the quarries.

Quarry 2

Quarry No. 2 is located on the opposite side of the Lurgan road from Quarry No. 1 and appears to act as a standalone independent quarrying operation. This quarry commenced operations in the period 1982 to 1984. Rock was blasted and transported from Quarry 2 to crushers/breakers in Quarry 1.

Quarry 3

This quarry commenced operations in January 1999. The quarry apparently commenced operations without planning permission and following objections from the local community Donegal County Council requested that the McCaffreys cease operations at this quarry. The Quarry was never properly backfilled and again following objections from local residents Donegal County Council have written to McCaffreys for details of proposed remedial works to restore same and a timeframe. To date the quarry has not been restored and is currently being used as a machinery yard and works area.

3 ADHERENCE TO THE PLANNING REGULATIONS

The planning regulations are complicated and the opinions of a professional planner and /or a planning barrister are often required to advise on cases such as this. However, the following comments provide an initial review, which can be considered further in due course.

In our opinion the 3 No. Quarries operated by McCaffery's should have sought planning permission under the planning system introduced into Ireland in 1963. After that date, all new industrial developments including material changes of use and almost all expansions came within the scope of the planning acts. However, as the quarries have been in operation for a considerable time a legal review is now needed to determine their present planning status.

In 1989 the Environmental Impact Assessment Regulations amended the planning Acts to require that certain specified developments be subject to an EIA. Under the first schedule of this act Part III (F) the extraction of stone, gravel, sand or clay where the area involved would be greater than 5 hectares should be subject to an EIS. These regulations came into law on the 1st day of February 1990, and apply to any quarrying undertaken after that date but not retrospectively to Quarries 1 & 2. The current amendments to the planning acts may require that the existing Quarries also be subject to an EIS.

The extension to Quarry 1 would normally require planning permission where the development involves a greater area or a deeper floor level. While an EIS would be required where the expansion exceeds 5 hectares the Local Authority can always request an EIS even where the size threshold is not exceeded by the proposed development.



4 ENVIRONMENTAL COMPLIANCE

In assessing the site with respect to environmental compliance the following environmental factors were considered;

- Dust
- Air Quality
- Noise
- Visual Impact/Waste Disposal
- Surface Water Flooding and Soil Contamination
- Groundwater

4.1 *Dust*

An examination of the Gorman land and photographs presented by the Gorman's clearly indicate in our opinion problems with dust pollution from McCaffrey's quarry. Photographs 5 to 9 attached confirm this observation. A visual inspection of the quarry from the perimeter of the site identified the following dust sources:

- dust from uncovered stockpiles of materials,
- dust from crushing equipment,
- dust from the access road,
- dust from vehicles,
- dust from the quarry floor itself.

An examination of the site by KTC from the perimeter identified no abatement measures to control dust. According to the Gormans no simple measures such as road sweepers, or sprinklers have ever been employed. See Photographs 10 and 11. Possibly, as a mitigation measure during dry weather there is a continuous flow of water from a hose at the entrance to the quarry, onto the access road that runs through the middle of the Gorman's land. This has little impact on controlling dust and is a nuisance to the Gormans, as it is causing dirty surface water run-off into their land.

As shown on the attached photographs, which were taken prior to June 2000 show no mitigation measures such as the construction of a berm or the planting of trees have ever been employed. Recently a shallow berm, approximately 1m high has been constructed on the south side of Quarry No. 1. In our opinion this will have little or no impact at controlling the spread of dust into the Gorman's land.

Measurement of Dust Levels

Total dust deposition levels were measured at seven locations on the Gorman's property and at one location on land owned by the O'Reillys. The monitoring locations are shown on Figure 2.

Bergerhoff gauges as specified in the German Engineering Institute VDI 2119 document entitled "Measurement of Dustfall Using the Bergerhoff Instrument (Standard Method)" were used to measure total dust deposition.

Instantaneous measurements of total dust were also taken using a handheld Casella Dustrack meter. This meter gives an instantaneous digital reading of the concentration of particulates.

The results from the Bergerhoff gauges are presented in Table 1 while the results from the instantaneous dust survey are presented on Figures 3 and 4.

Results

Dust Deposition

The results from the dust deposition survey using the Bergerhoff gauges are presented in Table 1. No dust deposition standards are available in this country to compare measured values against. However in IPC and waste licences issued by the EPA they normally set levels somewhere in the range of 240 to 350 mg/m²/day for concentrations at the site boundary.

At three of the monitoring locations (D3, D6 and D8) dust gauges were located on the Gorman's property but beside the boundary of the quarry. The dust deposition levels measured at these locations ranged from 753 mg/m²/day to 1,759 mg/m²/day. These levels are extremely elevated and exceed guideline values normally set by the EPA. In the absence of a standard in this country for dust deposition, levels are often compared with standards set in TA Luft (Technical Instructions on Air Quality Control – T.A. Luft 1987). The standard in TA Luft is that average dust deposition levels should not exceed 350 mg/m²/day. Measured concentrations at these three locations (D3, D6 and D8) also exceeded this standard.

The remaining five monitoring locations were at various distances away from the quarry as shown on the attached Figure 2. The concentrations measured at these five locations ranged from 137 mg/m²/day to 2,190 mg/m²/day. At one of these locations D4, which is near the access road to the quarry that runs through the middle of the Gorman's land the concentration measured over the entire monitoring period was on average 2,000mg/m²/day. Dust from the access road was the only obvious source. This concentration exceeds the aforementioned EPA standard and TA Luft Guideline. This result from D4 confirms that the mitigation measure being employed of discharging water from a point source onto the access road is not sufficient at controlling dust.

Instantaneous Measurements

Results from Instantaneous Measurements are presented on Figures 3 and 4. When the quarry was not in operation dust concentrations measured ranged from 0 mg/m³ to 0.48 mg/m³. When the quarry was in operation dust concentrations ranged from 0mg/m³ to 3.02 mg/m³. At the time of



measurement wind direction was from the north west therefore the most elevated concentrations were detected to the south east.

In Ireland we have Occupational Exposure Standards (OEL's) for an eight-hour exposure. In this case where there is potential 24-hour exposure then as a rule of thumb, according to Enterprise Ireland for a 24-hour exposure the 24-hour OEL should be $1/40^{\text{th}}$ of the 8-hour OEL. The 8-hour OEL for total dust is $10\text{mg}/\text{m}^3$; therefore the 24-hour OEL is $0.25\text{mg}/\text{m}^3$. At a number of sampling locations the 24-hour OEL was exceeded indicating potential health risks from dust exposure.

4.2 Air Emissions

Photographs 12 to 14 show two significant air discharges from McCaffrey's Quarry. The air discharges shown on the attached photographs are from the asphalt plants installed in c.1975, a second one installed in the early eighties and a third plant installed in April 2000. It appears from a visual examination of these stacks from the site boundary that there are no abatement measures to control the emissions. The emissions from these stacks are likely to contain fine particulates and a range of volatile and semivolatile organic compounds consisting of compounds that are suspected and proven carcinogens. A strong tarmac odour was obvious at the site boundary down-wind from the stacks.

Under the Air pollution Act, 1987 certain emissions should be licenced. The third schedule of the act, No. 26 "the production of tar and bitumen and the manufacture of products containing them" is listed as a process, which should have a discharge licence. However the Air Pollution Act, 1987, (Licensing of Industrial Plant) Regulations, 1988 did not require existing plant under this category to obtain a licence, therefore the Macadam plants installed in 1977 and the early eighties may not be obliged to obtain a licence. The plant installed in 2000 should have obtained a licence under the Air Pollution Act before it was commissioned.

If the installation of the new plant in 2000 was seen to have represented a major change to the overall operation, then all the Macadam plants should now have a licence. *On this issue I am writing to the EPA for clarification.*

The Air Pollution Act, 1987, covers air pollution from all sources in addition to those that specifically require a licence. Therefore just because the Macadam plants may not have specifically required a licence there was still a requirement on Donegal County Council under the Air pollution Act, to ensure the Macadam plant and the site in general was not causing air pollution.

Air pollution in Section 4 of the Act is defined as a condition of the atmosphere in which a pollutant is present in such a quantity as to be liable to –

- be injurious to public health or
- have a deleterious effect on flora or fauna or damage property or



- impair or interfere with amenities or with the environment

At the McCaffrey site it is our opinion that air pollution is occurring, as the discharge from the Macadam Plant is likely to be injurious to public health and the deposition of dust and macadam fumes is damaging flora, fauna and property and is interfering with amenities and the environment.

Donegal County Council should therefore request that the McCaffreys undertake a full assessment of the site with respect to air pollution. Following the assessment the necessary mitigation measures should be implemented to ensure that air pollution does not occur.

4.3 Noise

A total of ten noise readings were taken at 6 different locations (N1 - N6) for the purposes of this survey. Five readings were taken on the Gorman's property and one reading was taken approximately 1.2km south of the site to act as a representative background reading in the absence of quarry noise. The noise monitoring locations are shown on the attached Figure 5.

The survey was undertaken between the hours of 12.00 and 20.00 on the 18th of July 2000 and between the hours of 0700 and 1200 on the 19th of July 2000. The aim of the noise survey was to establish the existing noise environment on the Gorman's property with and without the quarry in operation. The measurements were representative L_{Aeq} readings and were carried out in accordance with ISO1996 (Description and measurement of environmental noise) and BS4142 (Method for rating industrial noise affecting mixed residential and industrial areas).

At each location, ambient noise levels were measured using a Cirrus Research CR:703A Data Logging Integrating Sound Level Meter. The meter was frequently calibrated using the calibrator, CR:513A during the survey. The Cirrus noise meter and calibrator were last laboratory calibrated on the 8th of February 2000. Noise levels were measured using the A-weighted filter network and a fast response time of 125 milliseconds.

At each monitoring location the following data was recorded:

$L(A)_{eq}$: Equivalent Continuous A-weighted Sound Level. The continuous steady noise level, which would have the same total A-weighted acoustic energy as the real fluctuating noise measured over the same period of time. Measurements were carried out over an approximate thirty-minute period for this survey.

$L(A)_{10}$: The noise level that is equalled or exceeded for 10% of the measurement period.

$L(A)_{90}$: The noise level that is equalled or exceeded for 90% of the measurement period.

These data are summarised and presented in Table 2, along with a description of the locations where the measurements were carried out and details of the noise sources recorded during the measurement. The EPA state that if the total noise level from all sources is taken into account, the noise level at sensitive locations should be kept below a level of 55dB(A) by daytime. At night the noise level should not exceed an L(A)eq value of 45dB(A).

Noise Sources

During the noise survey on the Gorman's property the following noise sources were identified emanating from the quarry;

- Hopper / Conveyor continually running
- Crusher operating intermittently
- Delivery / collection of stone by large Hyno /Artic trucks along the public access road.
- Employees' vehicles driving along the public access road.
- General Quarry activities.

It should be noted that the quarry typically operates from 0700 to 1900 depending on the season. However, historically the quarry has commenced operations as early as 0530 in the morning.

In addition to noise from the quarry, noise was also recorded from traffic along the N15 road and typical rural noises from cattle, tractors etc.

Noise Survey Results

Results from the noise survey show that noise levels (L(A)eq) on the Gorman's property when the quarry is in operation range from 75.1 dB(A) at N 1 to 53.8 dB(A) at N 2 during the day. It should be noted that the EPA guideline daytime value at noise sensitive receptors is 55 dB(A). Results of the noise survey show that this daytime value is significantly exceeded on the Gorman's property as a result of quarry activities e.g 75 dB(A) at N1. Traffic noise from the N 15 was also audible at the noise measurement locations.

In comparison, when the quarry was not in operation (after 7.30p.m on the date of the survey) noise levels on the Gorman's property ranged from 49.3 dB(A) at N2 to 38.7dB (A) at N 1. The northern fields on the Gorman's property are most affected by noise from McCaffrey's quarry. A comparison of results when the quarry was not in operation showed that at noise monitoring location N1, noise levels decreased by 36 dB(A).

The results from this survey show that noise levels from the quarry are impacting on the Gorman's property. Furthermore according to the Gormans, historically noise levels were much higher when production in the quarry was higher.

There was no evidence of noise mitigation or attenuation measures in place in the quarry in order to reduce the noise levels to acceptable standards. It is recommended that mitigation measures be



implemented to reduce noise levels at the site boundary to the EPA guideline values of **55dB (A)** by daytime (0800 to 2200) and **45dB(A)** at night (2200 to 0800).

4.4 Visual Impact/Waste Disposal

Photographs 15 to 18 attached show that large volumes of waste are disposed of in one corner of the site in an area adjoining the Gorman's land. Because of the location of the on-site waste disposal facility it is a major eye sore to the Gormans. An examination of the waste shows that it contains old machinery, old drums, pallets, plastic, oil filters, oils and grease, batteries, scrap metal, wheel rims and tyres. In effect rubbish is disposed off in an on-site landfill.

This practice of dumping waste on-site is in contravention of both the 1996 Waste Management Act and the Litter Pollution Regulations. It is recommended that Donegal County Council request the McCaffreys remove all waste stored on site to a licenced facility.

While the disposal of waste along the Gorman's site boundary is the main visual impact the entire quarry has a visual impact on the landscape. If the quarry had adhered to the planning regulations, proper landscaping would most likely have been a condition of planning. Donegal County Council most likely have powers under their development plan to request that proper landscaping be undertaken at this site.

4.5 Flooding and Soil Contamination

According to the Gormans, the McCaffreys, for several years have pumped water from the base of the quarry into one of their fields beside Quarry No. 3. Flooding of their land was therefore a frequent occurrence. The Gormans reported that at times the flooding covered up to half an acre of their property.

As well as causing flooding the water that was pumped from the quarry also contained oil, greases and tars. These pollutants resulted in contamination of the Gorman's fields. In response to complaints from the Gormans regarding the contamination the McCaffreys apparently agreed to cleanup the area impacted. However as part of the cleanup they apparently took it upon themselves to install a large soakpit on the Gorman's property. Excess water from the quarry is now discharged to this soakpit. As discussed in Section 4.6 of this report this wastewater is most likely impacting on local groundwater.

An examination of the site earlier this year showed in addition to the area where surface water is directed towards the soakpit, at another location surface water is flowing through a ditch and contaminating the Gorman's property with tar residues. At this location run-off from the on-site landfill is also migrating into the Gorman's property. Photographs 19 to 22 attached show how the Gorman's property has been impacted with the run off of waste water that contains dust, dirt, oil, grease etc

Samples were collected on two occasions from this impacted area and submitted to Alcontrol/Geochem laboratories in the UK to quantify the level of contamination. The samples were analysed for the following hydrocarbon indicator parameters:

- Mineral Oil and Diesel Range Organics (DROs)
- Petrol Range Organics (PRO's)
- Polyaromatic Hydrocarbons (PAHs)

The results from the analysis are presented in Table 3 to 4.

In the absence of any relevant Irish soil quality standards the analytical results are discussed with reference to the Dutch Target and Intervention Values (RIVM 1994 and subsequent amendments), as these provide the most comprehensive listing of contaminants for both soils and water. The Dutch have also used a source-pathway-target methodology in their development, based on a conservative set of exposure conditions. Using the Dutch criteria the degree of contamination is assessed using the following guidelines:

S-Value Reference for normal uncontaminated/background values for groundwater and soil.

I-Value Levels above which the need for further investigation assessment or remediation is indicated (which should take into account site-specific conditions).

Both human and environmental impairment are considered in the development of the guidelines. The Dutch values are only used for guideline purpose in this country as they have no statutory basis outside the Netherlands; however, the Dutch guidelines are generally considered to be one of the most advanced set of generic criteria available, and they are widely accepted by the environmental industry and by Irish regulatory authorities.

No Dutch standards are available to compare with PRO and DRO concentrations. PRO and DRO concentrations are therefore normally compared with typical background concentrations. In soil, PRO concentrations are normally less than the laboratory detection limit of 0.01 mg/kg, while background DRO concentrations rarely exceed 100 mg/kg.

Analytical Results

The mineral oil analytical results are presented in Table 3. These results show that the Dutch target and intervention value was exceeded in the samples collected in both May and July 2000. These samples were collected at the surface, therefore the relevant standard would be the Dutch target value (50mg/kg) so that harmful compounds are not entering the food chain through cattle grazing contaminated land.

The DRO and PRO analytical results are also presented in Table 3. No standards are available to compare acceptable DRO and PRO concentrations but the concentrations detected exceed the typical background concentrations by a factor of several thousand.



The PAH analytical results are presented in Table 4. In the samples collected in May and July 2000 PAH compounds were detected in both samples. Many of these compounds are suspected carcinogens and ideally should not be present at the surface in land grazed by cattle. When compared with the Dutch values the sum of the PAHs in the sample collected in July 2000 exceeded the Dutch target value.

The analytical results show that the run-off from the quarry has contaminated the soil in the Gorman's fields. As a result it is most likely that harmful compounds are entering the food chain. Furthermore leaching of this contamination will result in contamination of local groundwater.

It is therefore recommended that all contaminated soil on the Gorman's property is excavated and properly disposed off. Because of the elevated concentrations of certain parameters this soil under EPA guidelines is classified as hazardous waste. It will therefore most likely have to be shipped out of the country for disposal.

4.6 Groundwater

The local surface water drainage in the area is from the quarry towards Lough Gorman. It is our opinion that groundwater flow direction in the area is also from the quarry towards Lough Gorman. Lough Gorman is the source for the Ballymagroarty Group Water Supply Scheme. It is therefore possible that contaminants from the quarry could be entering the local group water supply.

We therefore recommend that Donegal County Council and the Local Health Board should immediately confirm that activities at this site are not affecting the local water supply. Such an investigation should establish if water from the on-site tailings ponds and the water being discharged into the soakpit in the Gorman's land are entering Lough Gorman.



In assessing the site with respect to general nuisances the following factors were considered.

- Safety
- Damage to Property
- Blasting/Vibrations

5.1 *Safety*

A number of unprotected cliff faces have been identified with no protection to prevent unauthorised access. No signs have been erected to warn of the dangerous condition of the cliff faces or no effort has been made to prevent people from straying into these areas. Attached Photographs 23 to 25 show the unprotected cliff faces.

A dangerous situation exists on the Lurgan Road with quarries on both sides of this local road with no adequate protection or markings. This in our opinion is a major safety hazard.

We recommend that this issue be brought to the immediate attention of the Garda Siochana, Donegal County Council and the Health and Safety Authority.

5.2 *Damage to Property*

The approach road to the quarry is shown on the attached Photographs 10 and 11. This road runs through the Gorman's land. Prior to the development of the quarry this was a typical narrow country road with dry stone walls on both sides. The road was never designed to deal with the volume of heavy traffic that is associated with McCaffrey's quarry.

As a result of the volume and amount of heavy traffic that uses this roadway the approach road has naturally widened with the dry stone walls pushed back causing them to become unstable. Furthermore as the road has widened McCaffreys have raised the level of the approach road by overlaying with surface materials. This has in effect reduced the ditch height, and this now makes these ditches unsatisfactory for retaining stock. As a result of the natural widening and vibration from the heavy traffic the stone walls regularly collapse as shown on the attached Photographs 27 and 28. Obviously when the ditches collapse, stock can immediately leave the fields and can end up on the heavily trafficked N15.

According to the Gormans the McCaffreys management were asked several times to rebuild the ditches, but maintain it is not their responsibility. Obviously the issue of who is responsible for repairs to these ditches needs to be established so that a permanent solution can be found to this problem. Otherwise there exists a risk of public liability claims arising from stock breaching these lands.

The Gormans have also raised the issue of unbunded tanks adjoining their property. A leak or even runoff from this area has the potential to cause significant damage to their property. Photograph 29

shows the two unbunded tanks. It is standard industrial practice to bund tanks of this size which contain petroleum products to 110% of their maximum volume.

5.3 *Blasting/Vibrations*

According to the Gormans there is ongoing concern over the failure of the McCaffreys to give adequate notice locally of intention to blast. Furthermore it appears that no monitoring is carried out to assess the impact of blasting on neighbouring properties. According to the Gormans their property has already being damaged as a result of blasting. In compensation for this the McCaffreys have placed a new tarmacadam driveway around their house. To prevent further damage to properties we recommend that an agreed level of vibration is set and for each blast and that the Gormans house is monitored each time.

In addition to damage associated with blasting there is also a nuisance problem for the Gormans. I understand from discussions with them that sometimes following a blast their fields are left covered with small rocks. As sufficient time is not available to move animals before a blast this obviously puts their animals at risk. Such rocks also have the effect of damaging machinery. To overcome this nuisance problem mitigation measures should be incorporated into the design of the quarry to prevent debris flying into adjoining land.



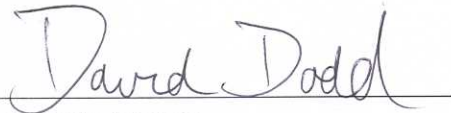
6 CONCLUSIONS

The information we have obtained from our investigations into McCaffrey's quarry indicates this is a development that was allowed to evolve without any compliance to planning or environmental regulations. As a result the area surrounding the quarry has now being adversely impacted with both environmental and general nuisances.

For the Gormans who are living and farm in the immediate vicinity of the quarry they have for years being exposed to these general and environmental nuisances.

The Gormans have fought without any success to have basic conditions implemented at this quarry to reduce their exposure to general and environmental nuisances. Sufficient legislation is available in this country to protect the Gormans and others who live in the immediate vicinity of this quarry. The responsibility therefore rests with the regulatory agencies to ensure the necessary investigations are undertaken and mitigation measures implemented to protect the Gormans and other living in this area.

Respectfully submitted,
K. T. Cullen & Co. Ltd



DAVID DODD

Environmental Scientist

Date: 22/12/00



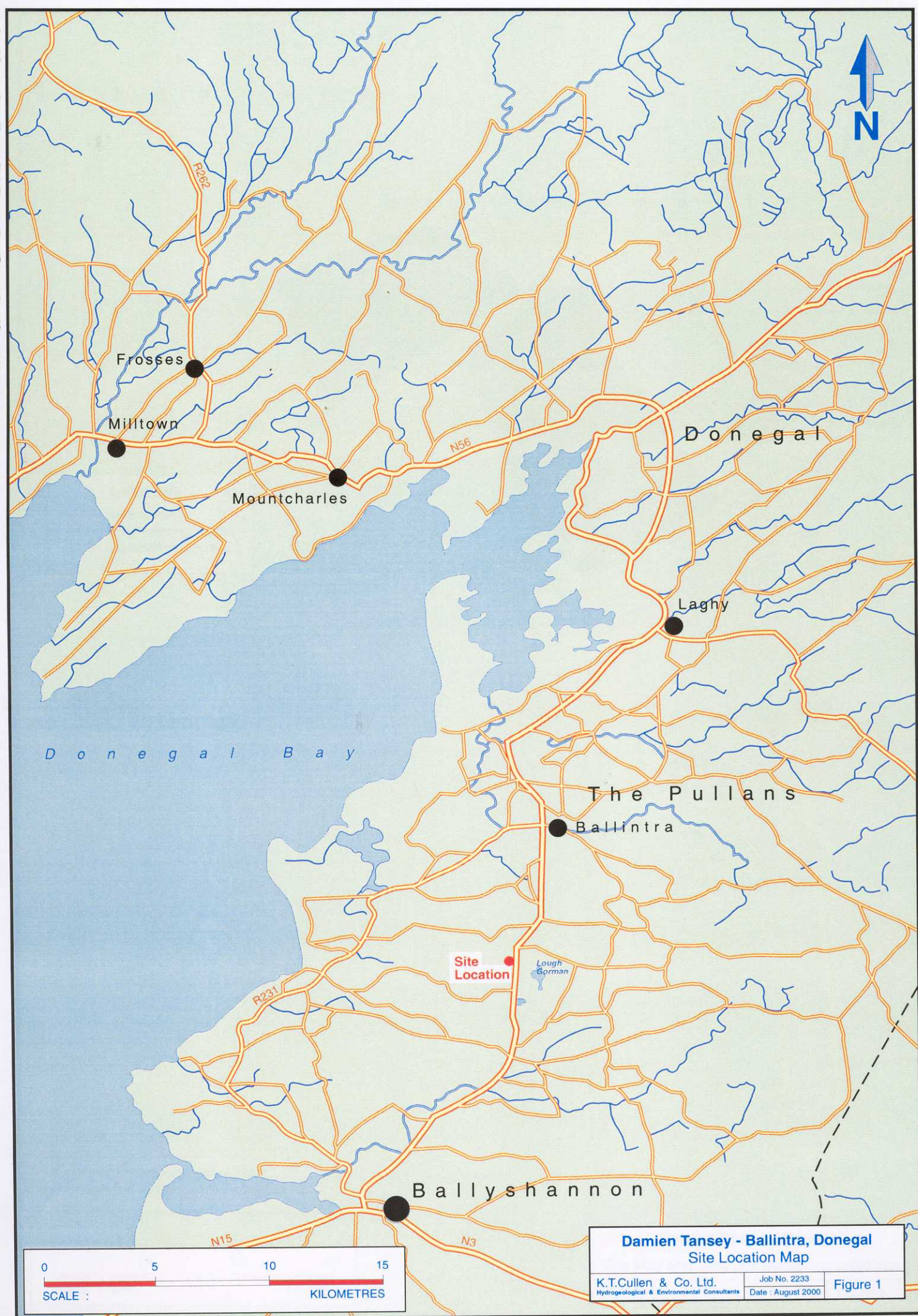
MICHAEL CUNNINGHAM

Senior Environmental Scientist

Date: 22/12/2000



FIGURES



D o n e g a l B a y

D o n e g a l

Laghy

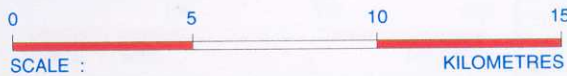
The Pullans

Ballintra

Site Location

Lough Gorman

Ballyshannon



Damien Tansey - Ballintra, Donegal Site Location Map		
K.T.Cullen & Co. Ltd. Hydrogeological & Environmental Consultants	Job No. 2233 Date : August 2000	Figure 1

G l a s b o l i e

B a l l y m a g o r t y



Quarry 2
(Estd. Mid 1980's)

Quarry 3
(Estd. 1999)

Quarry 1
(Estd. Early 60's)

LEGEND

- Site Boundary
- D1 ● Dust Monitoring Location
- S1 ● Soil Monitoring Location

D3

D2

D1

S1

D6

D4

D5

D7

Gorman House

Lough Gorman

This map is for diagrammatic purposes only.
No measurements are to be taken from this drawing.

0 100 200 300
SCALE 1 : 5000 METRES

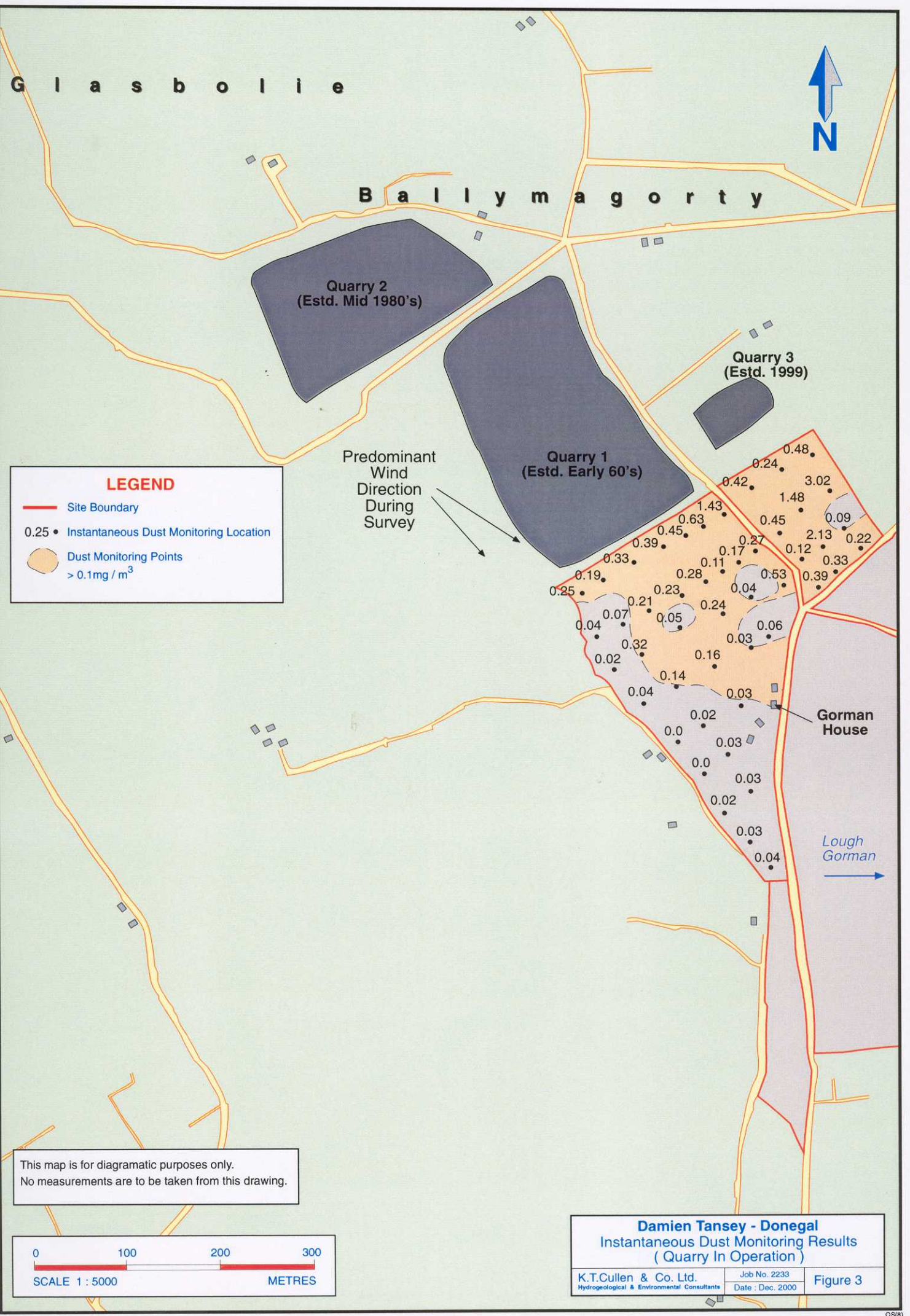
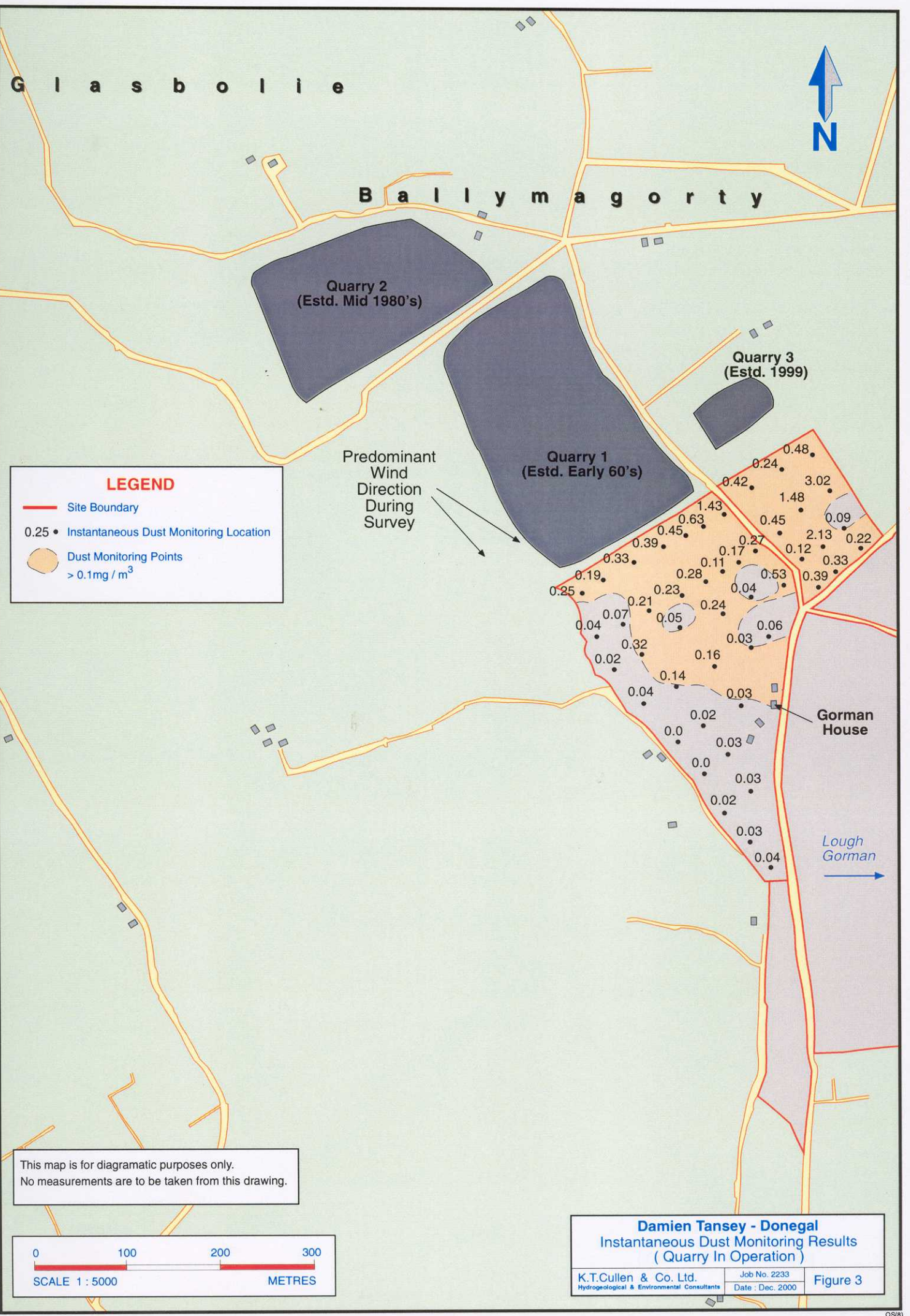
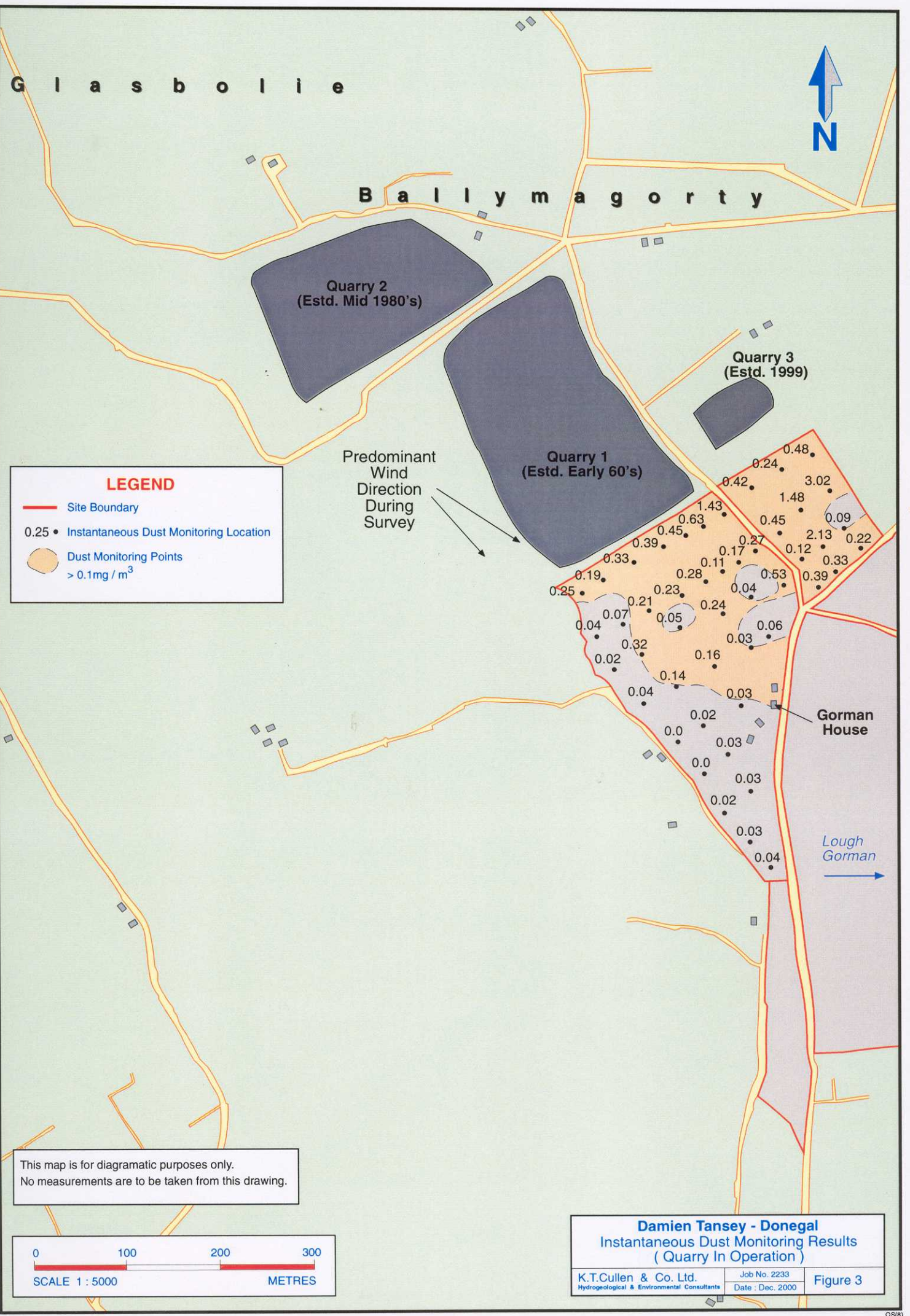
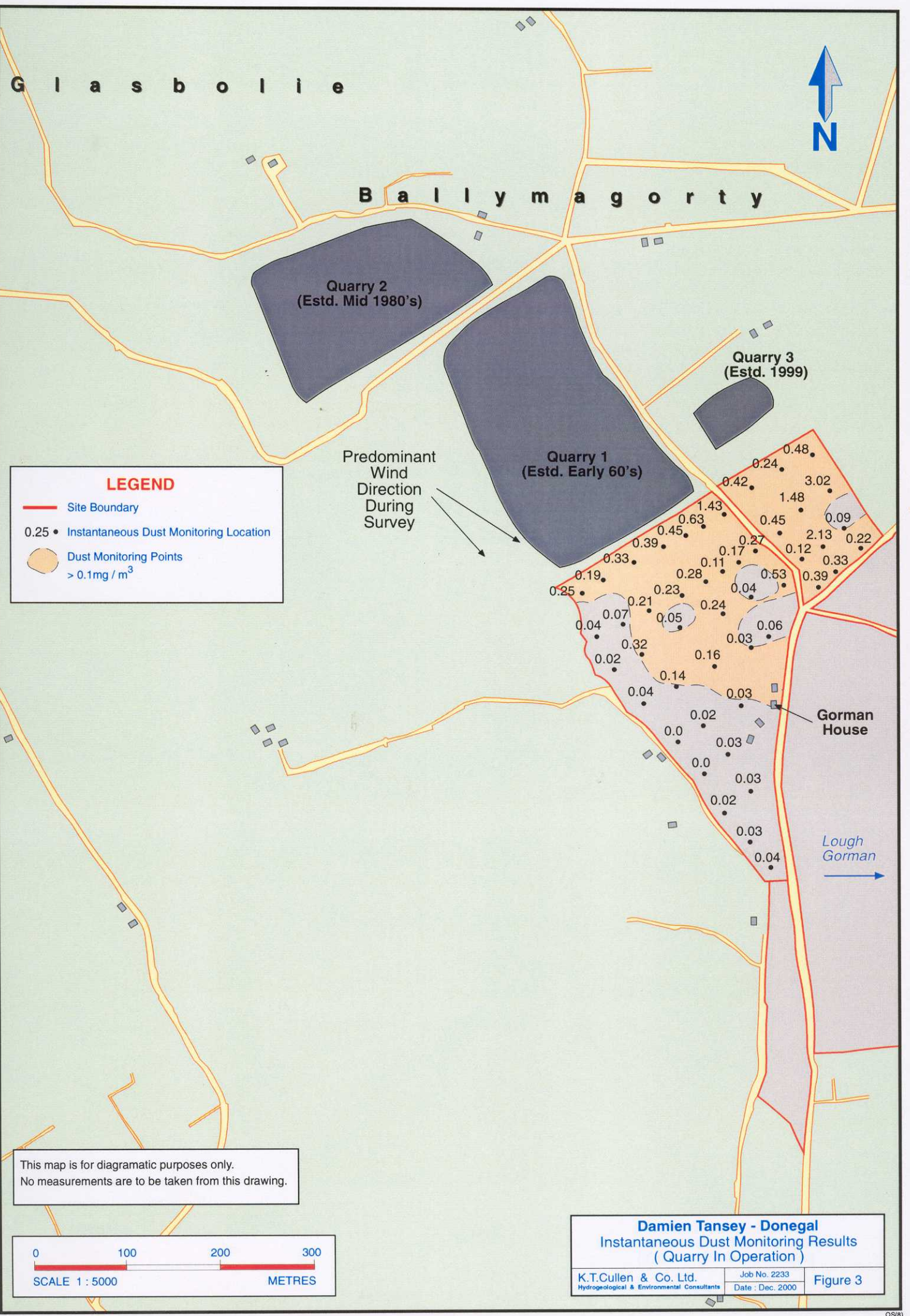
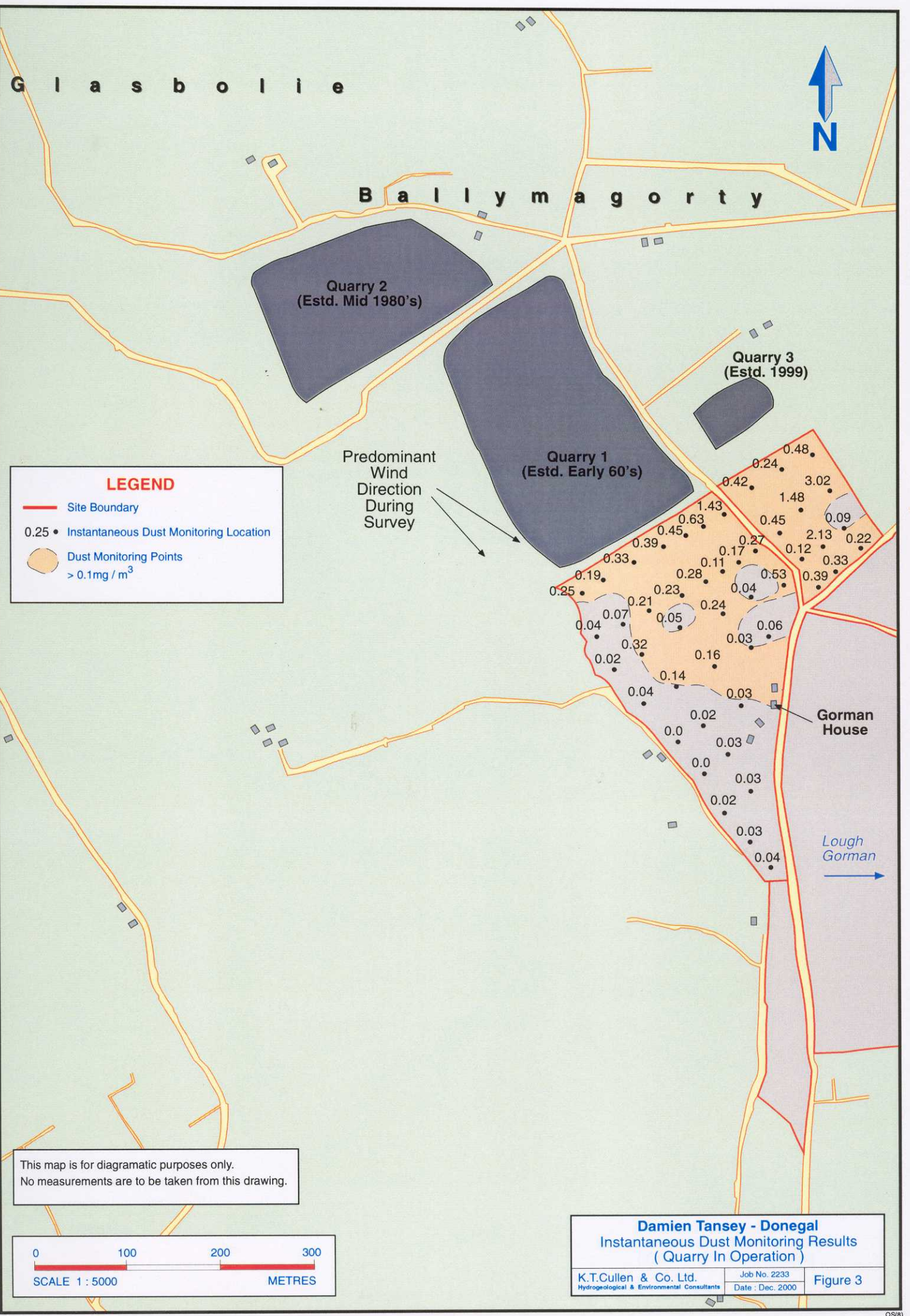
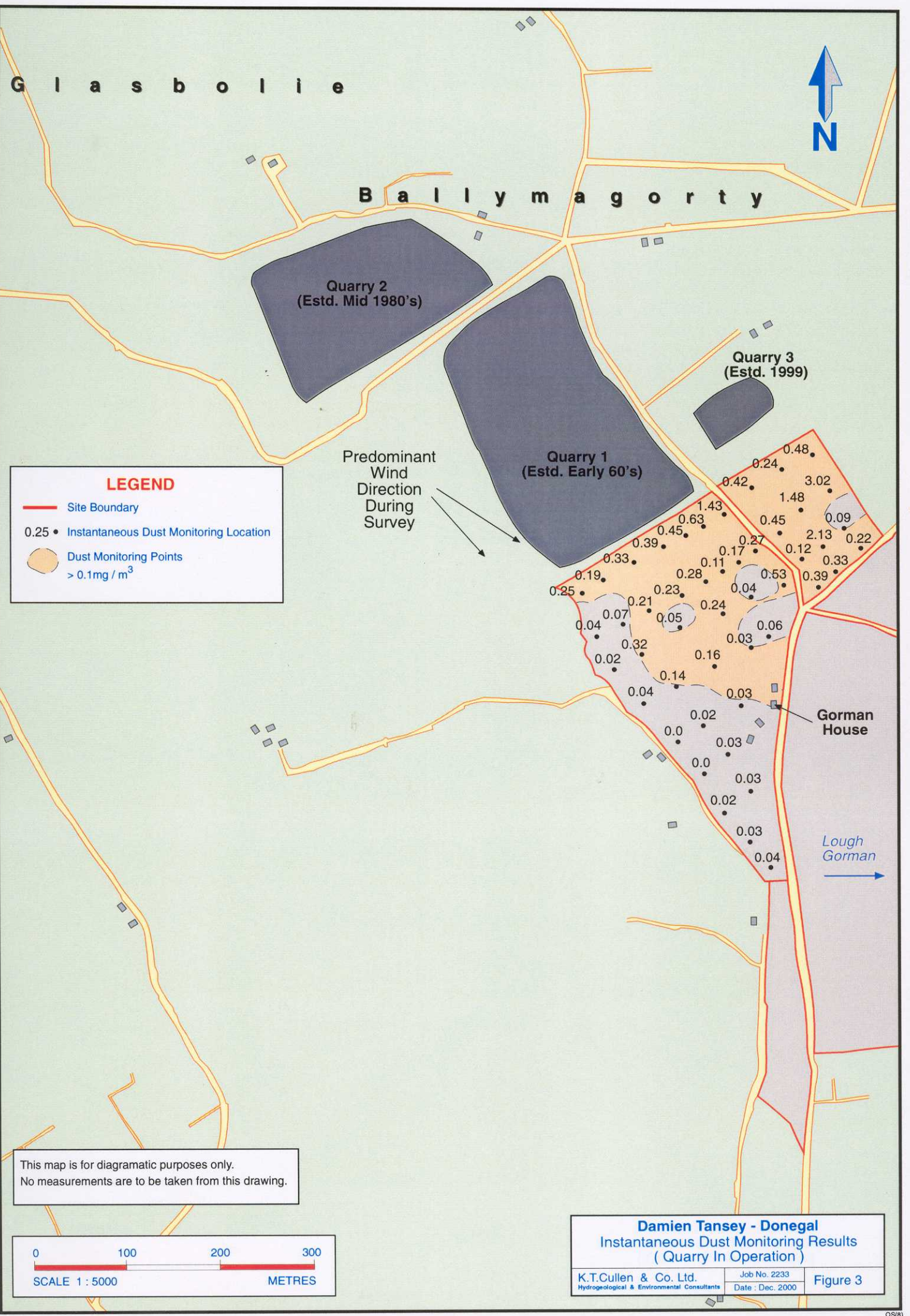
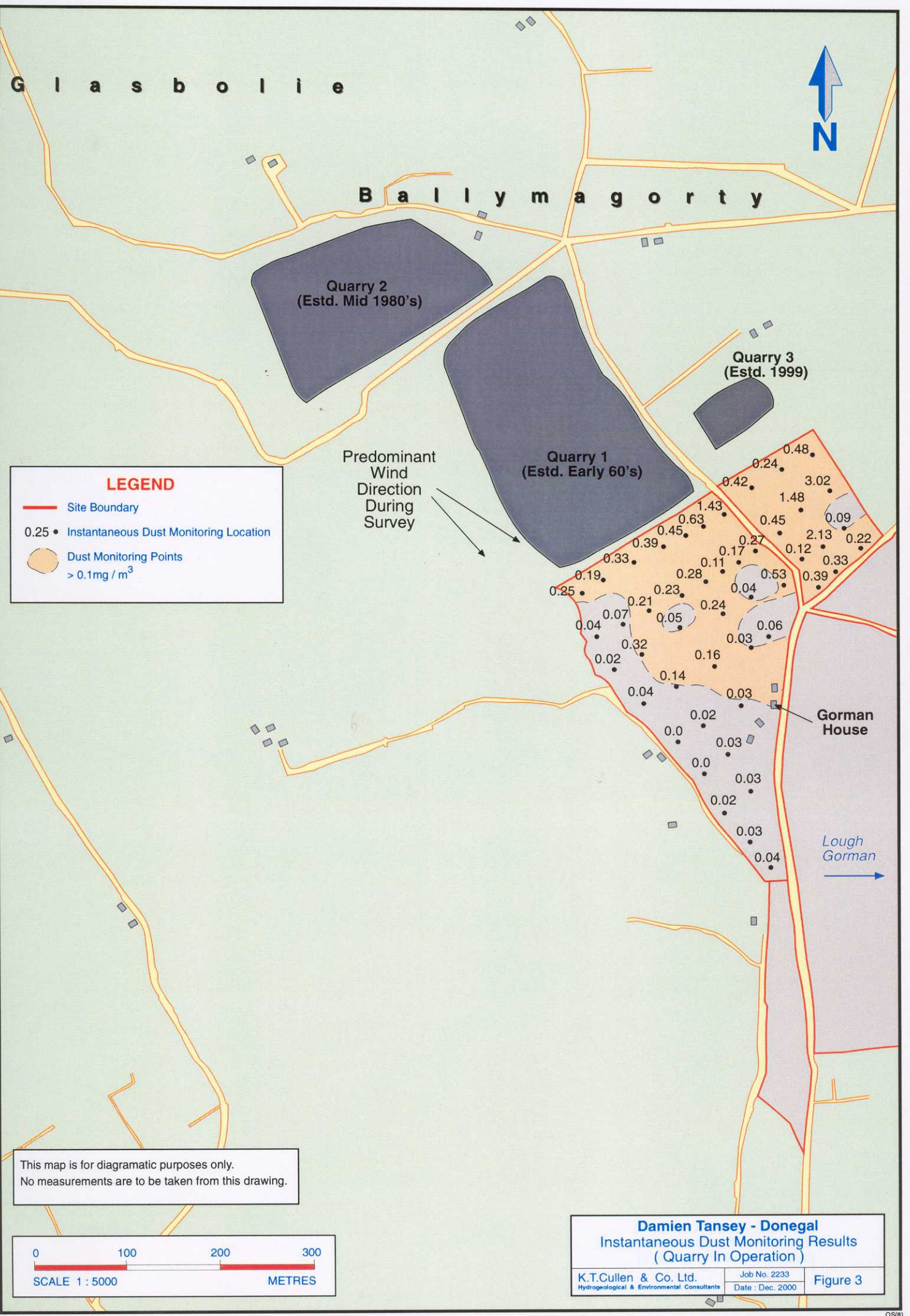
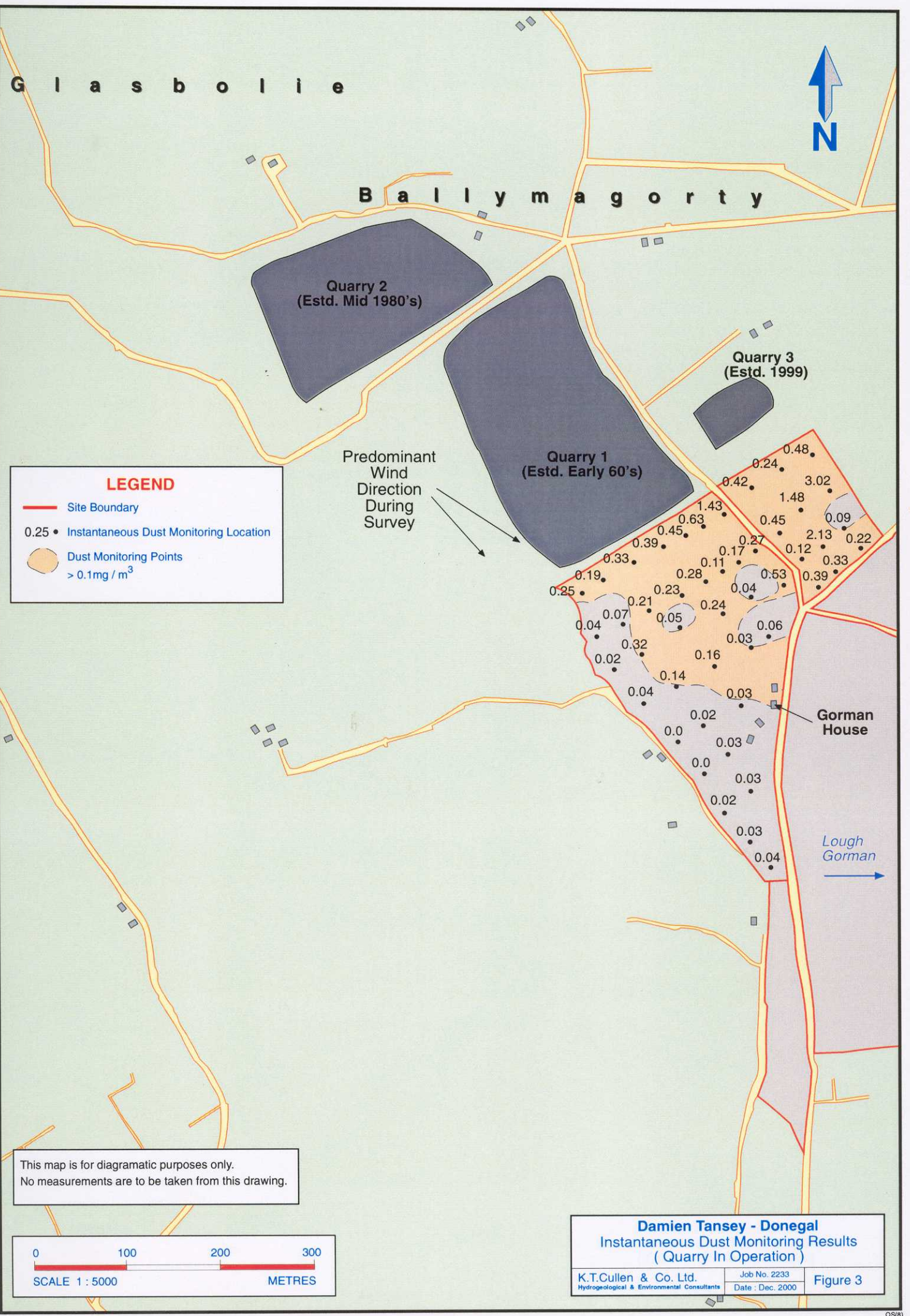
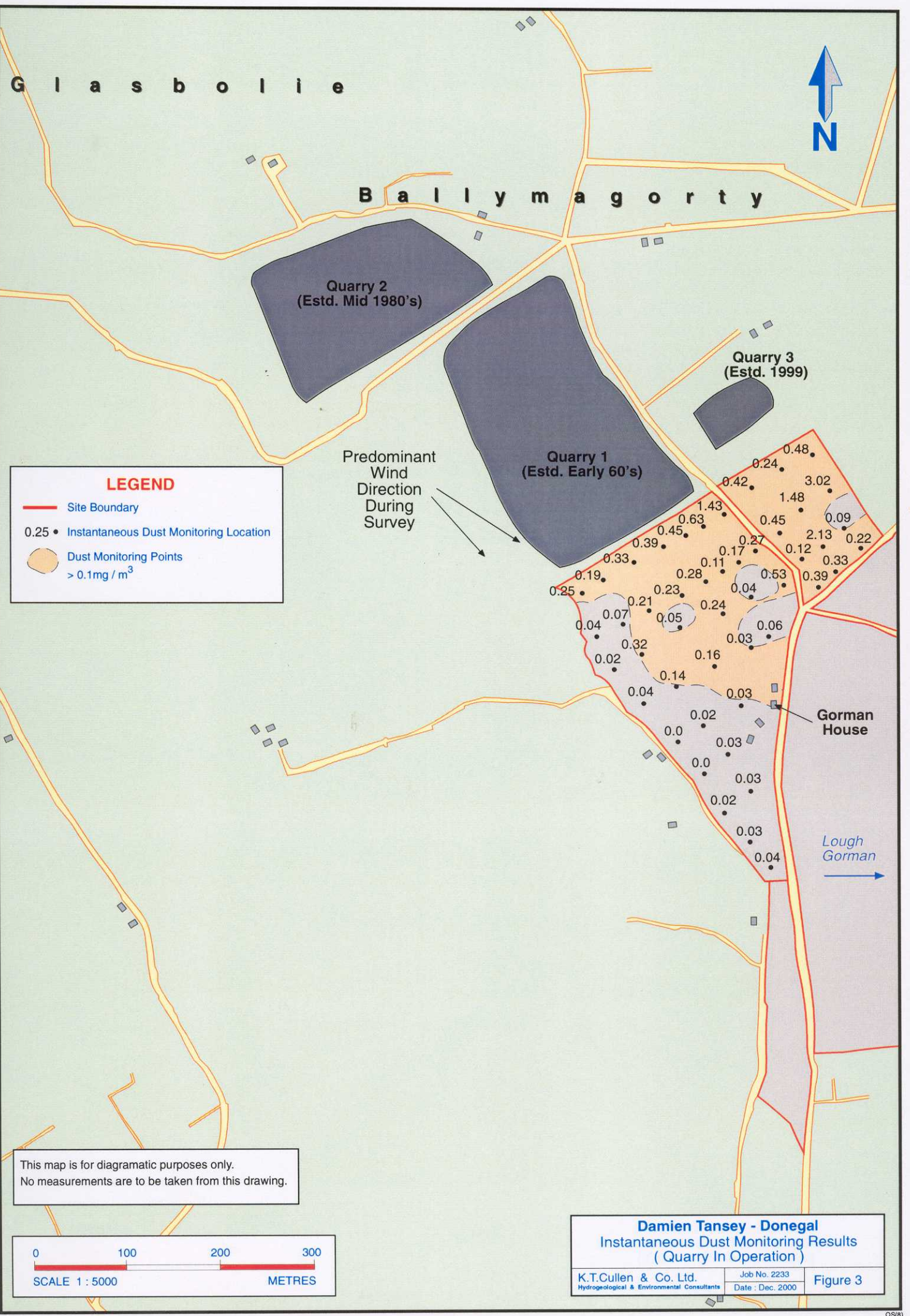
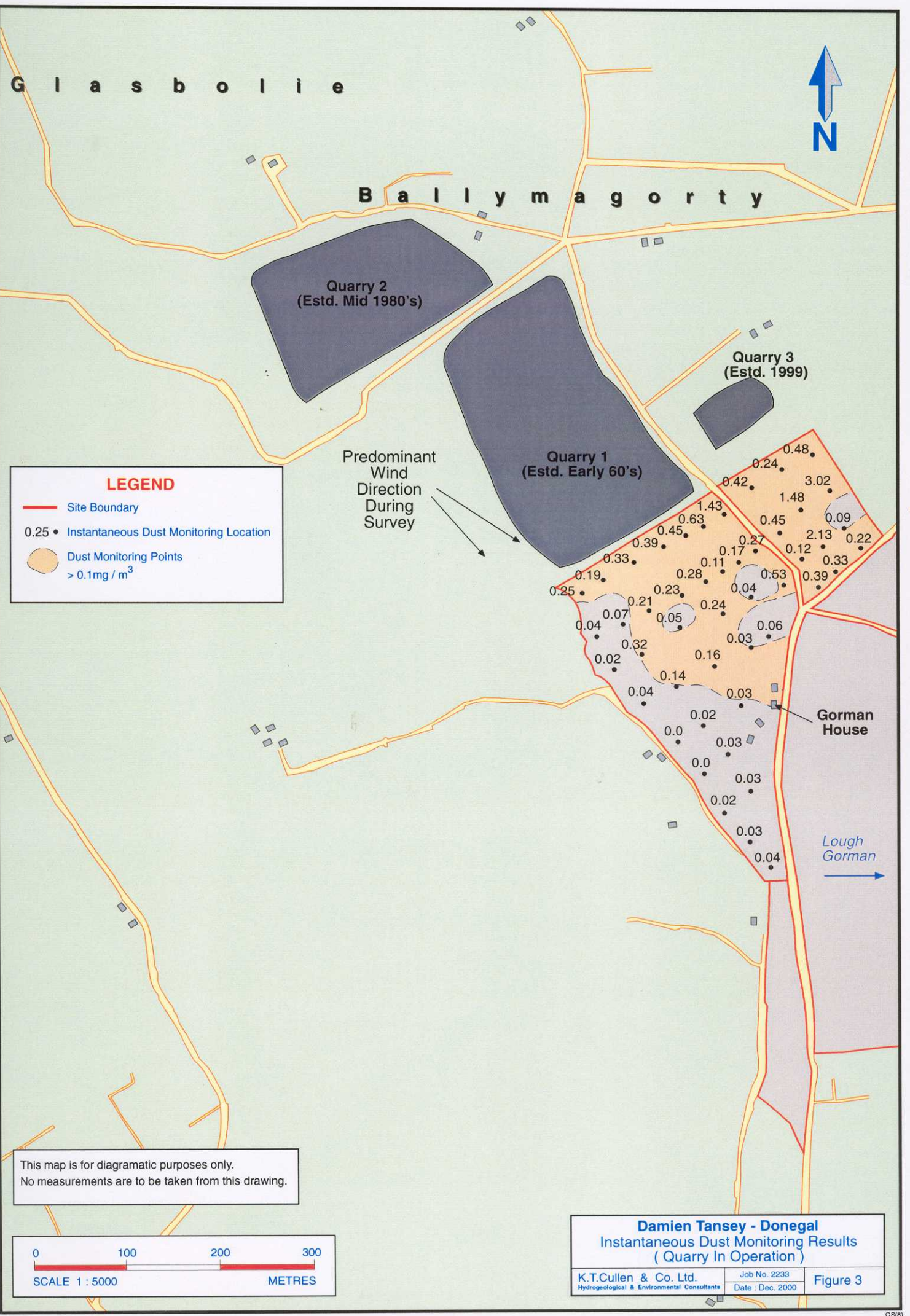
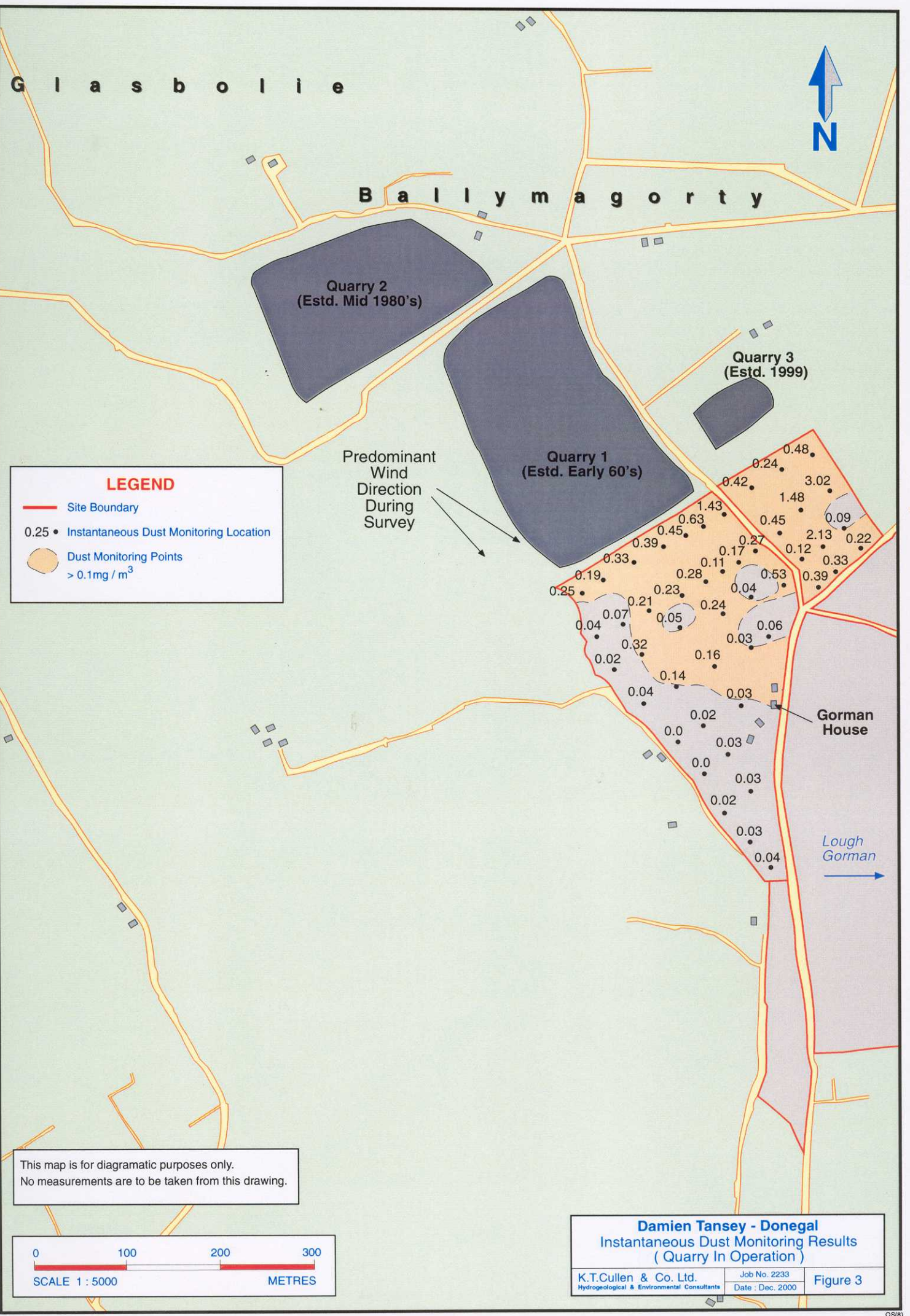
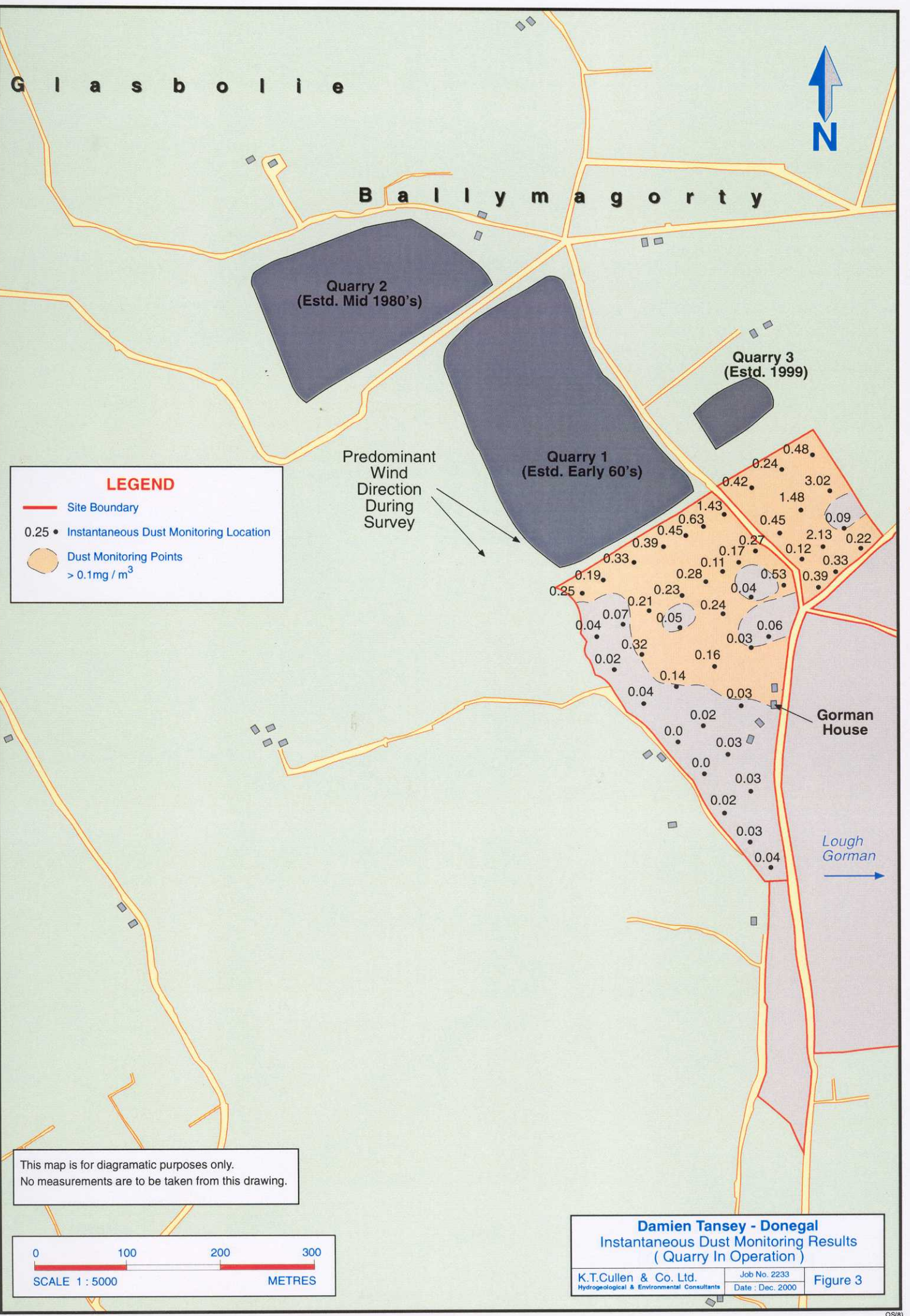
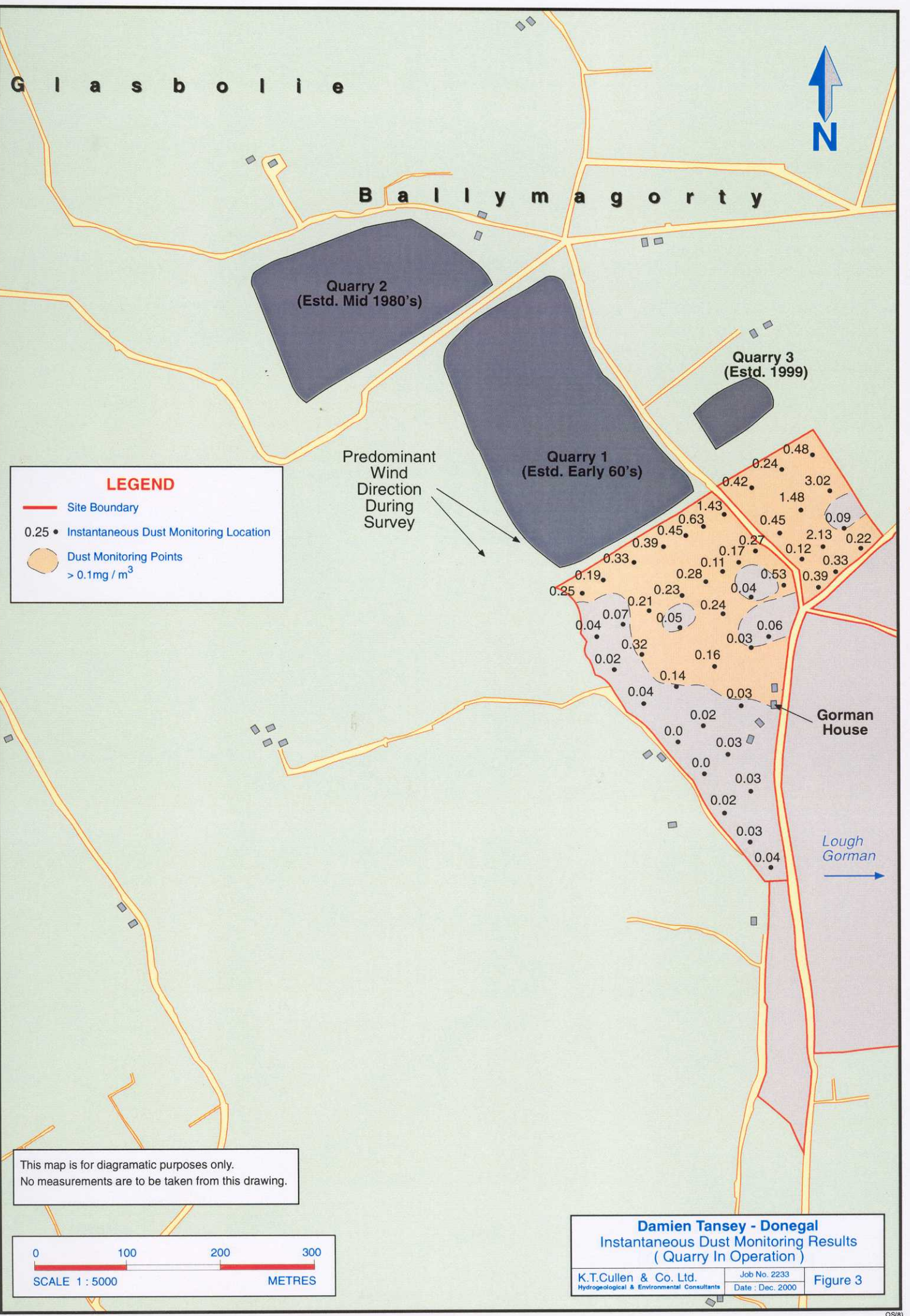
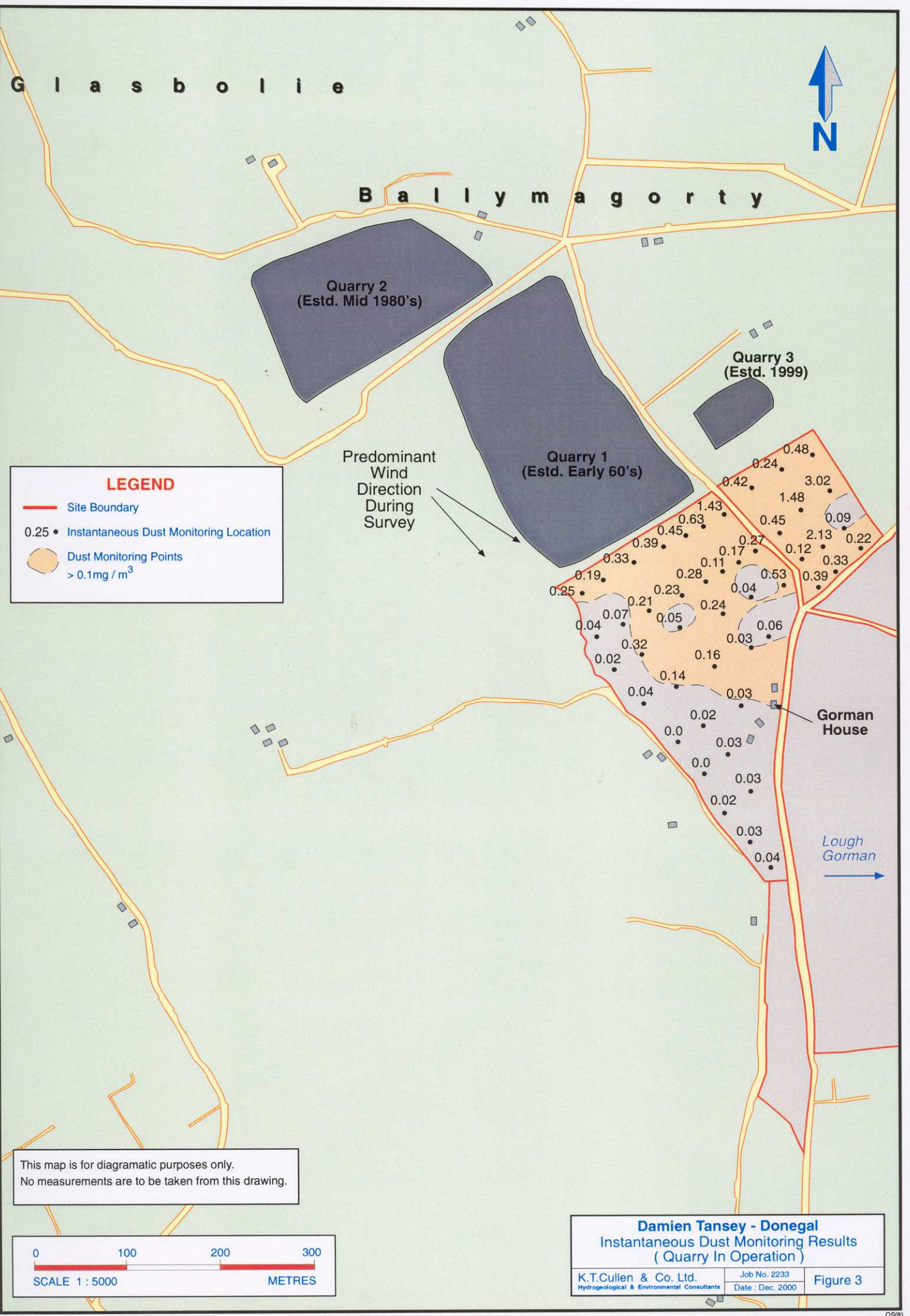
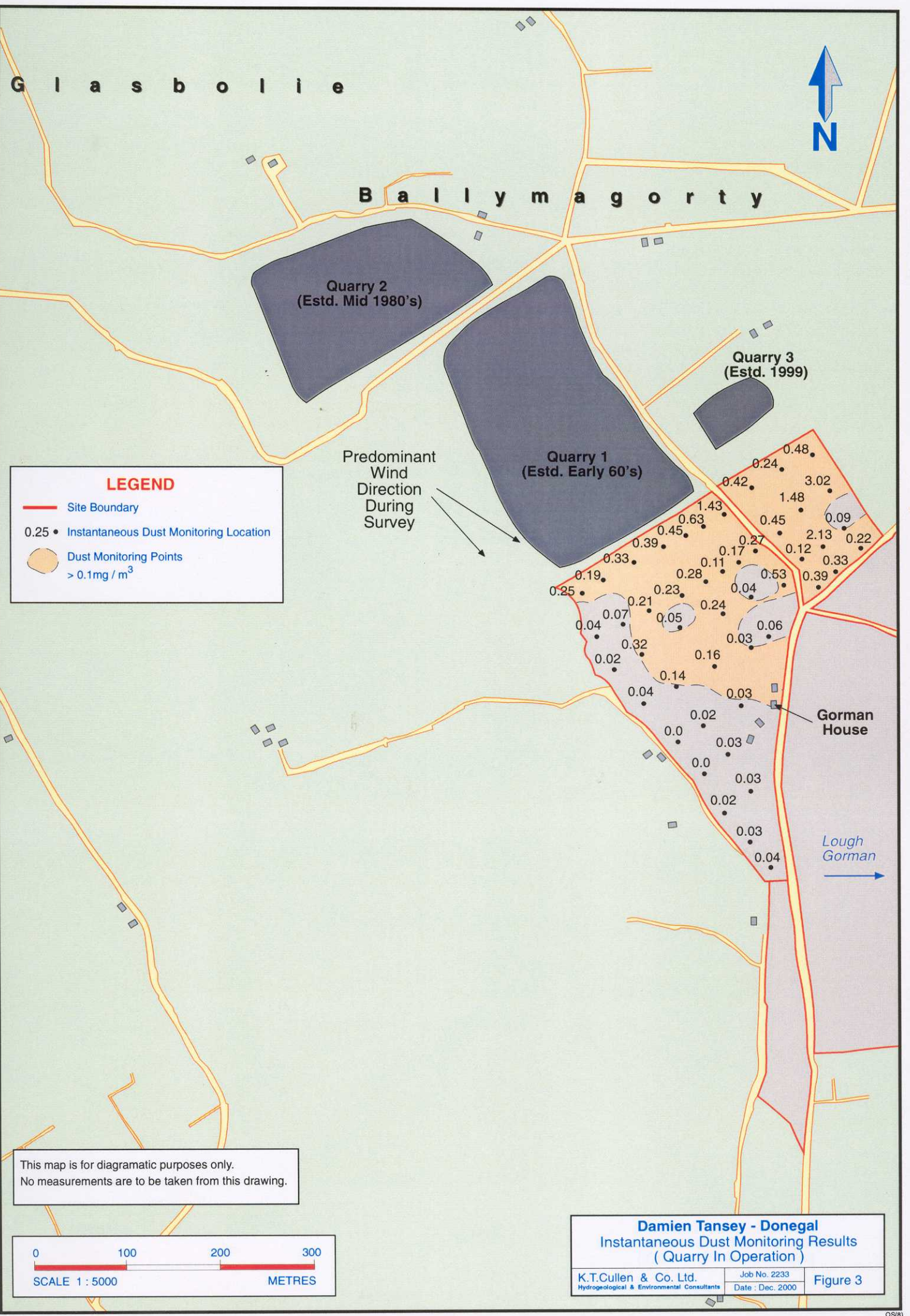
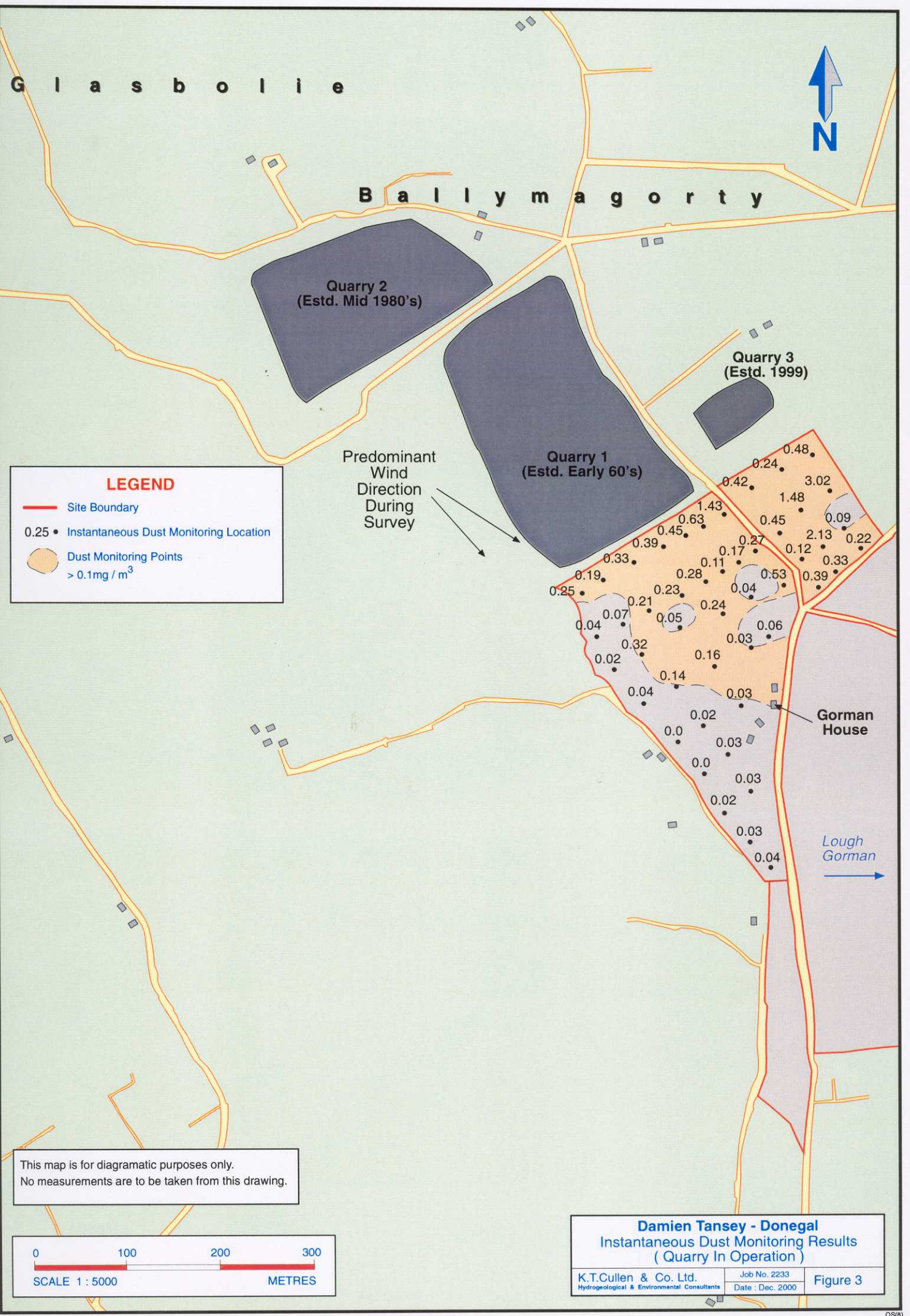
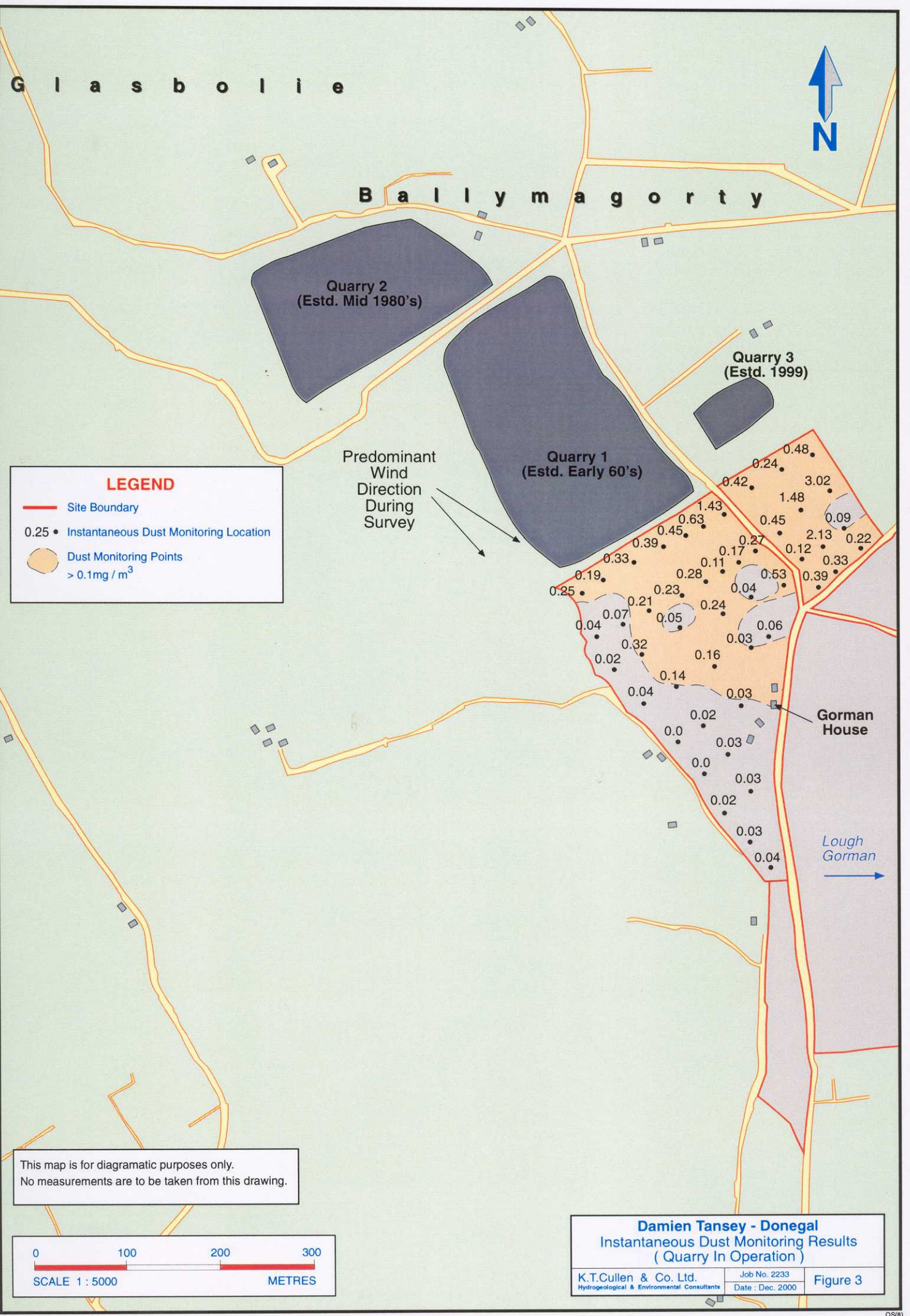
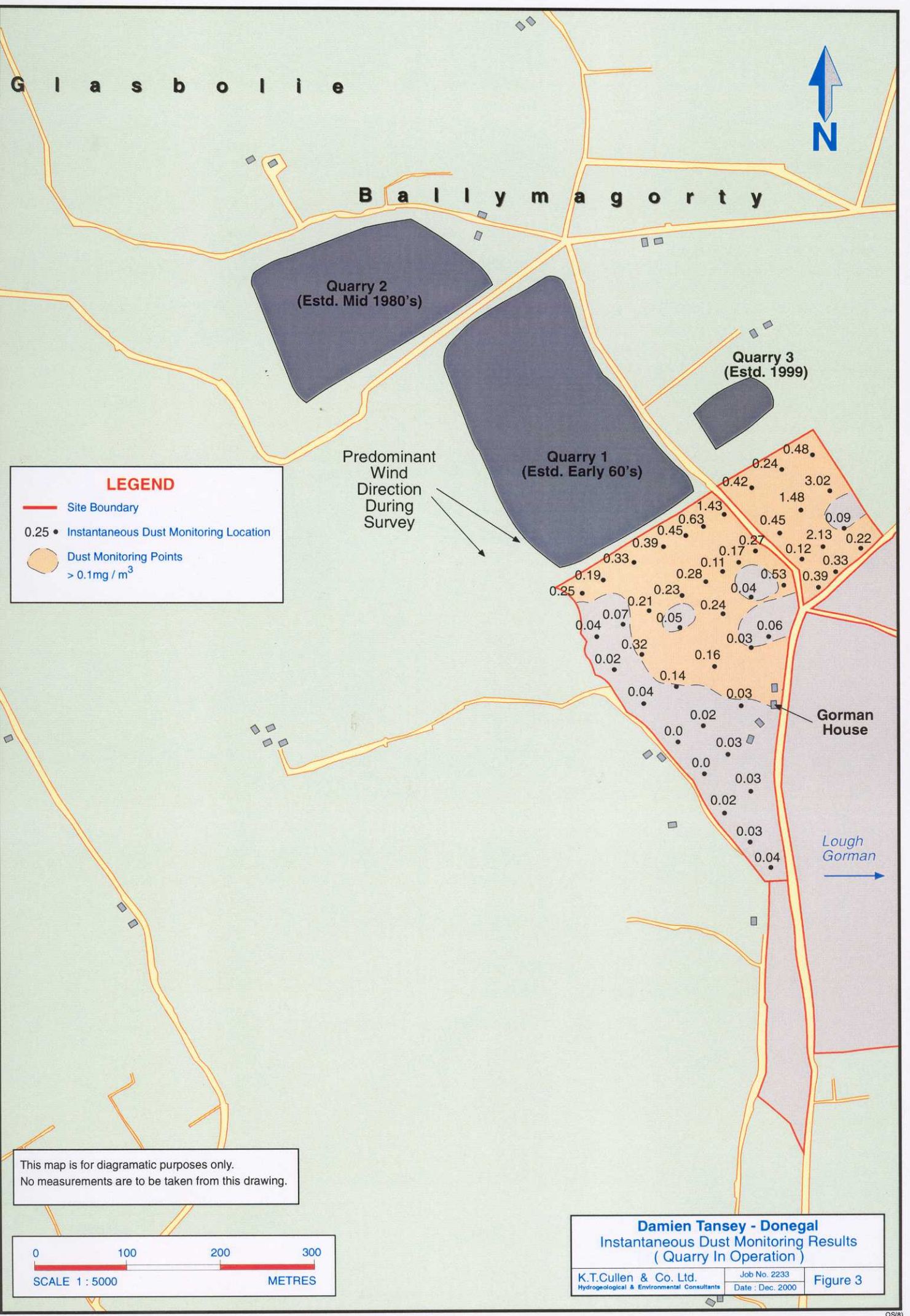
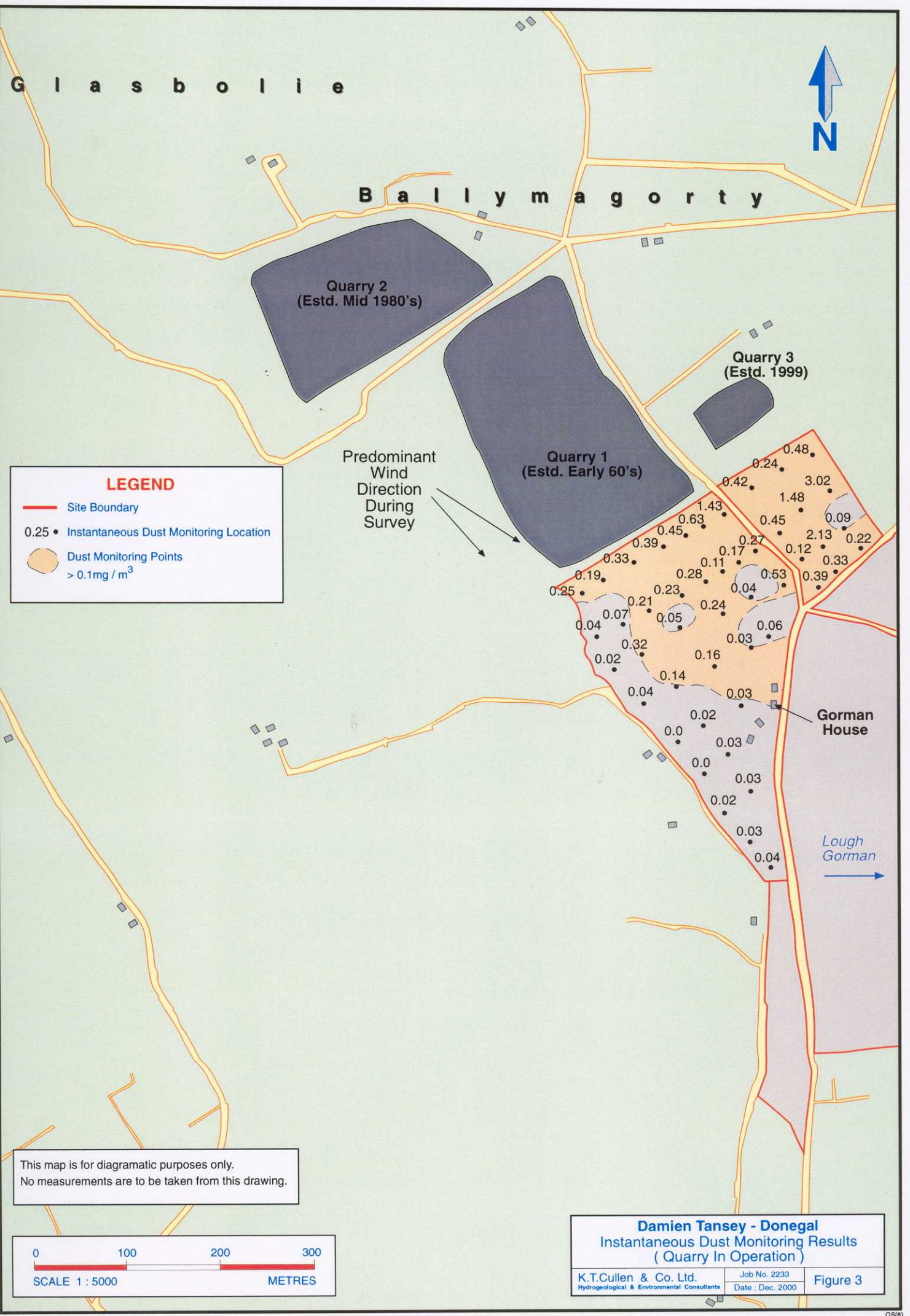
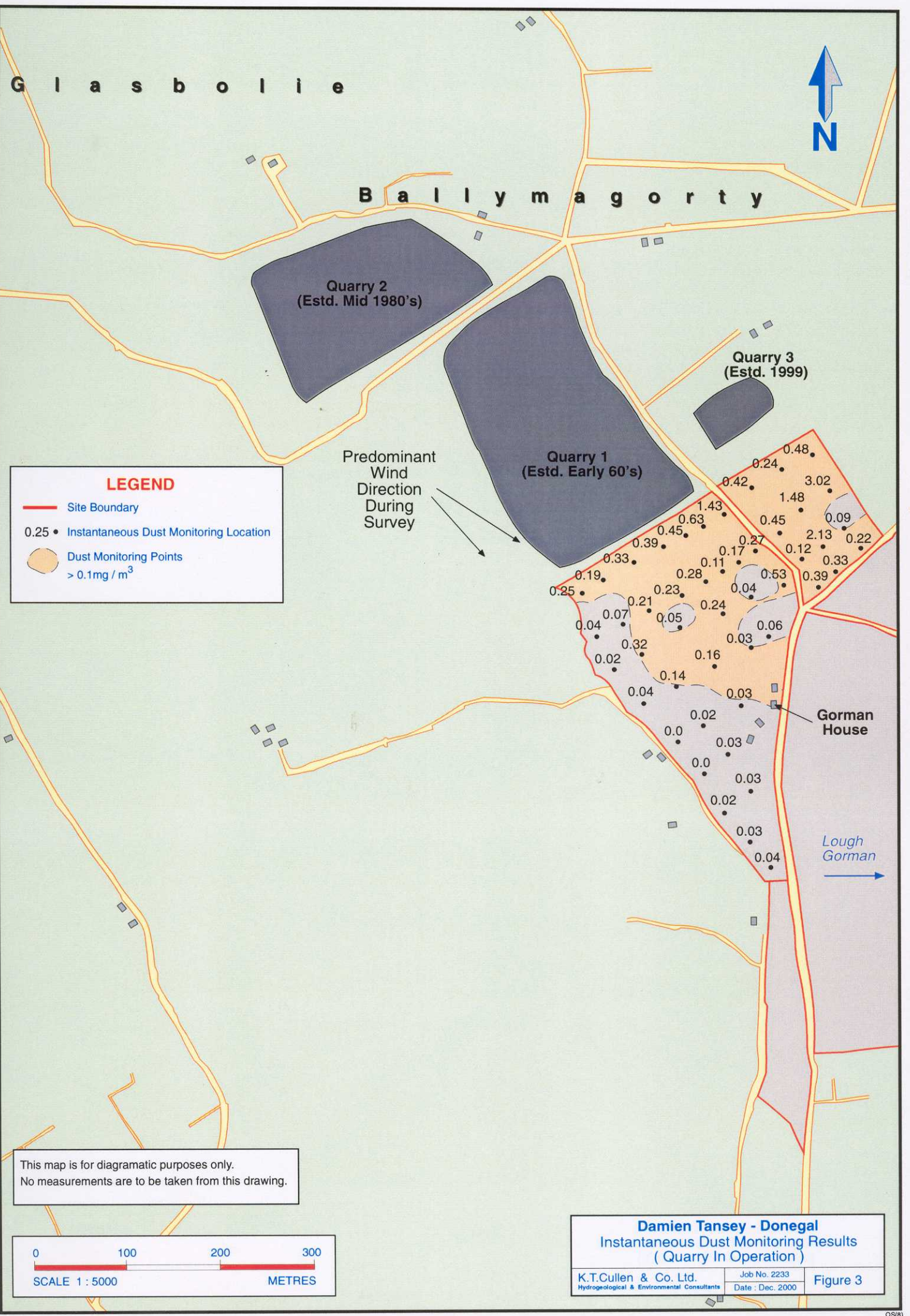
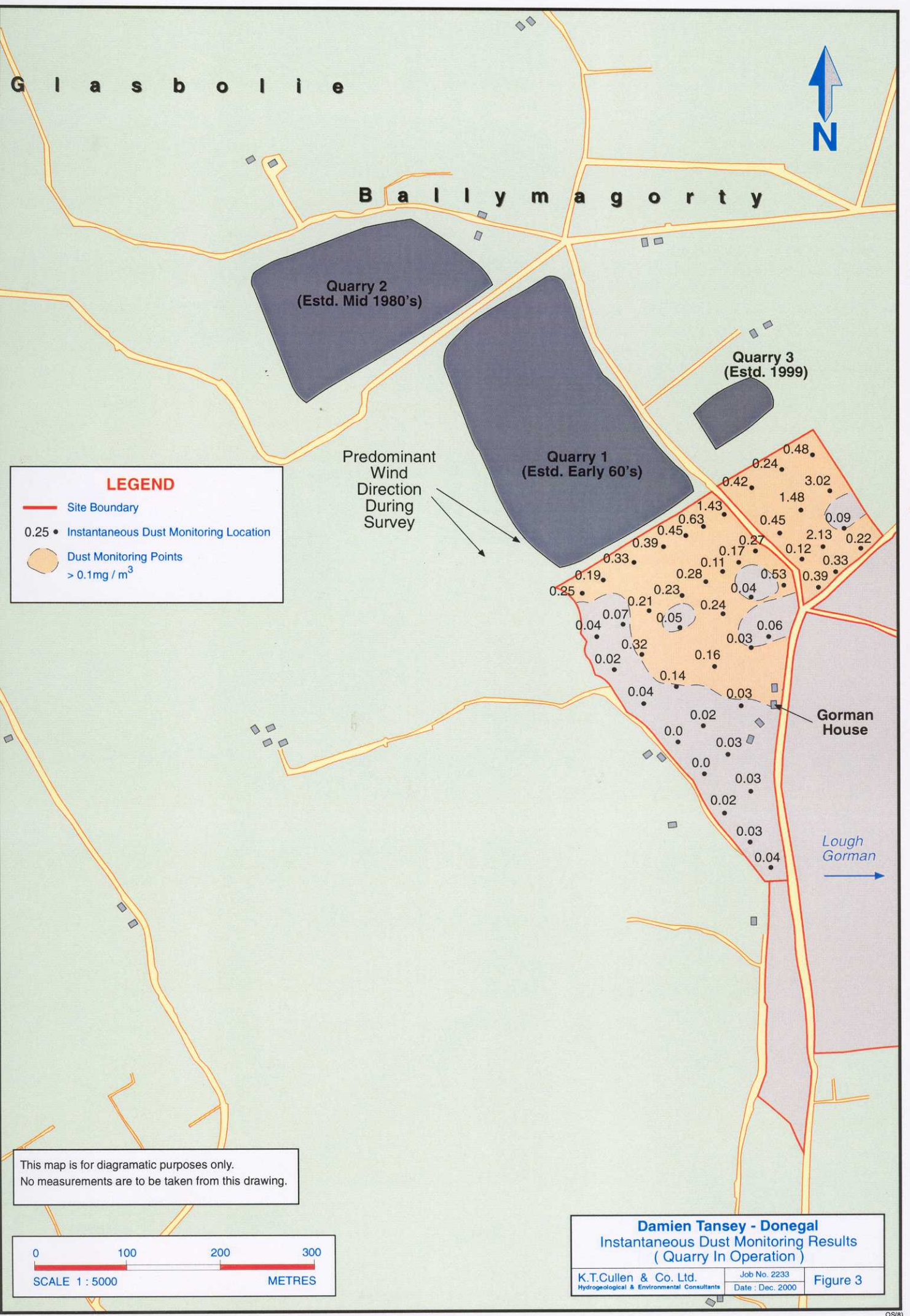
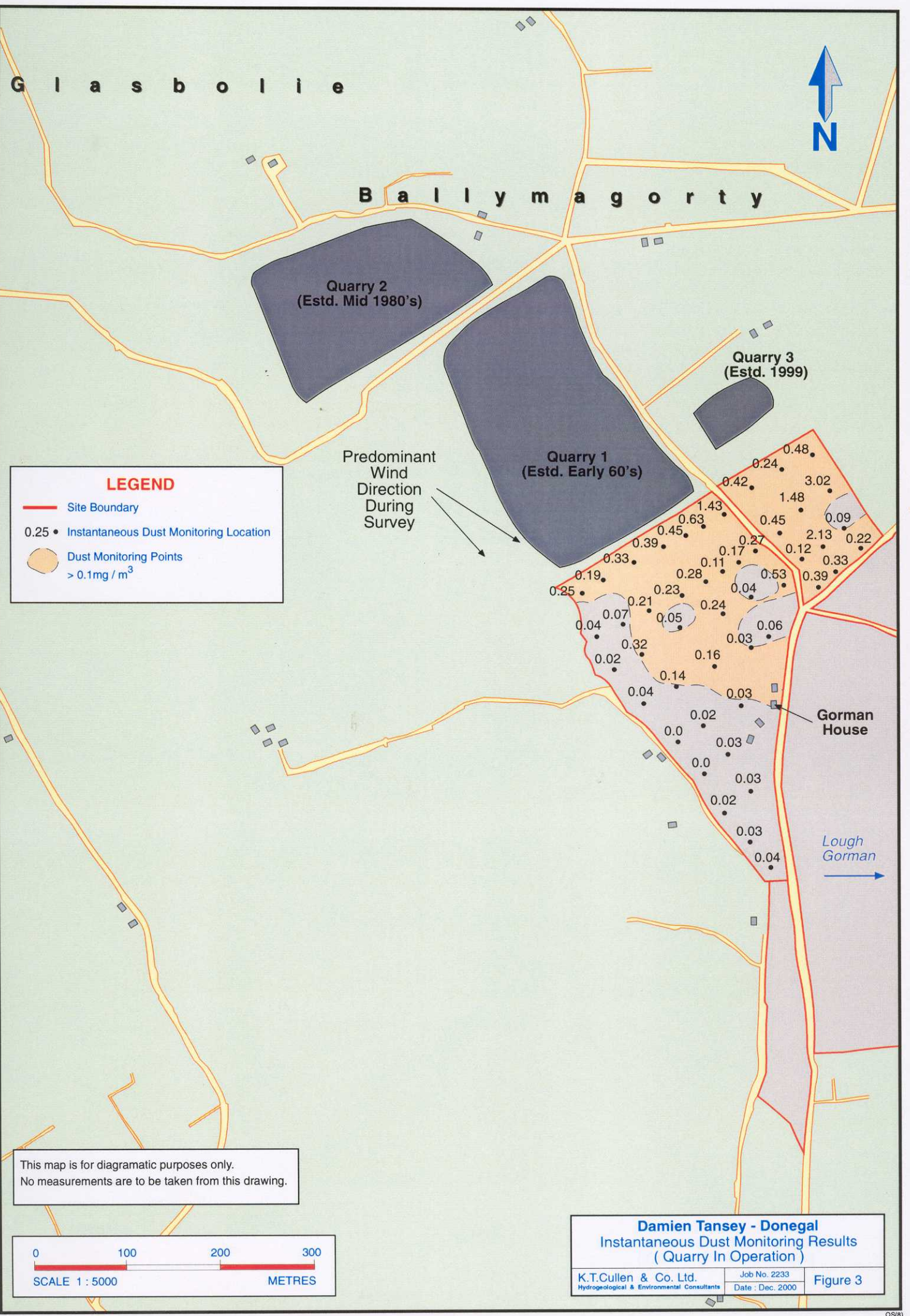
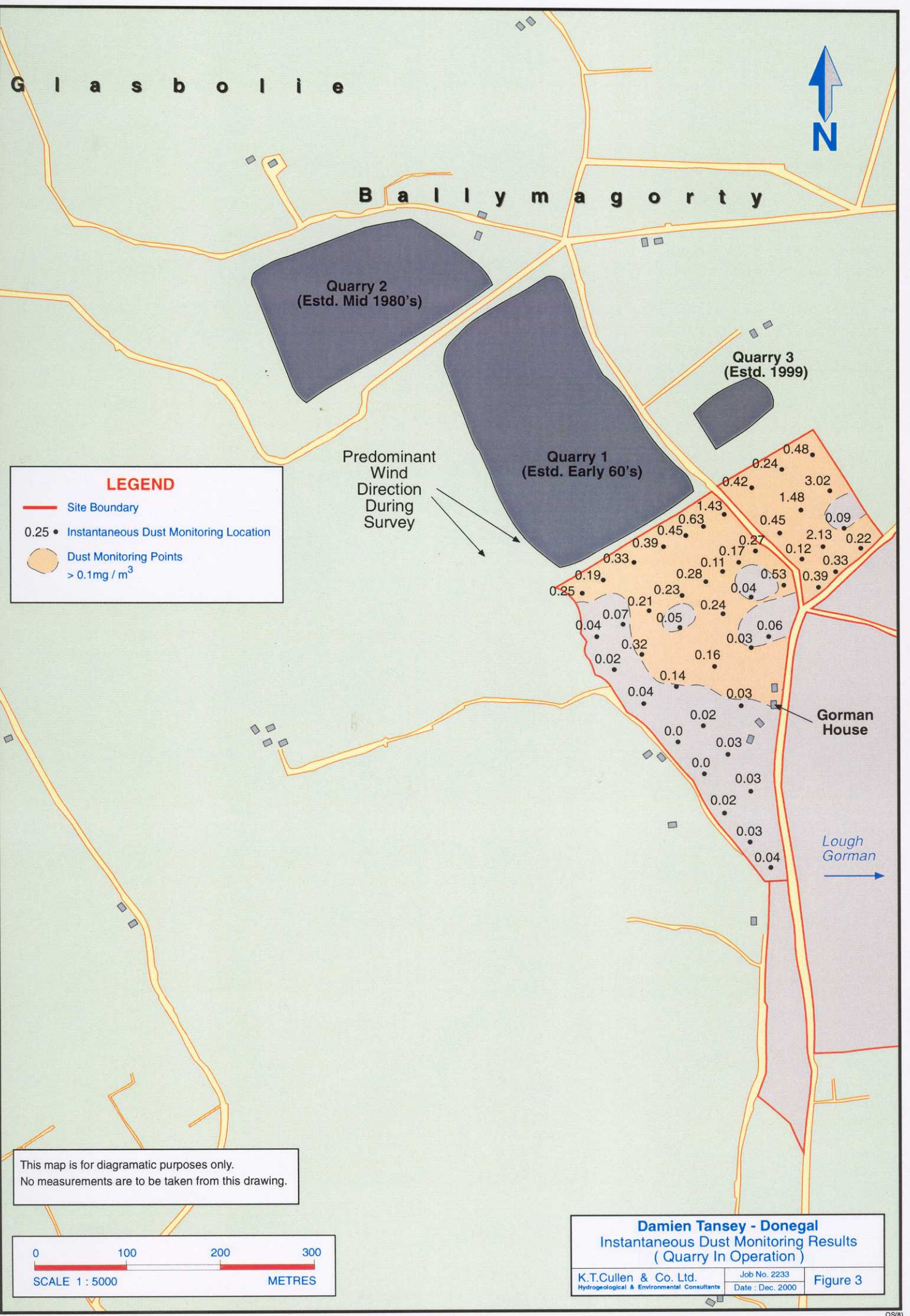
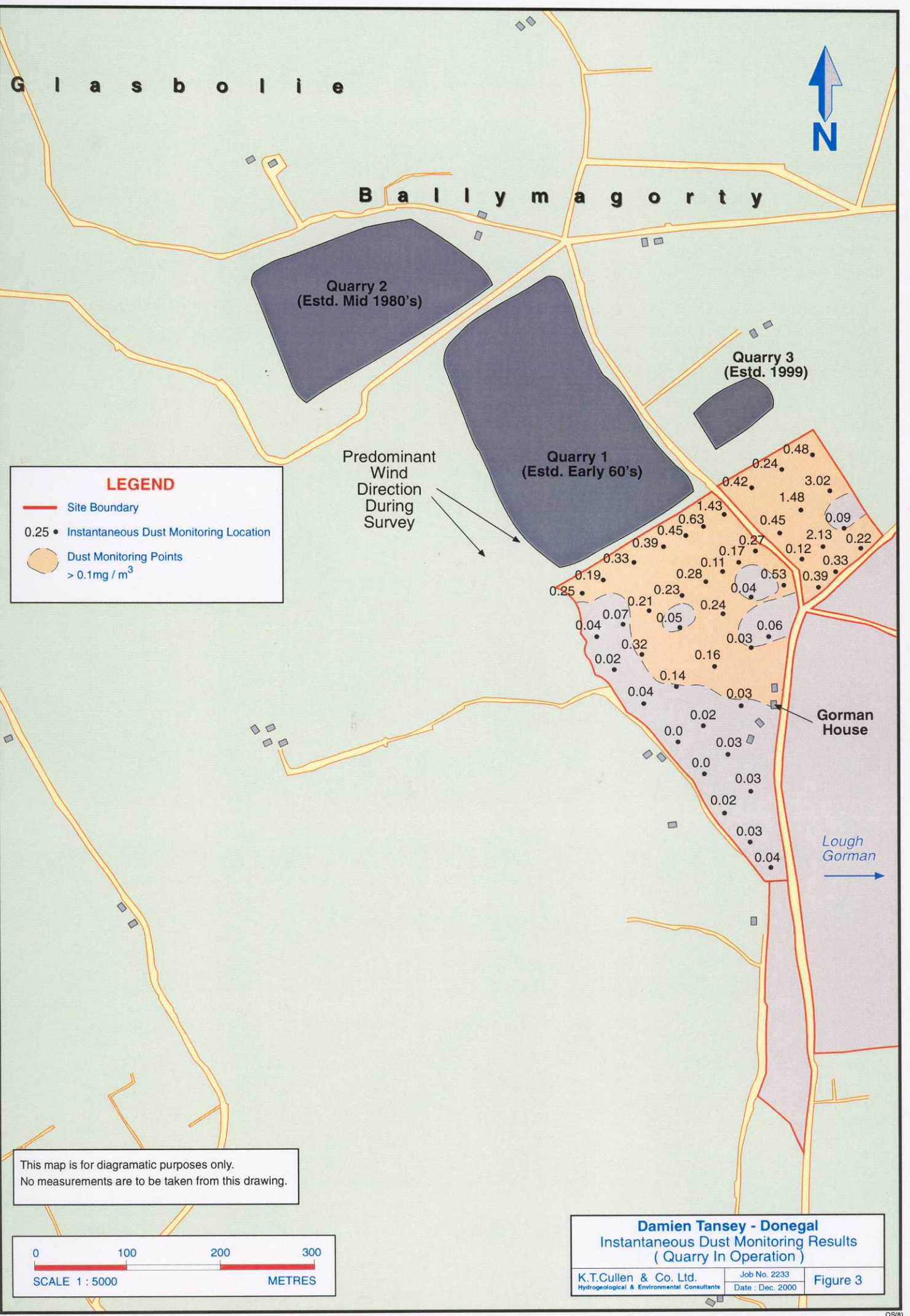
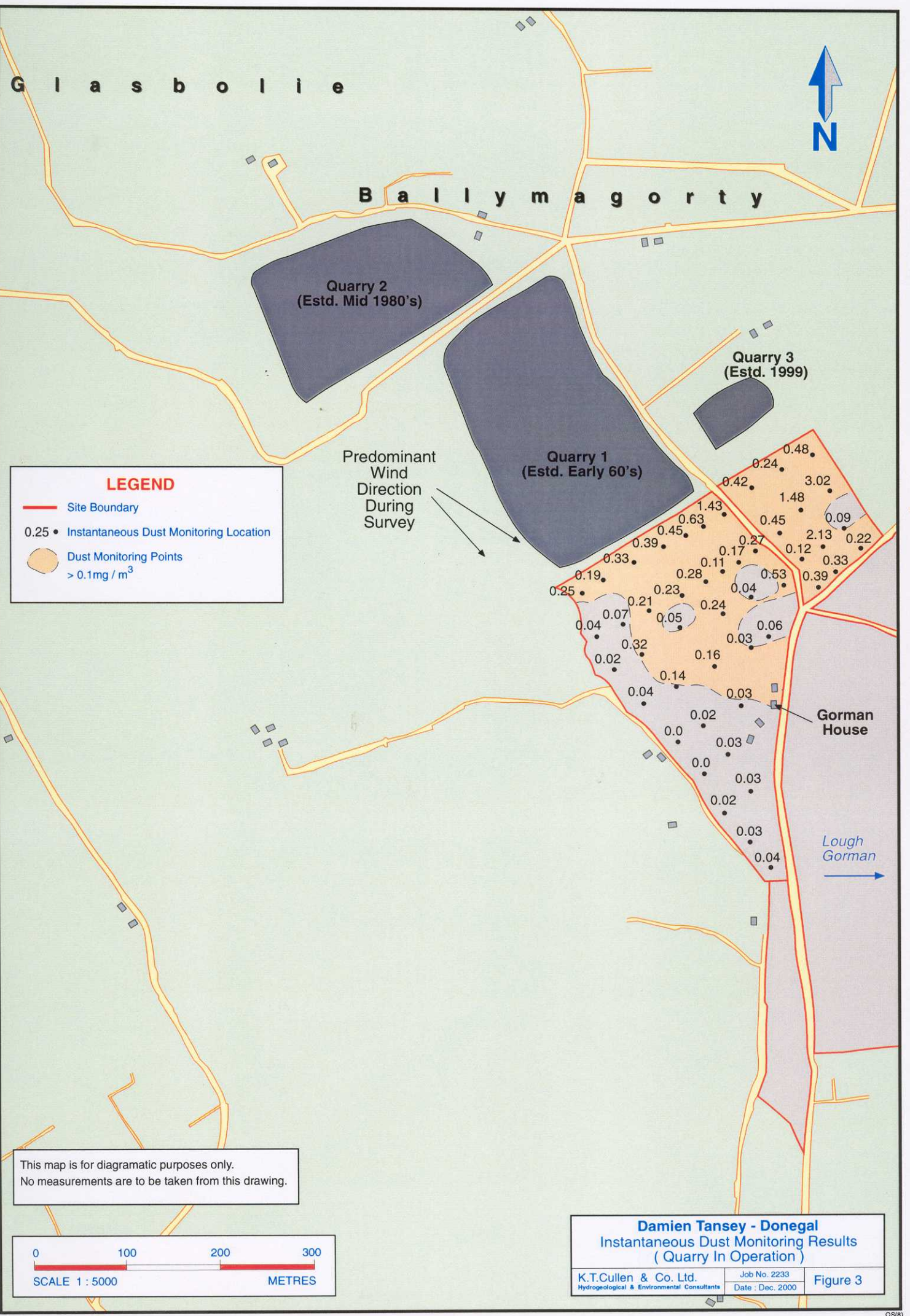
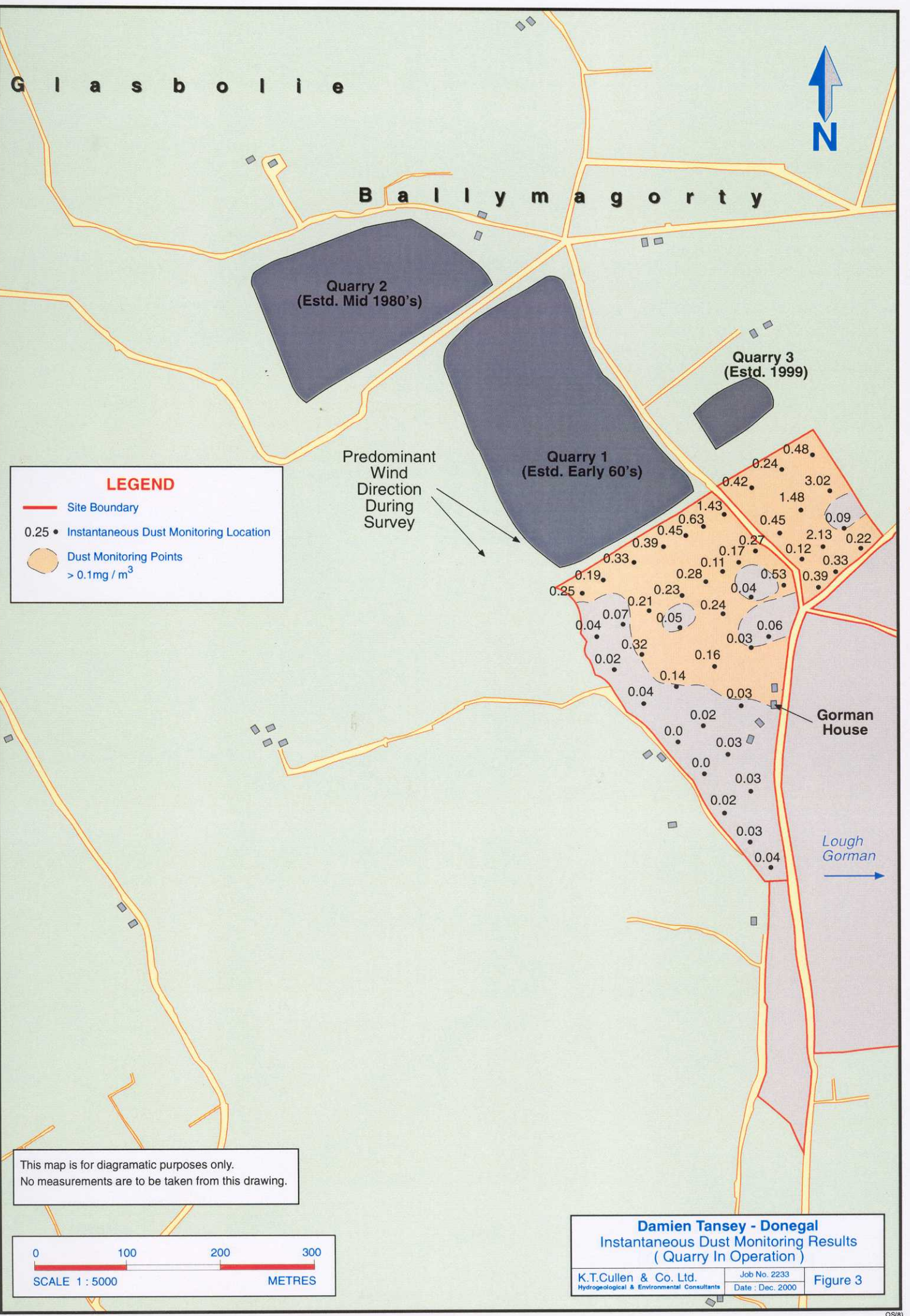
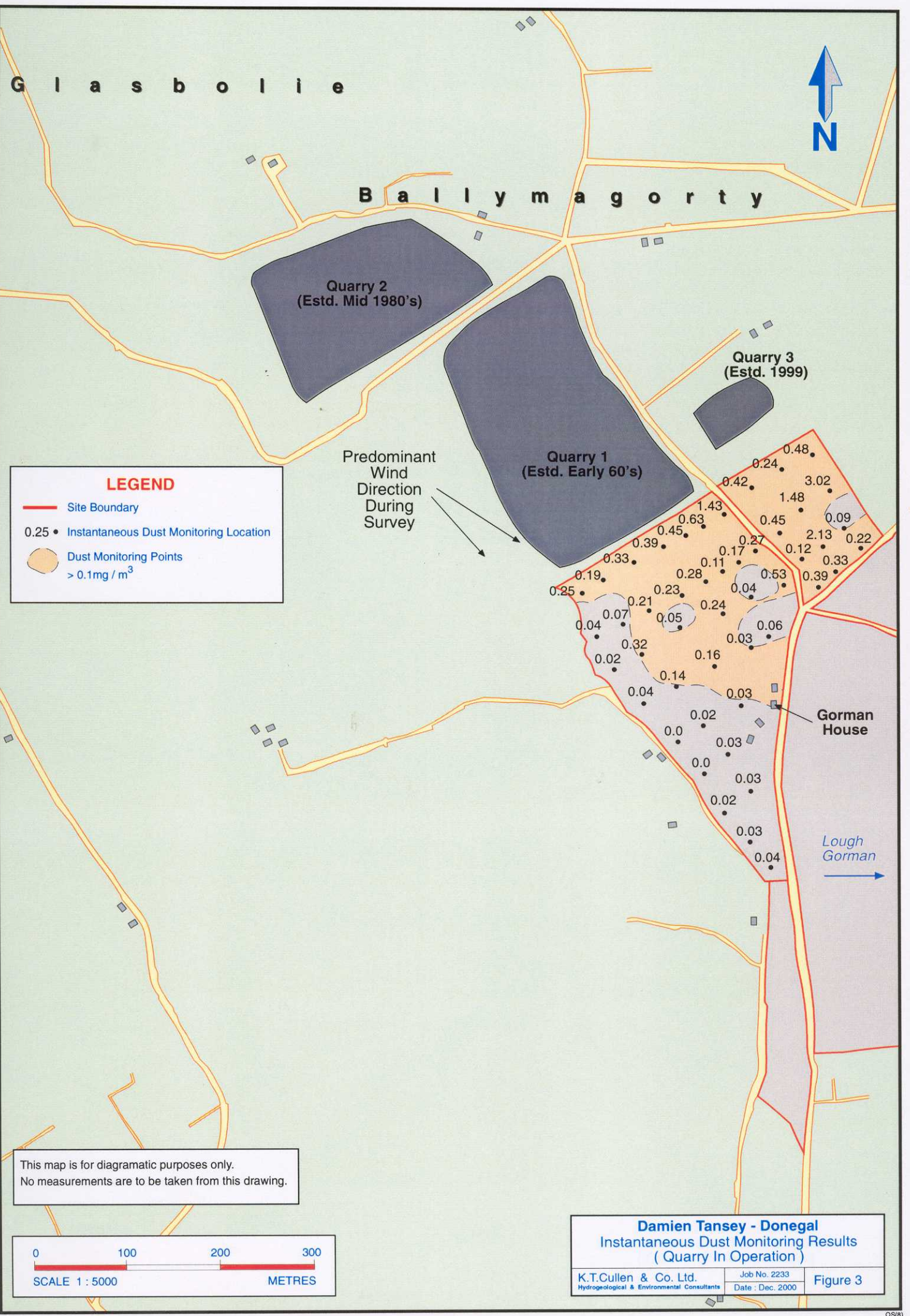
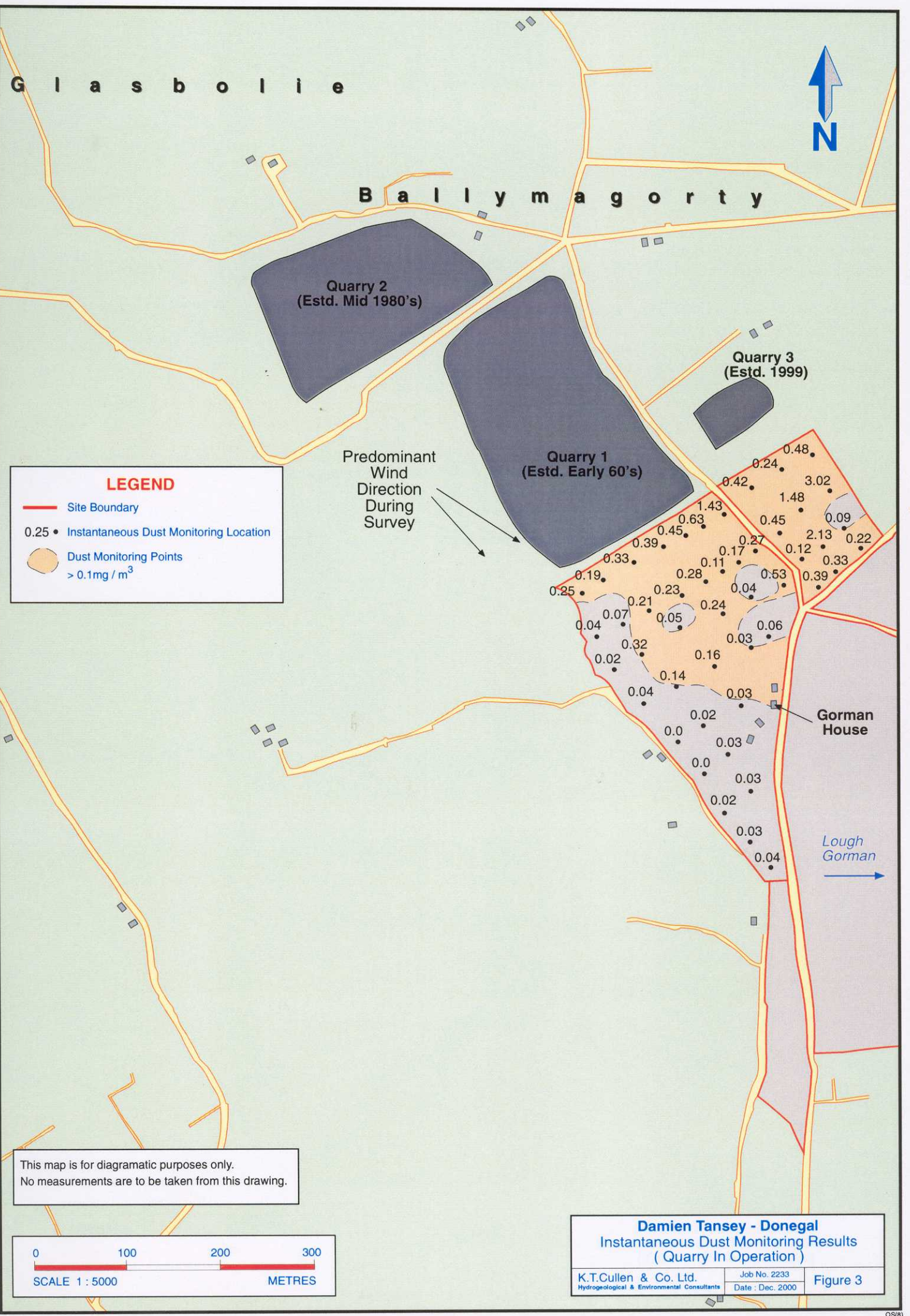
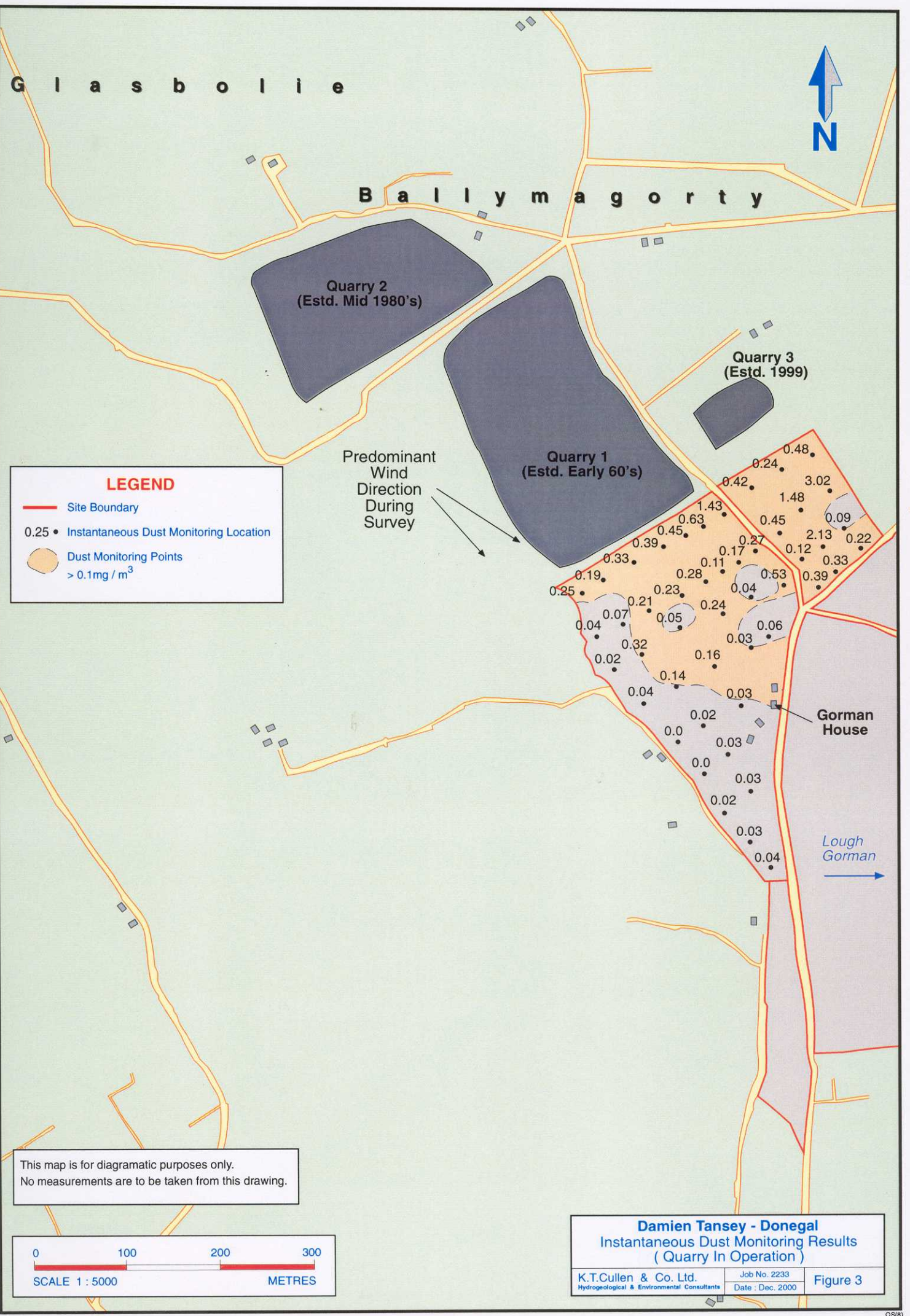
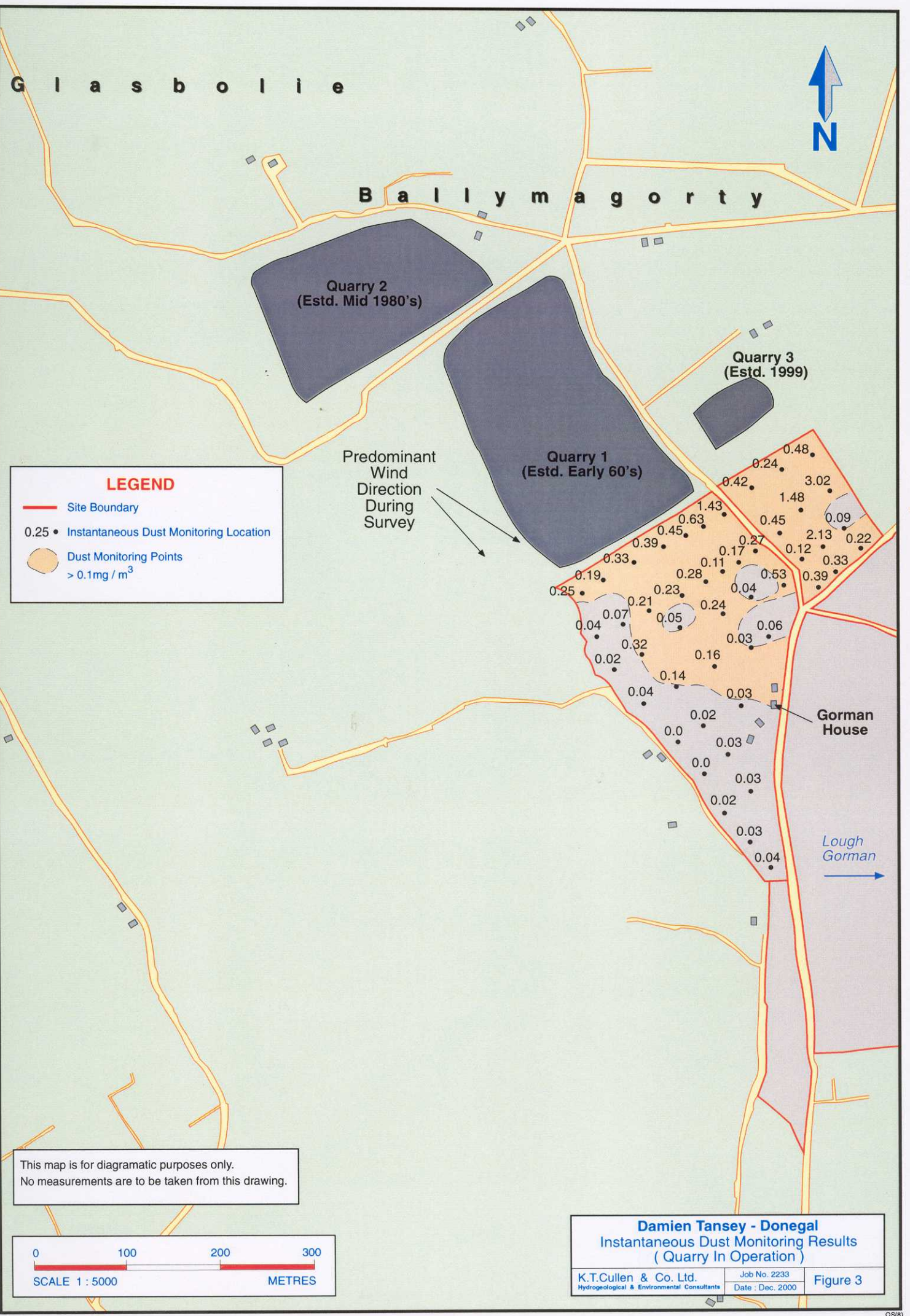
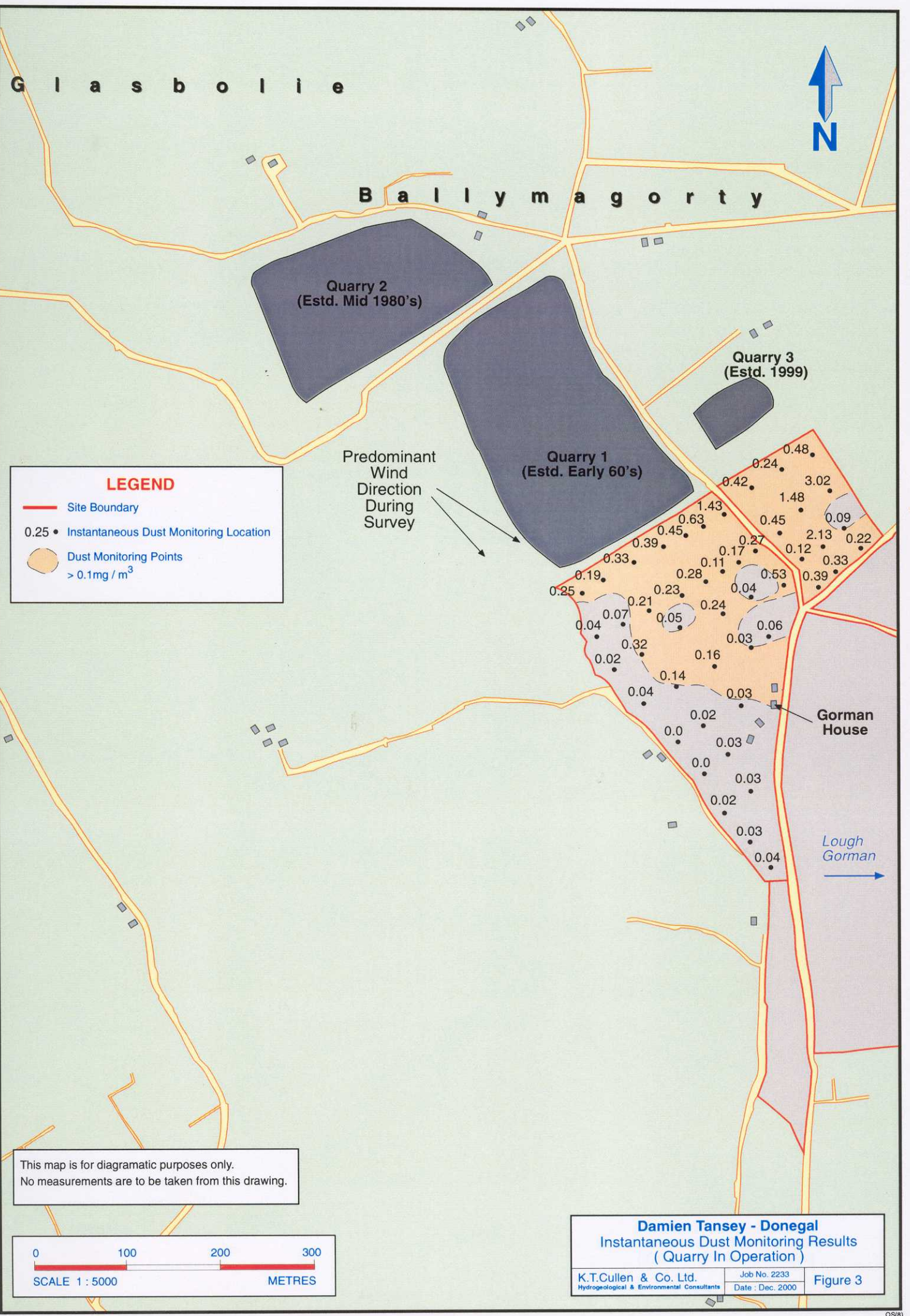
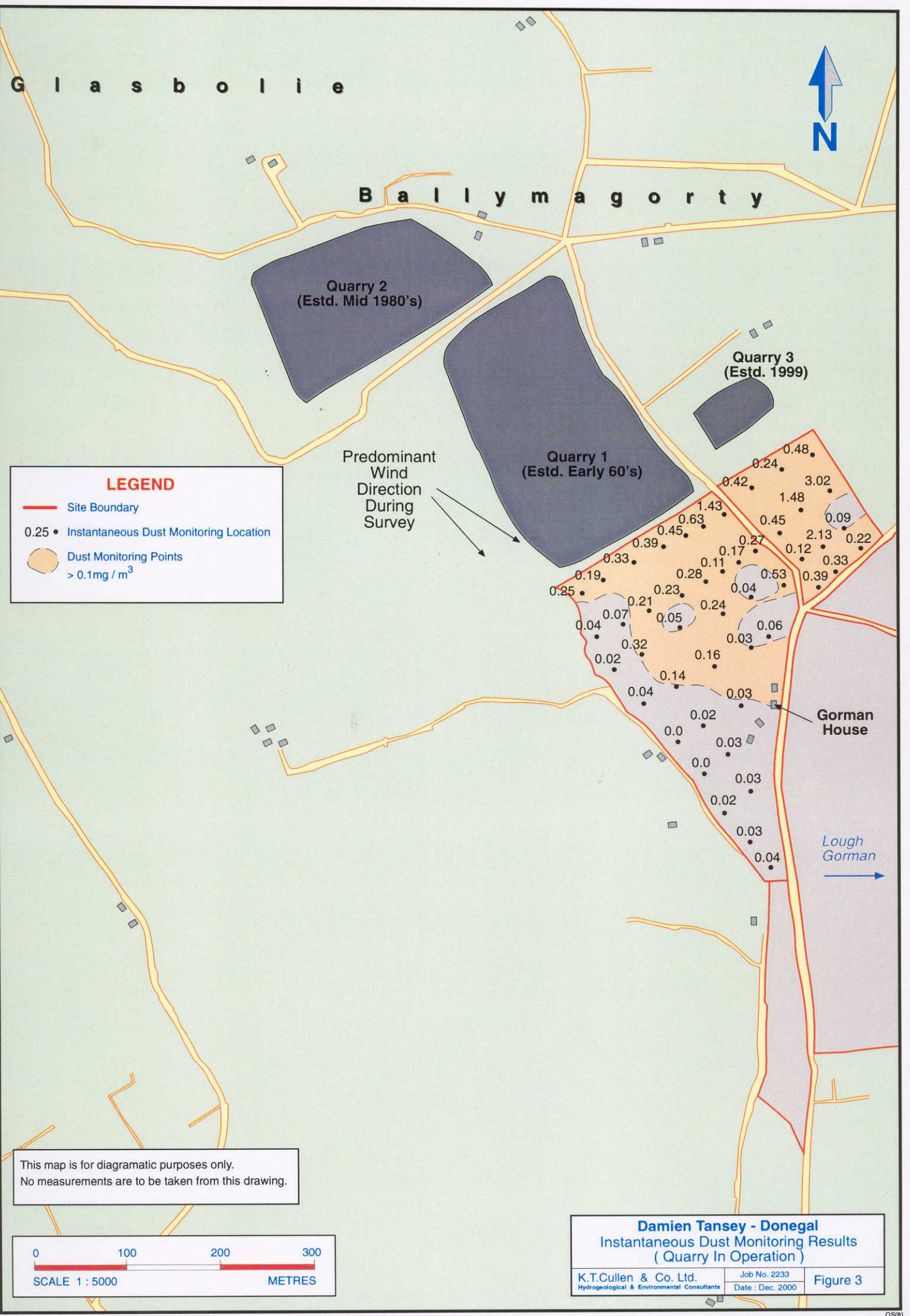
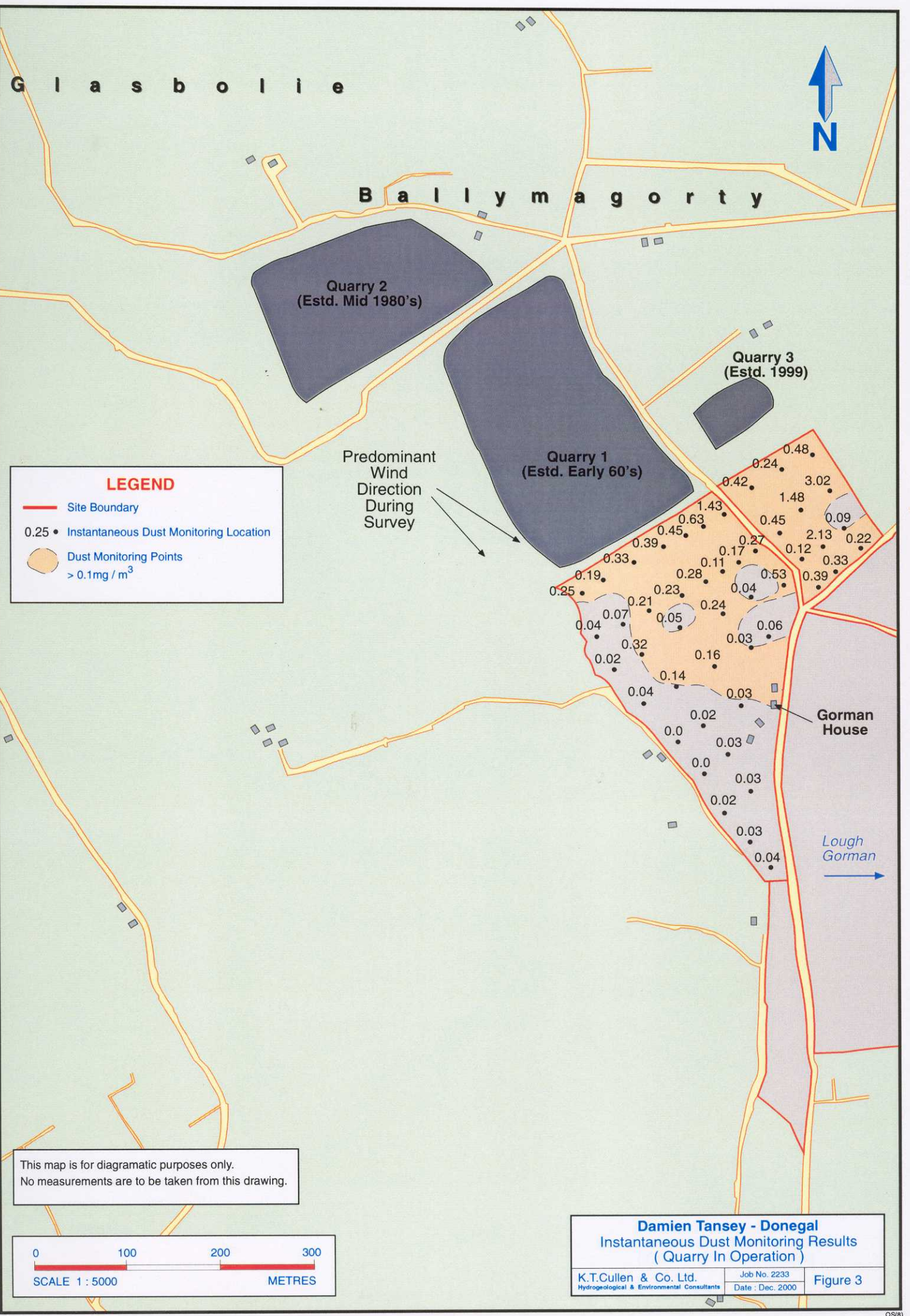
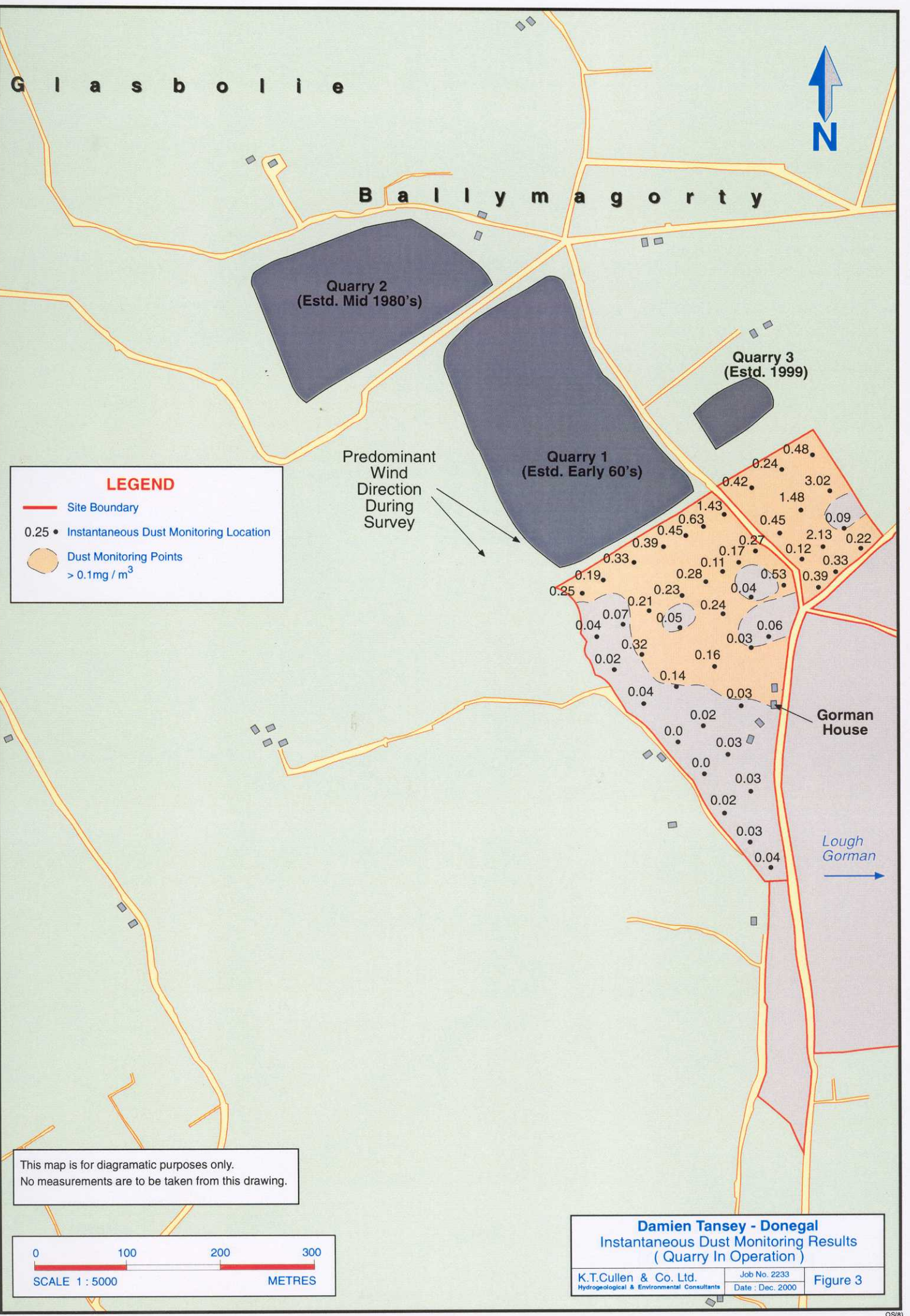
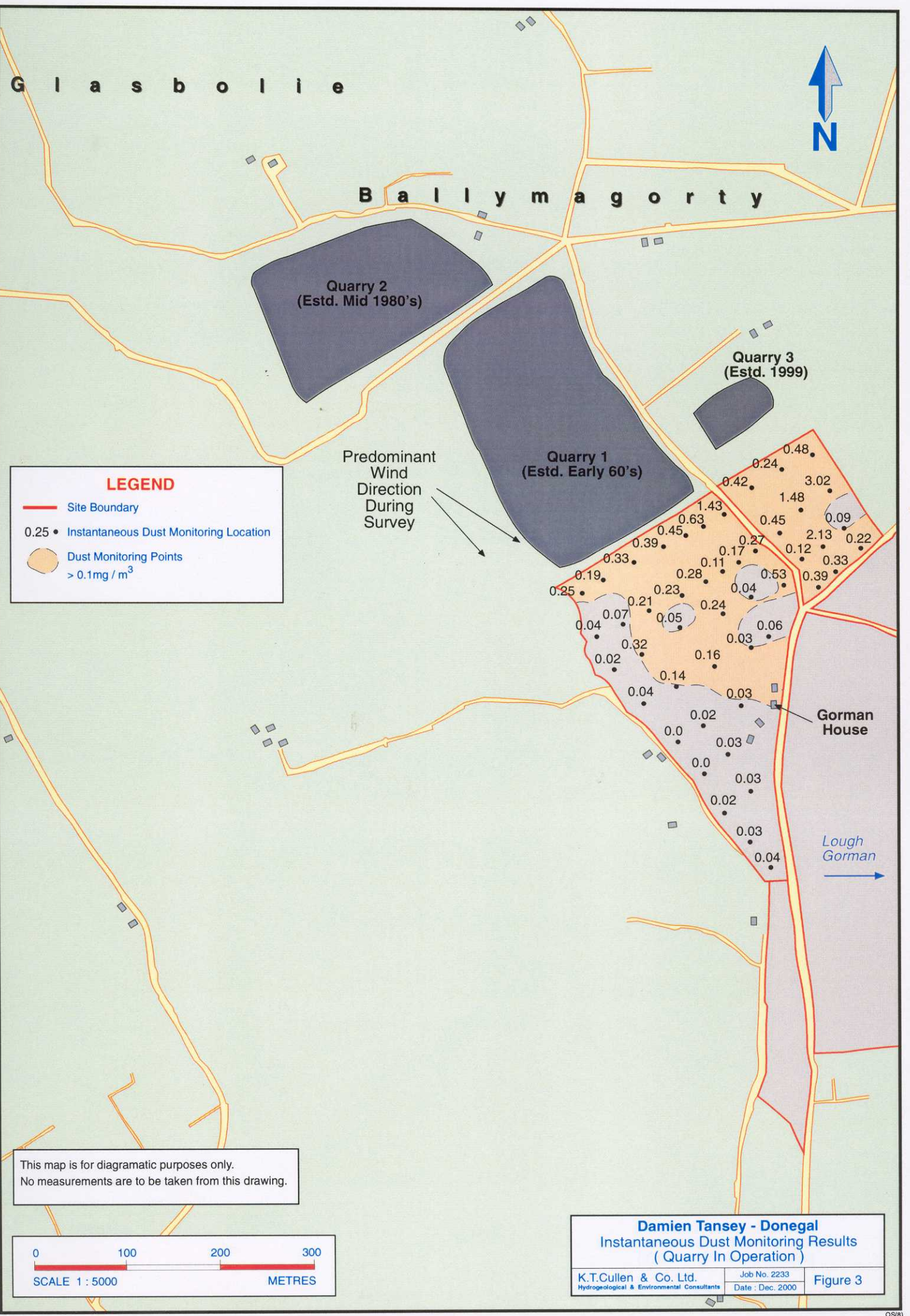
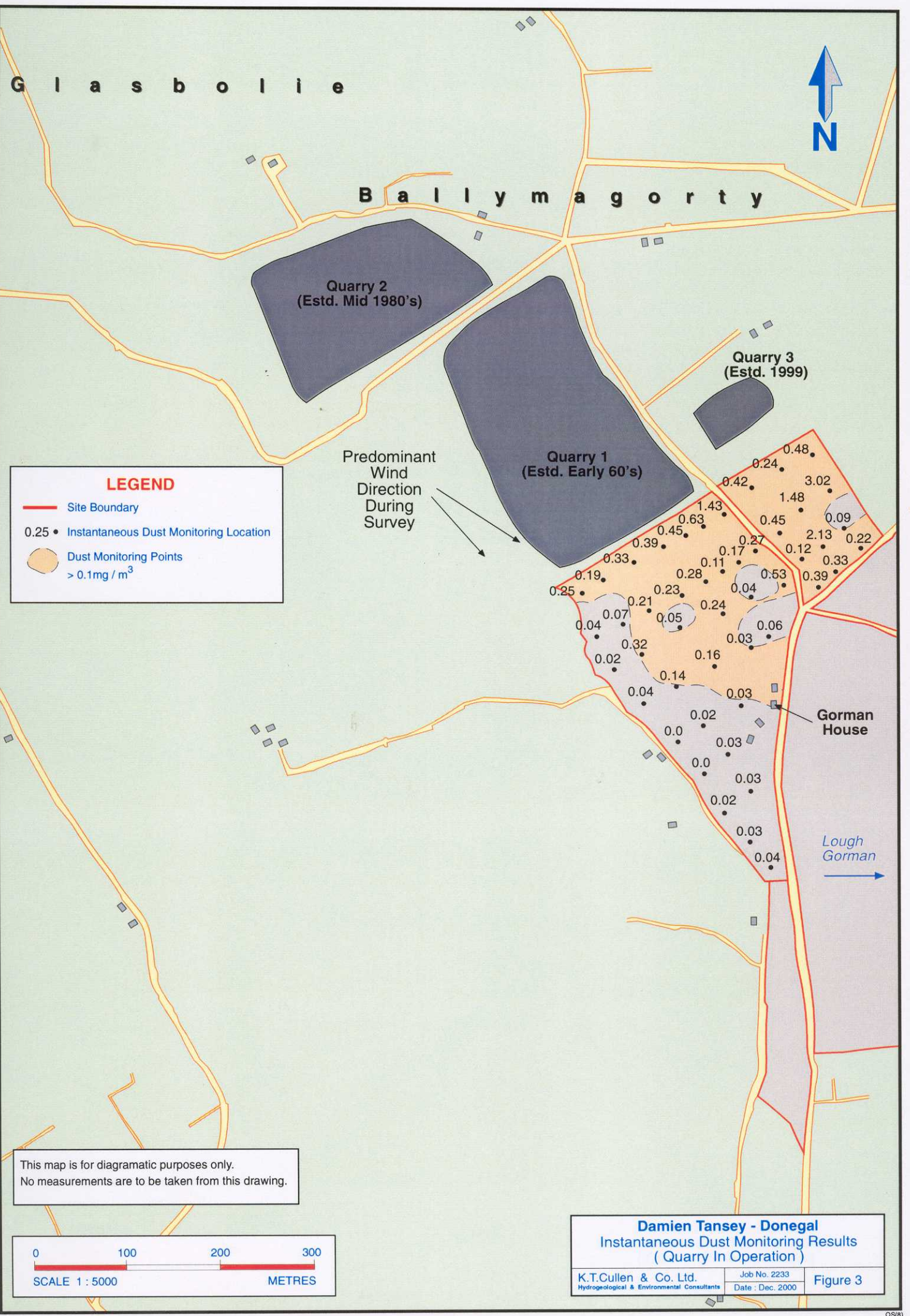
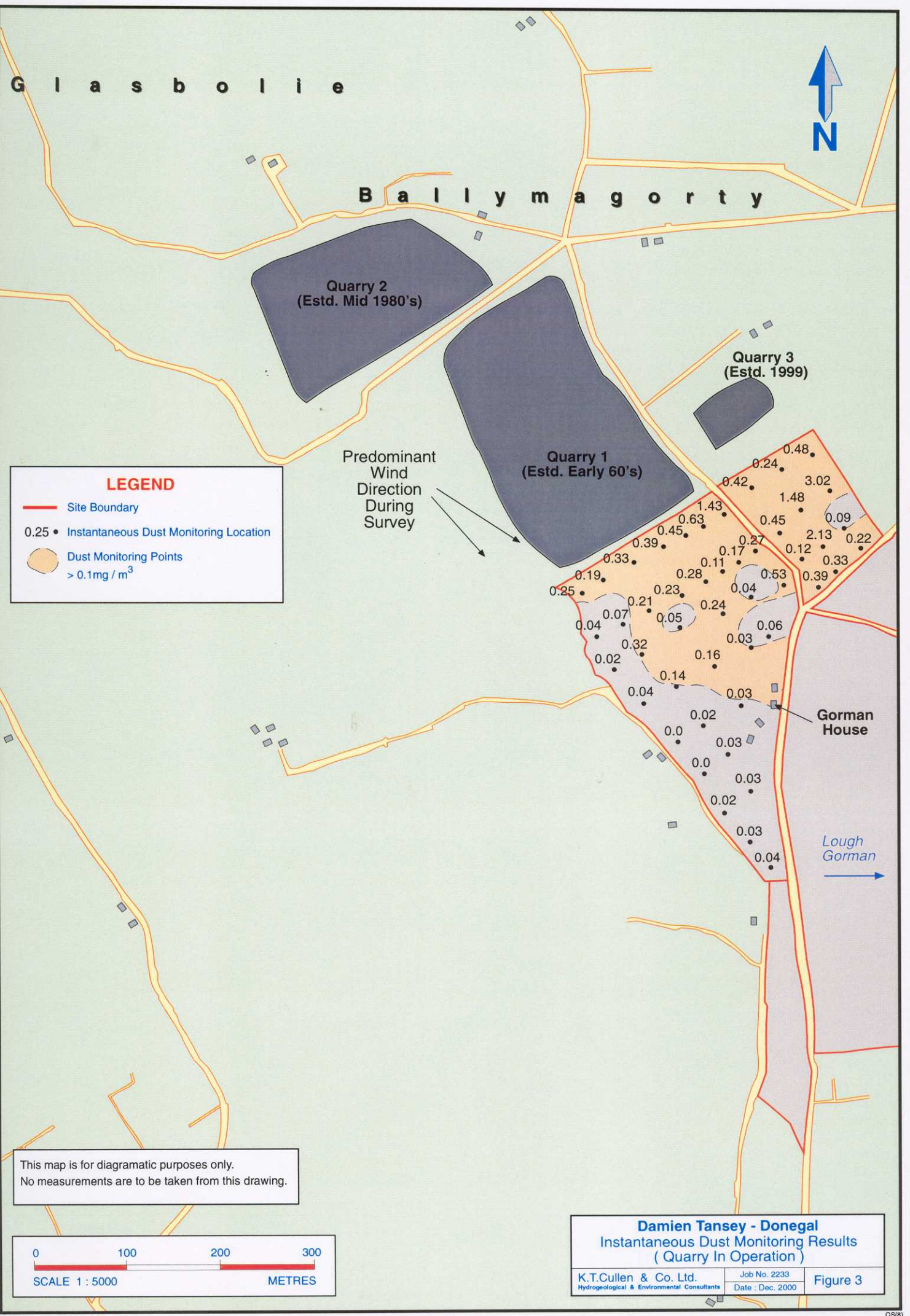
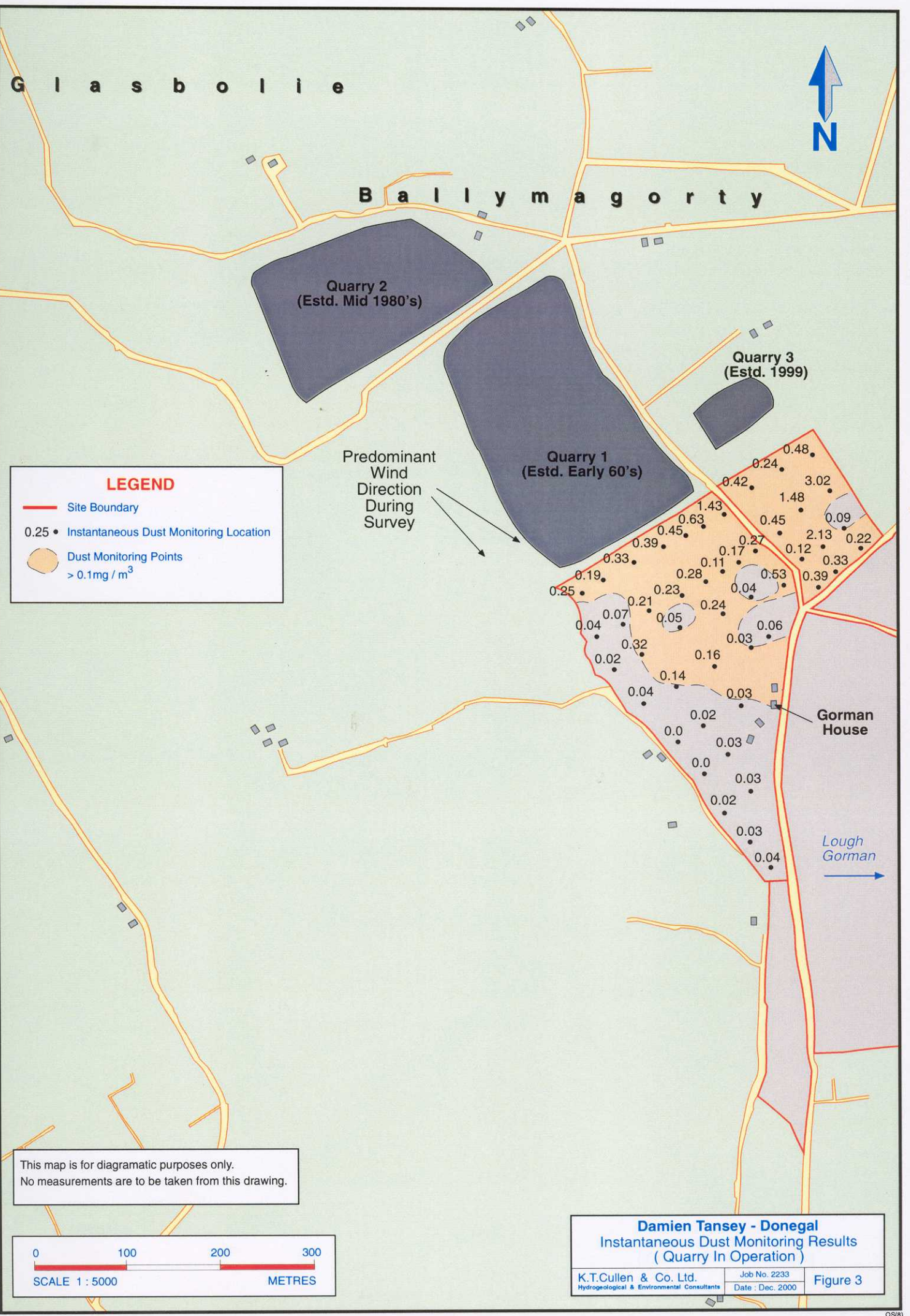
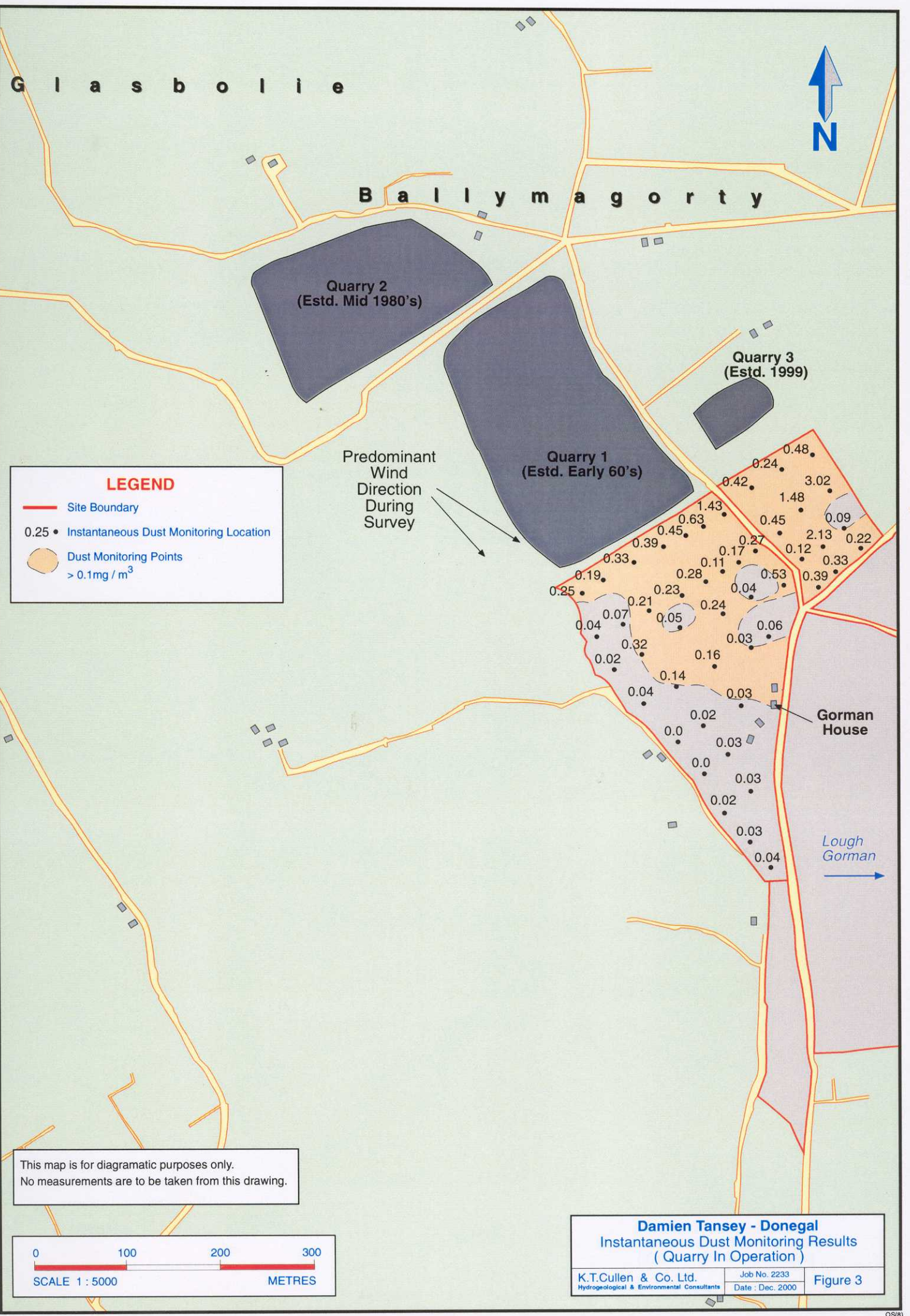
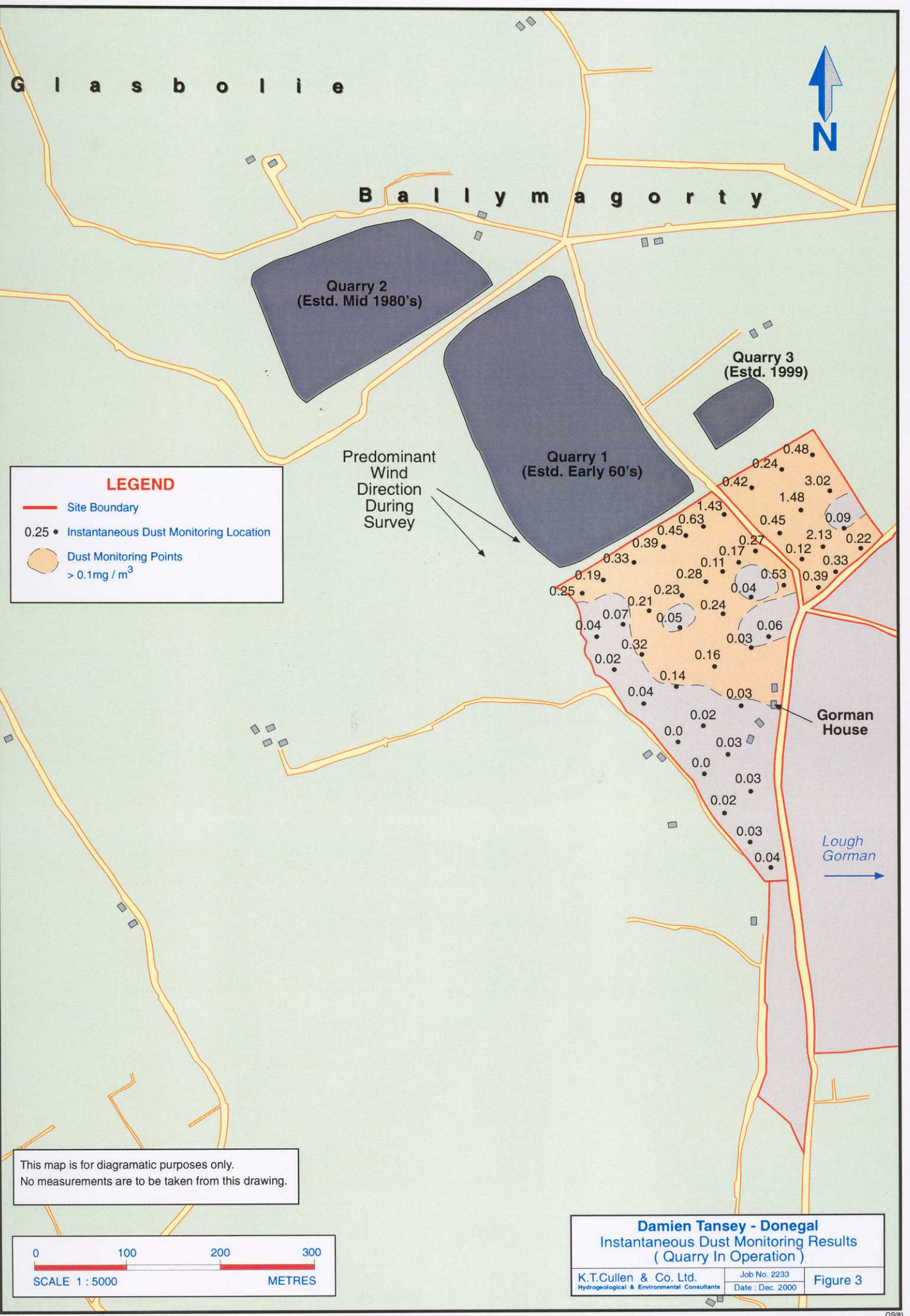
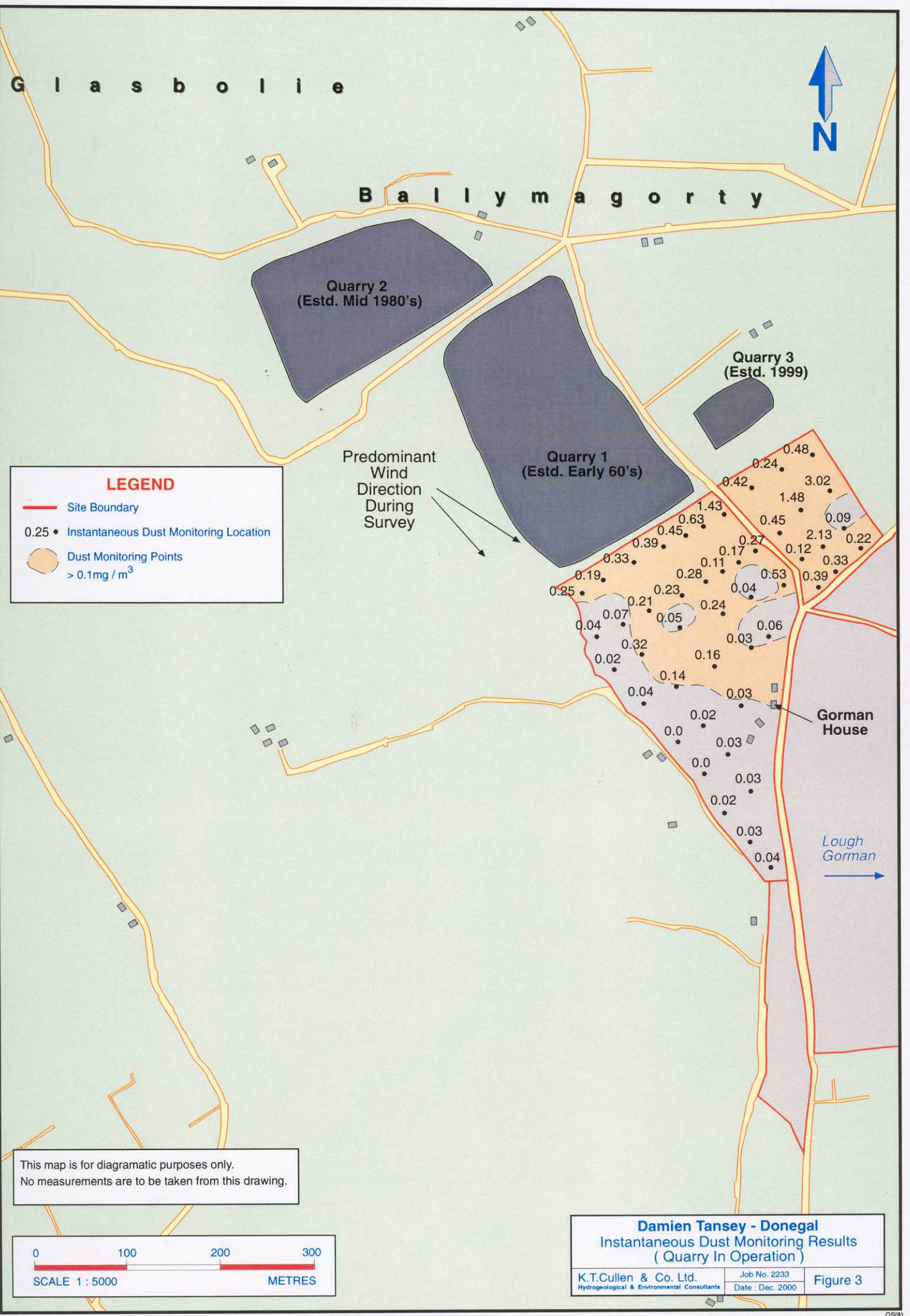
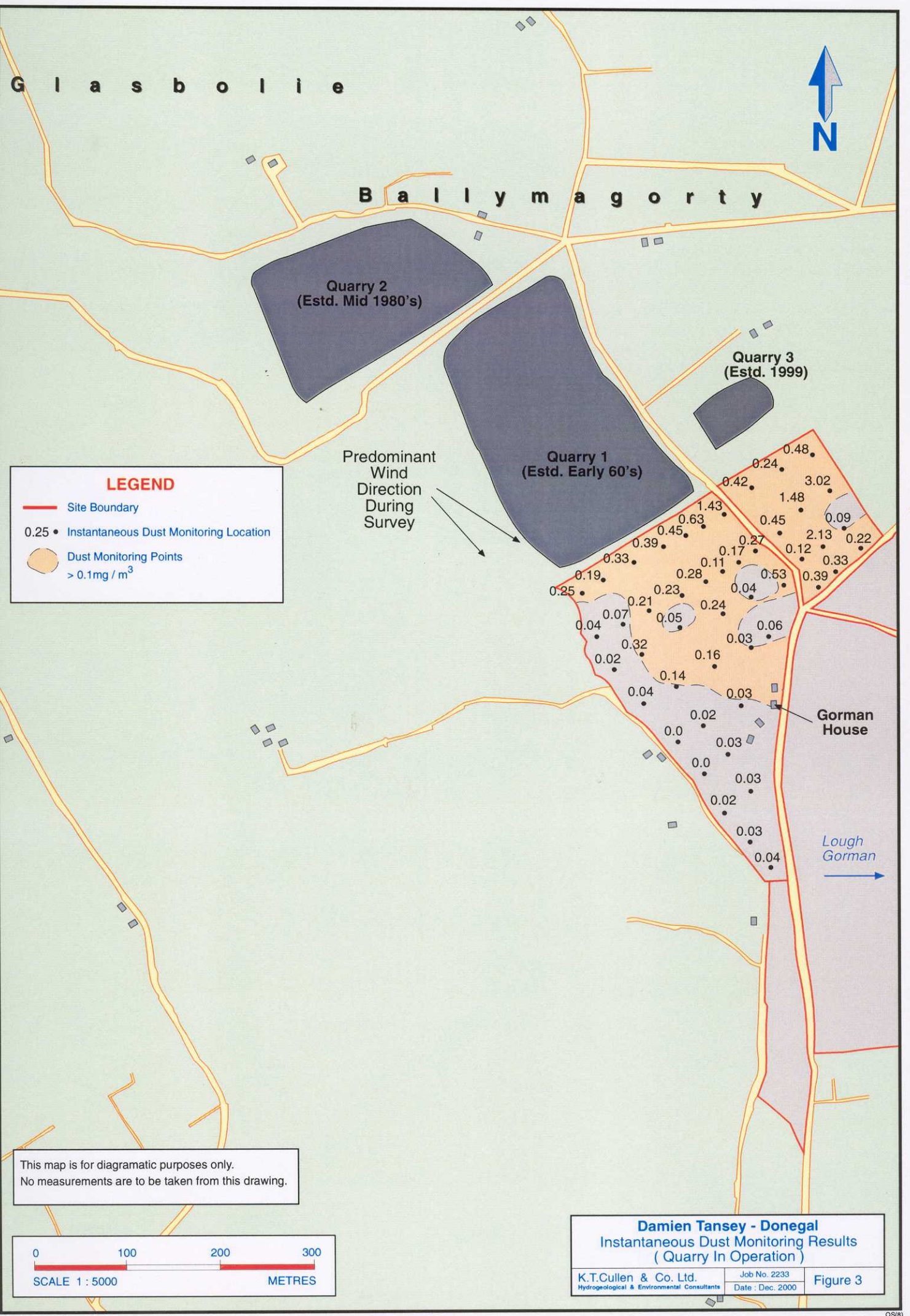
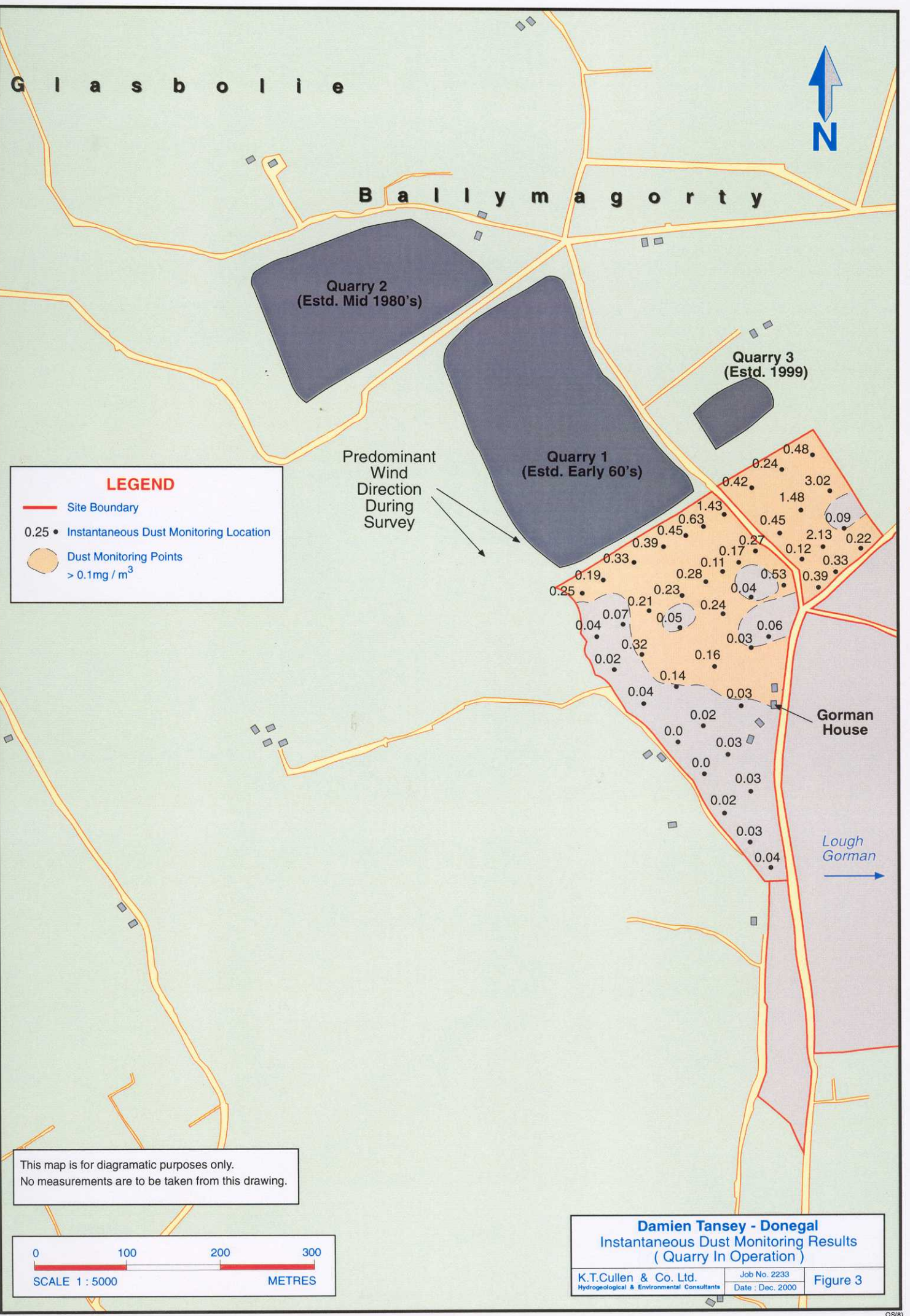
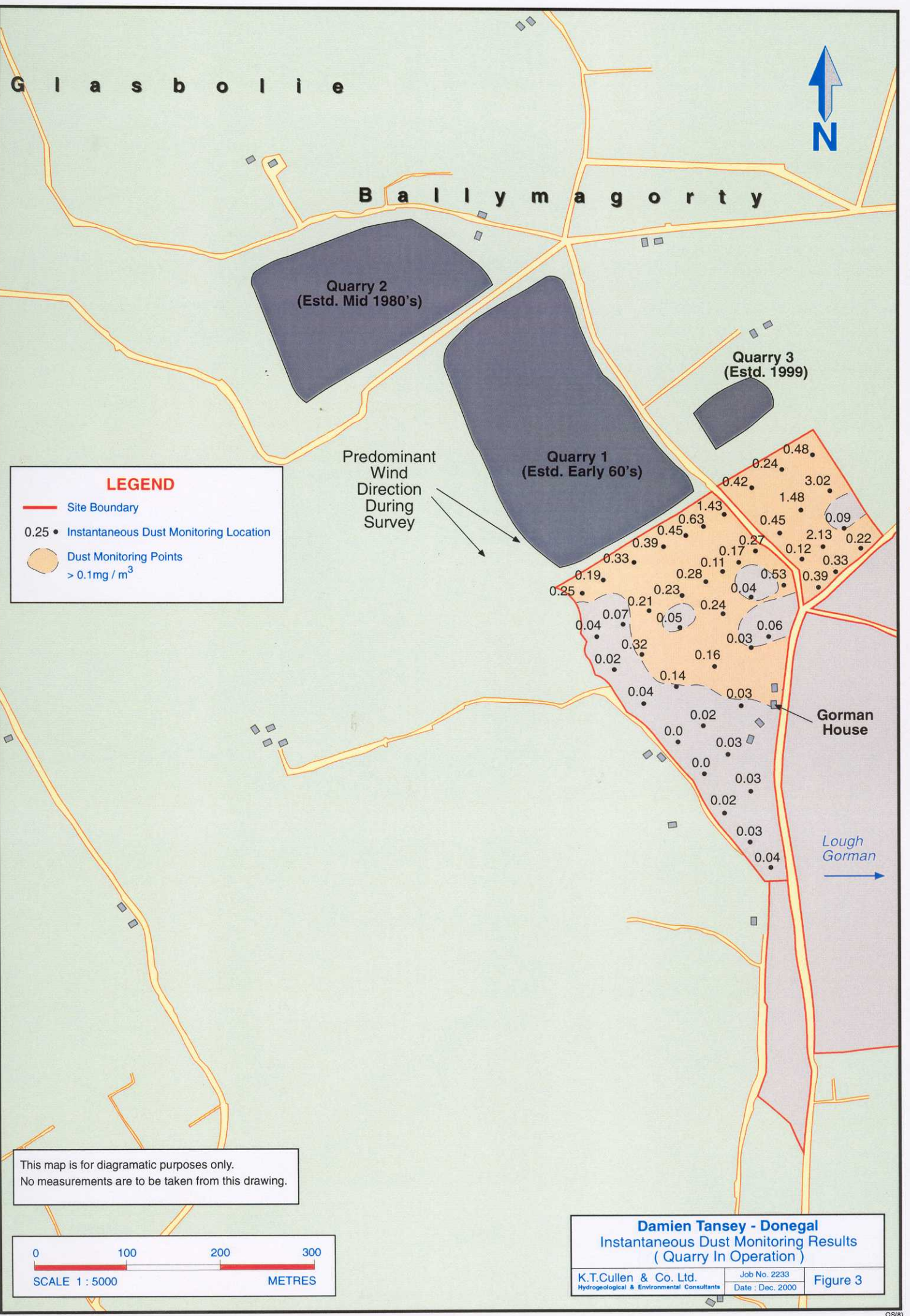
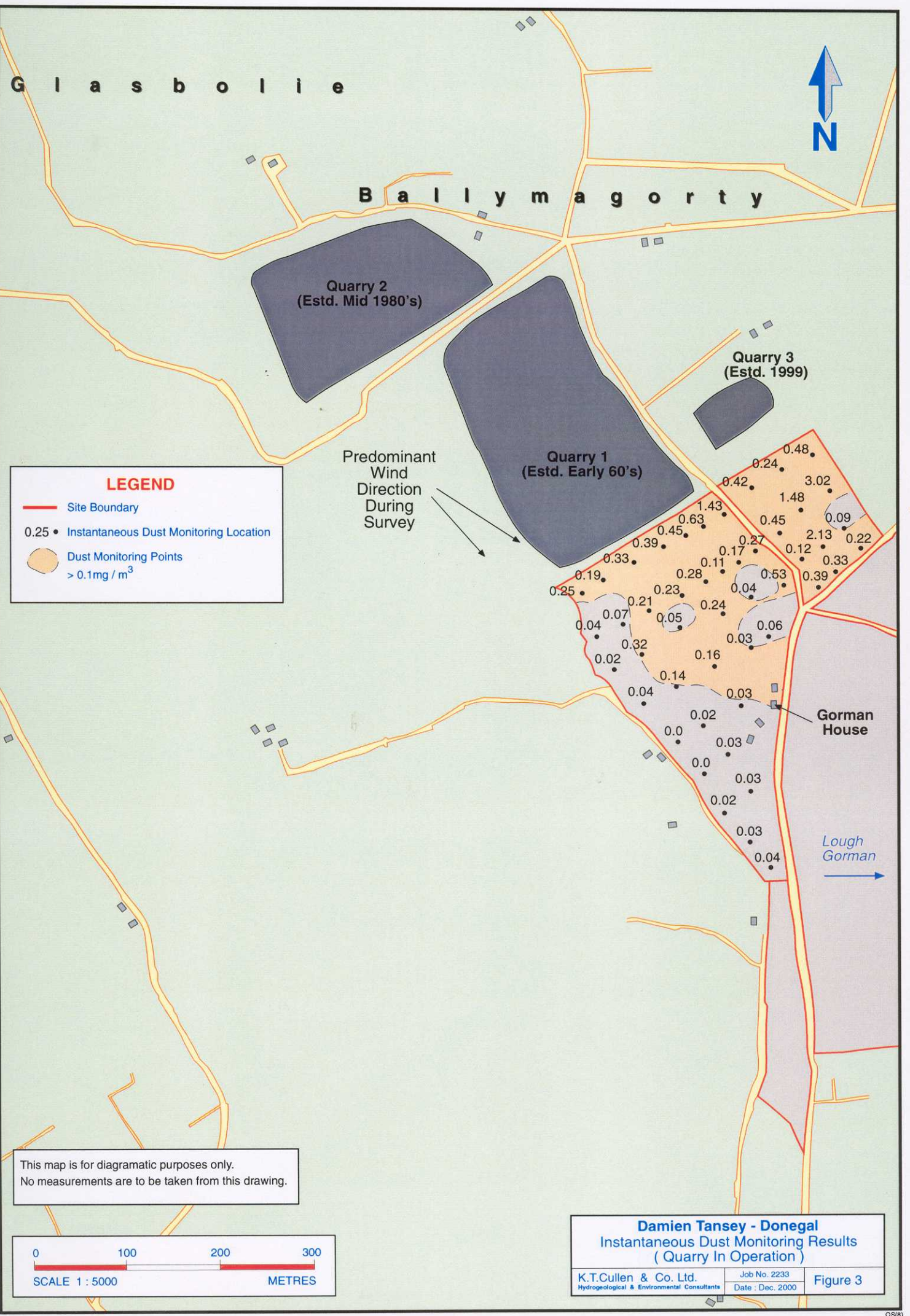
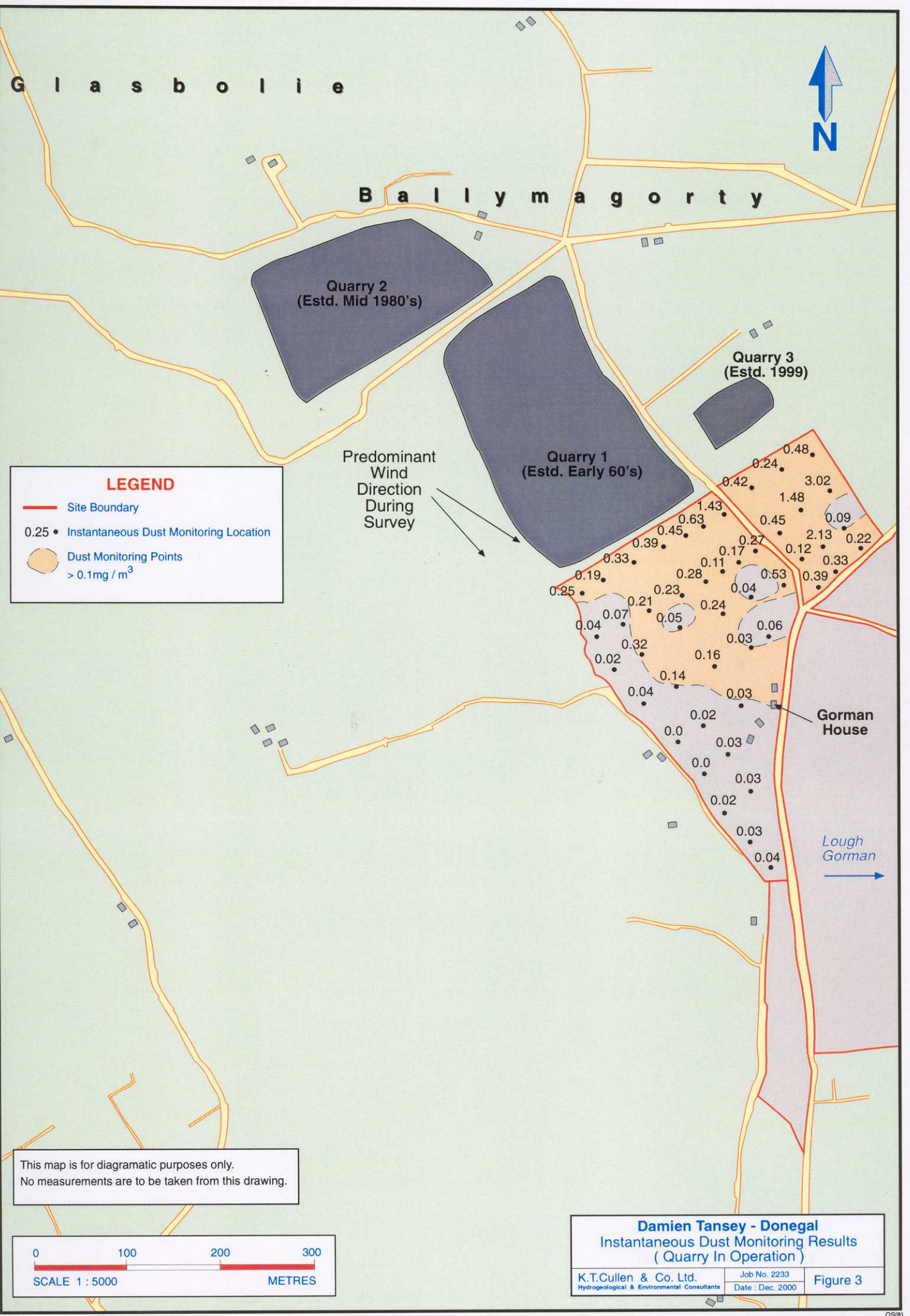
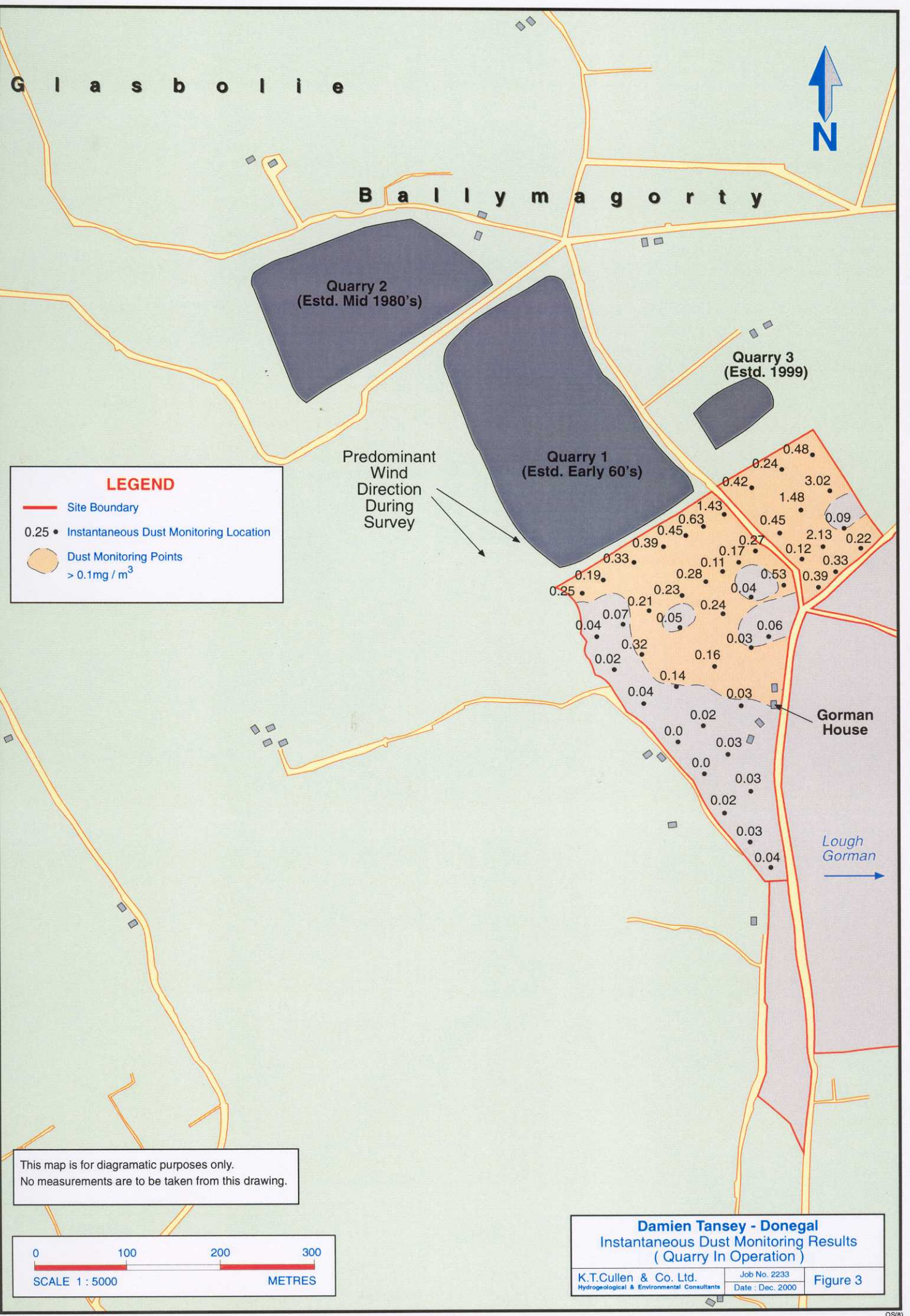
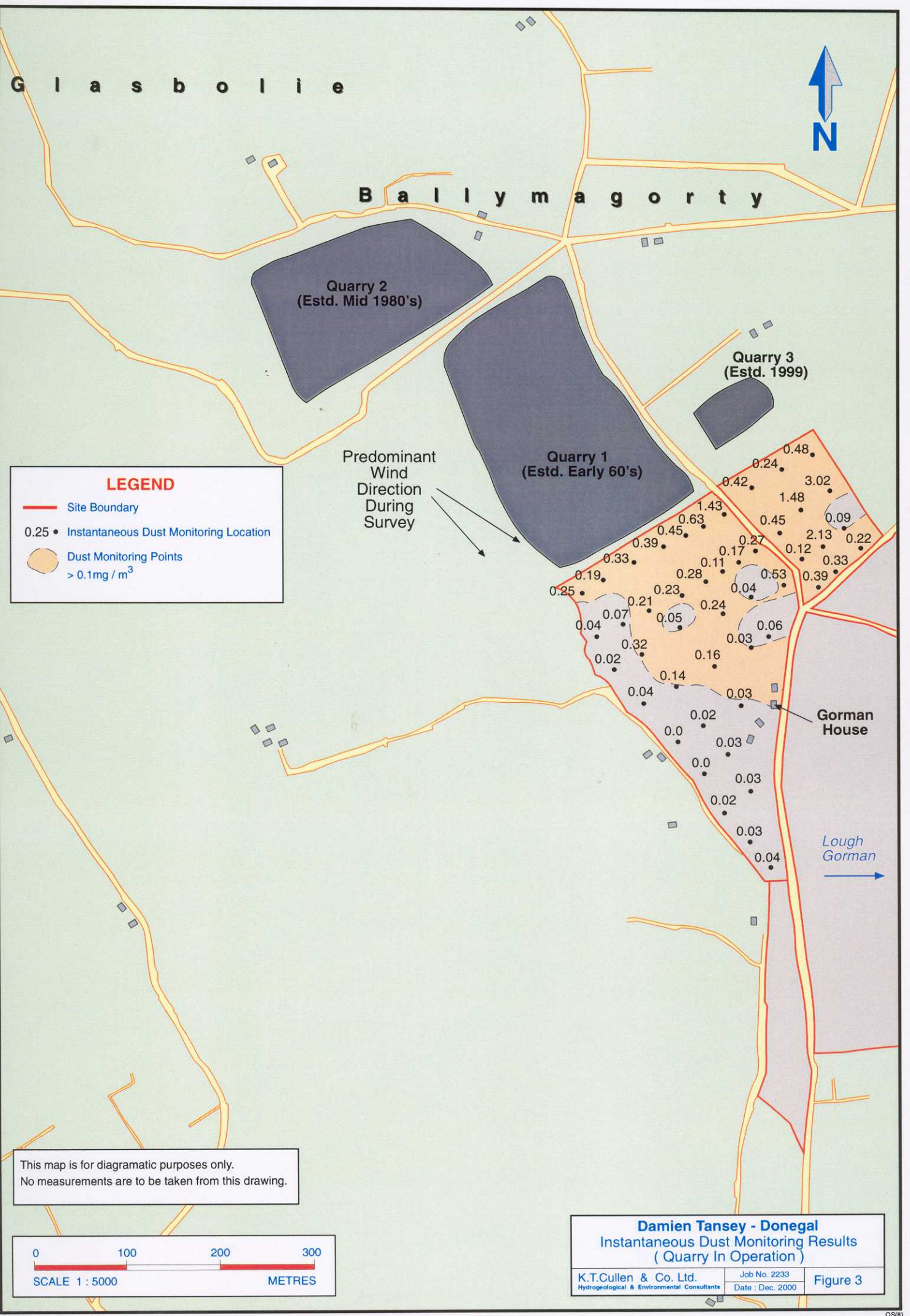
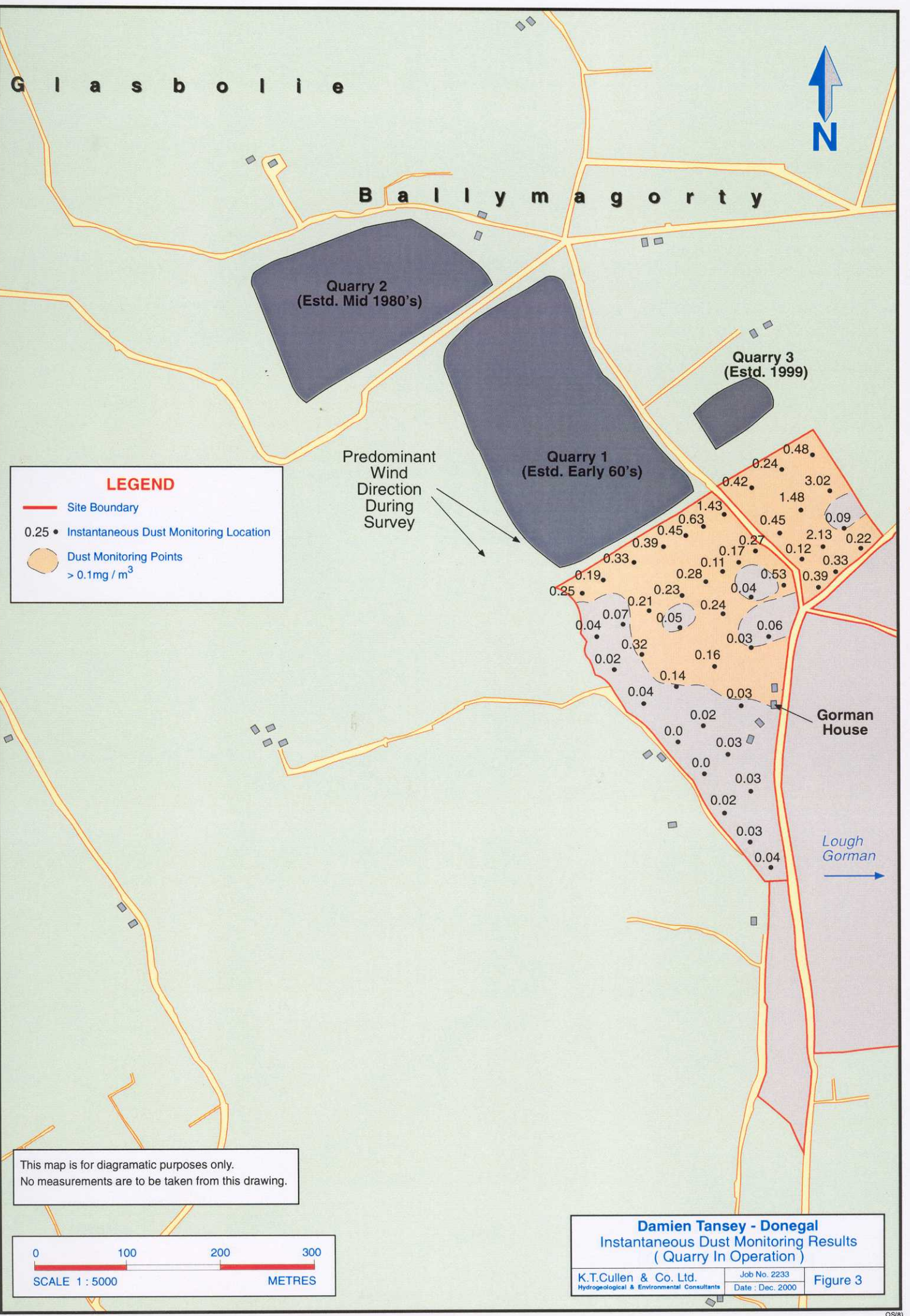
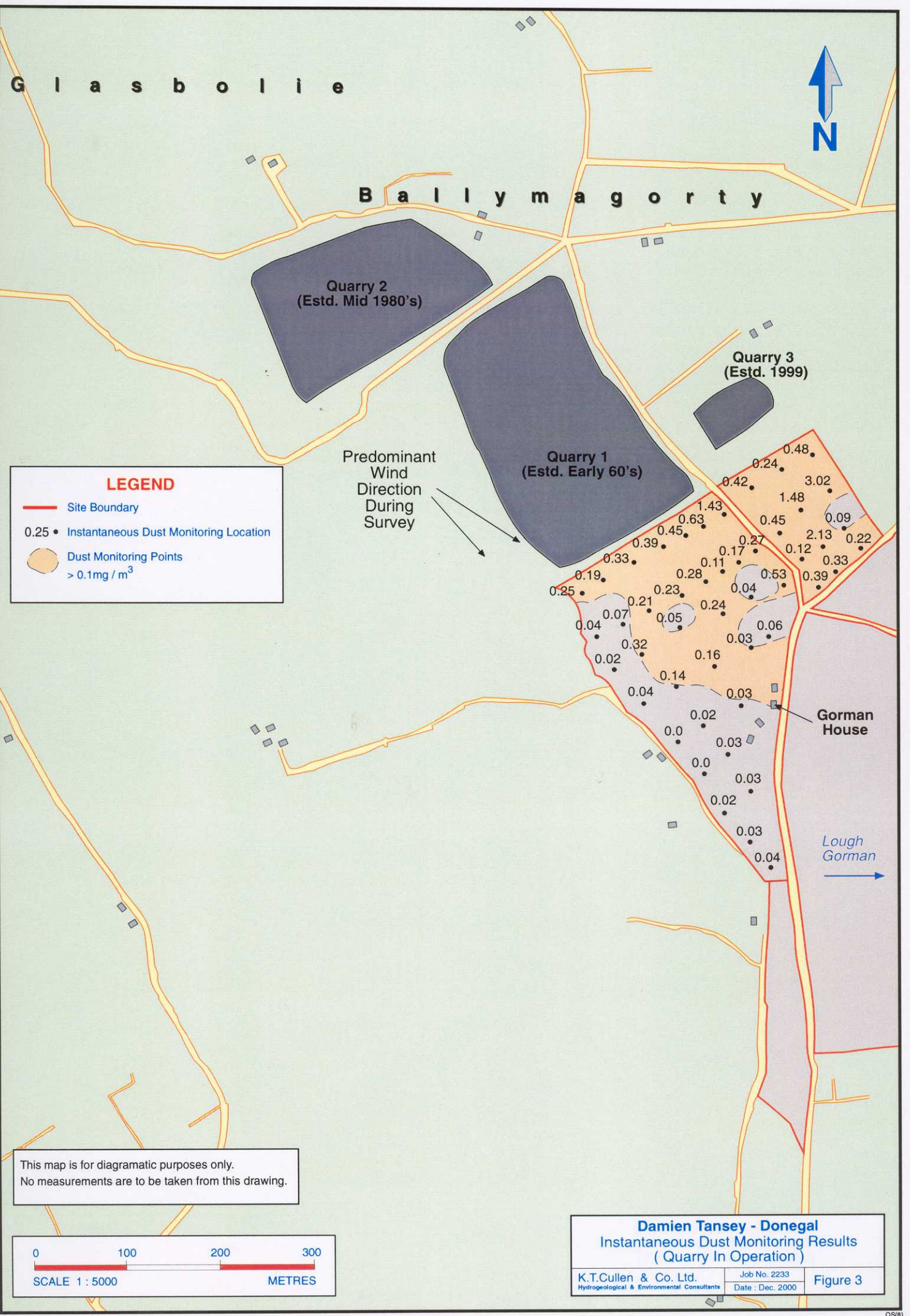
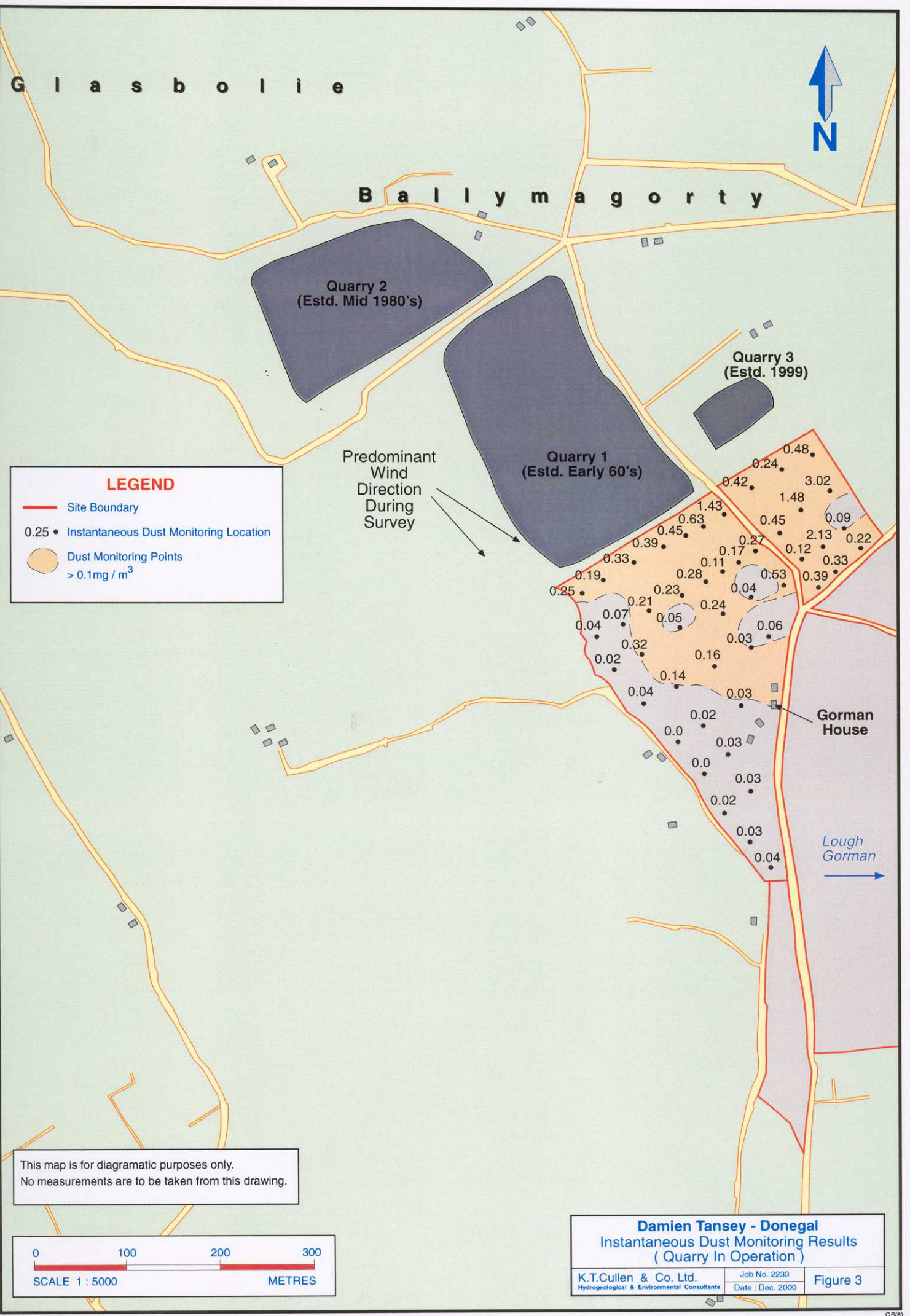
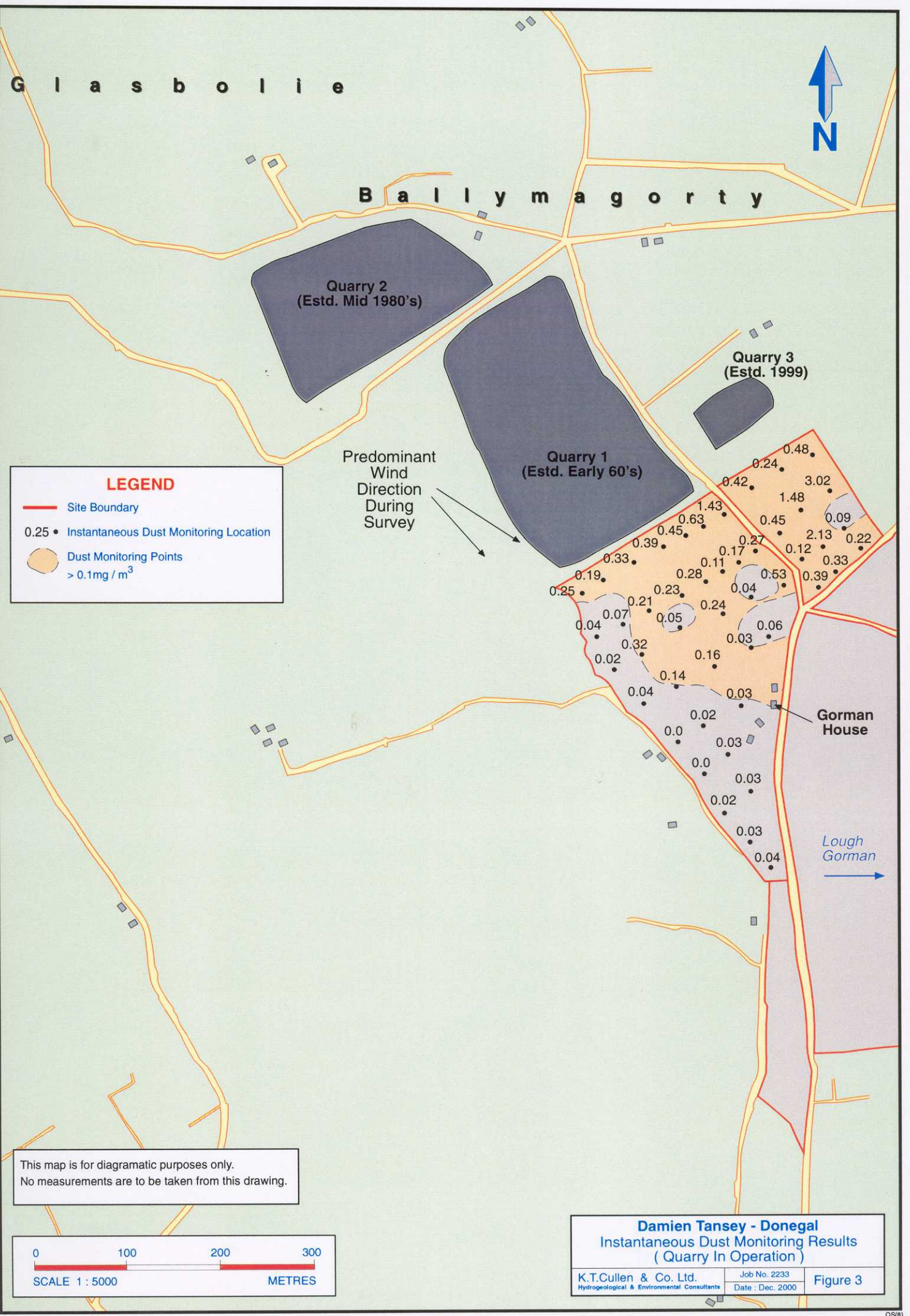
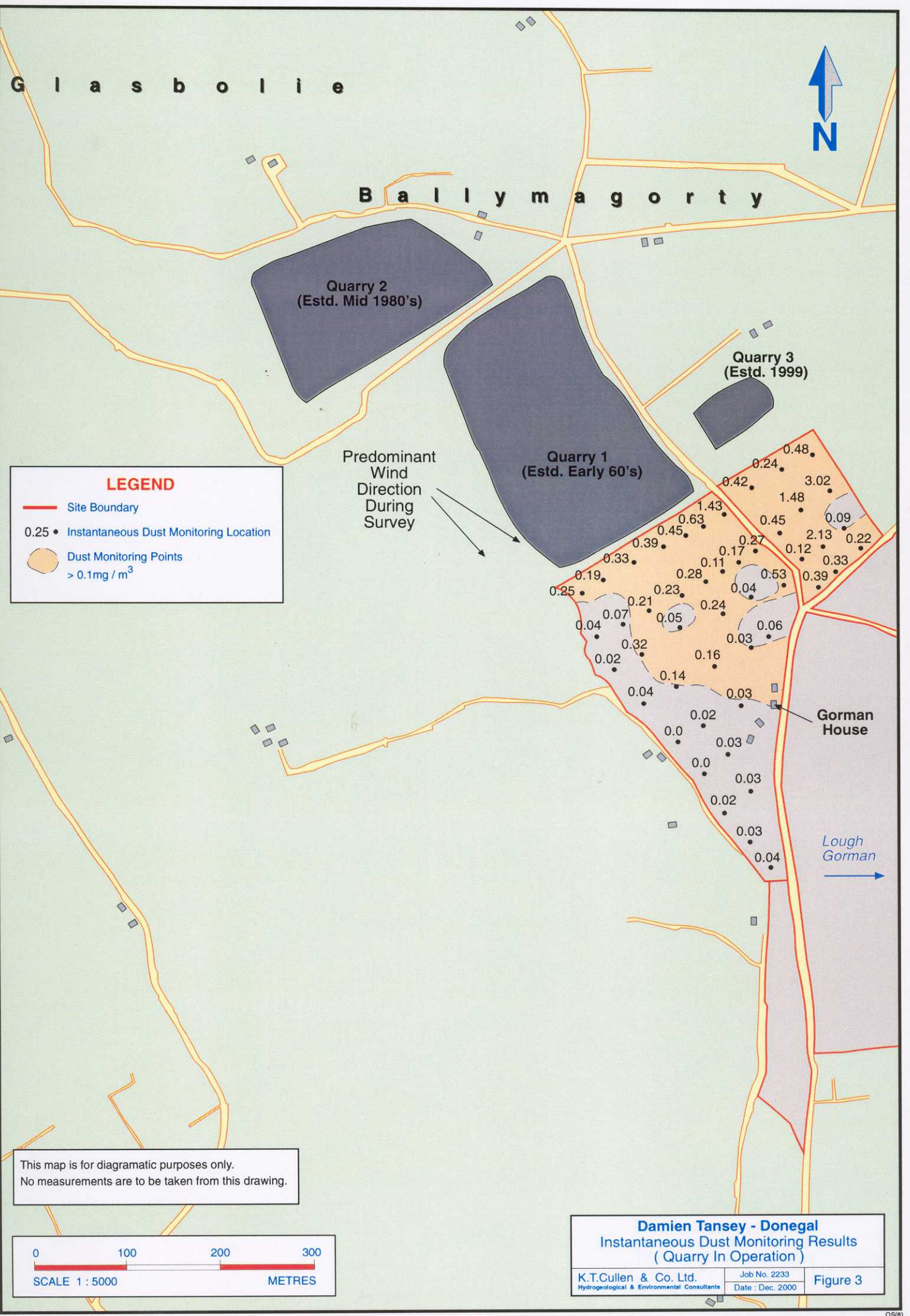
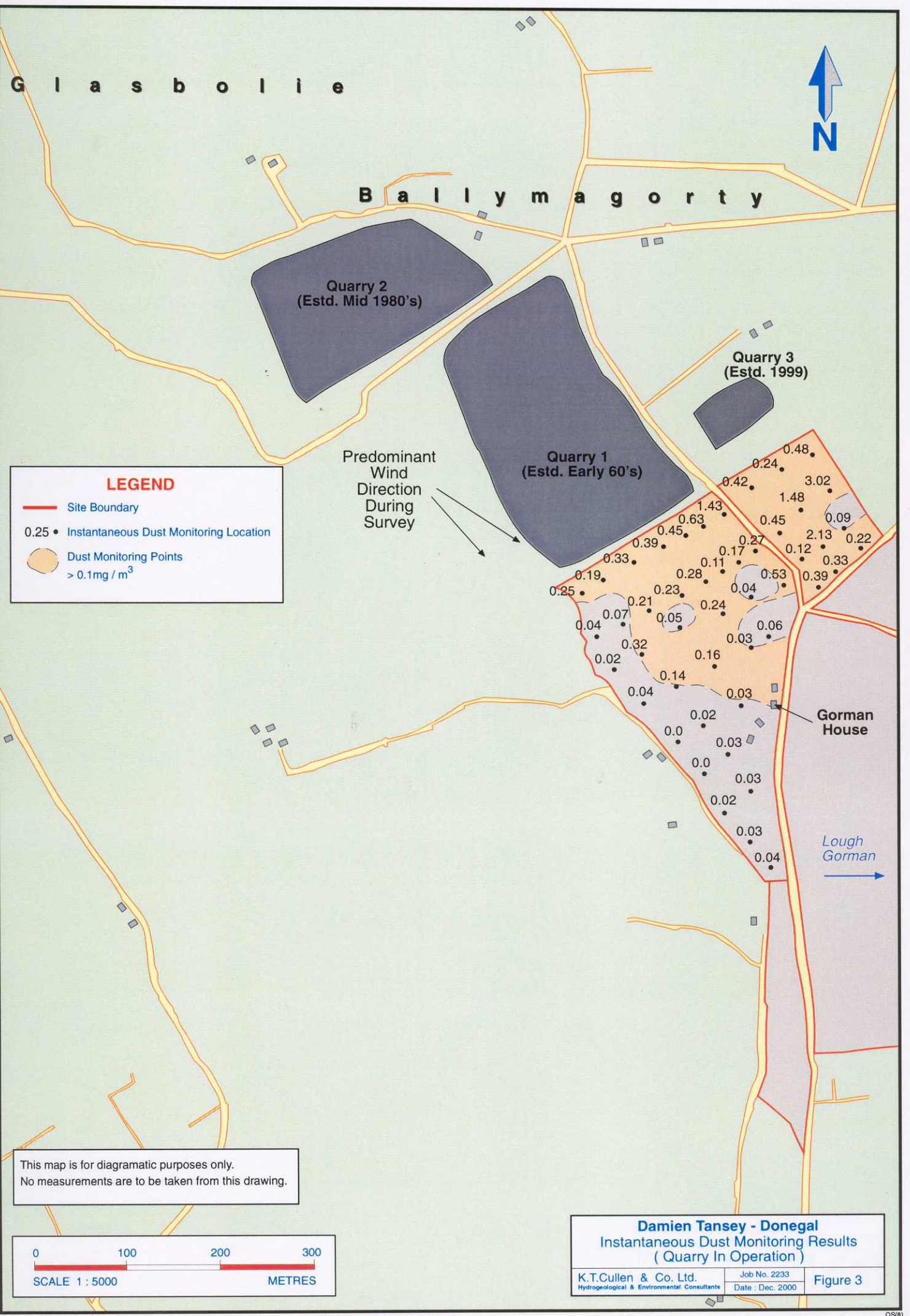
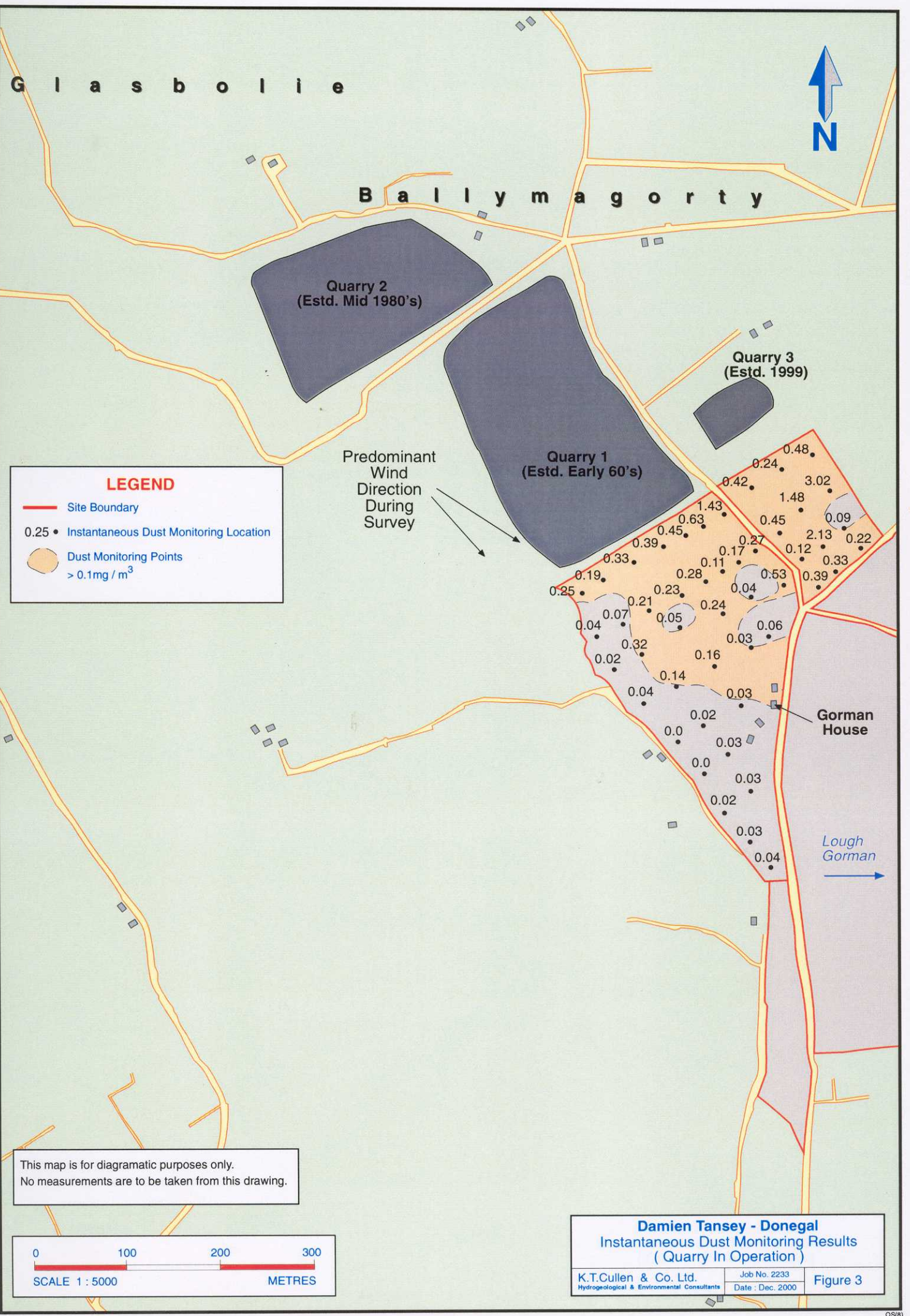
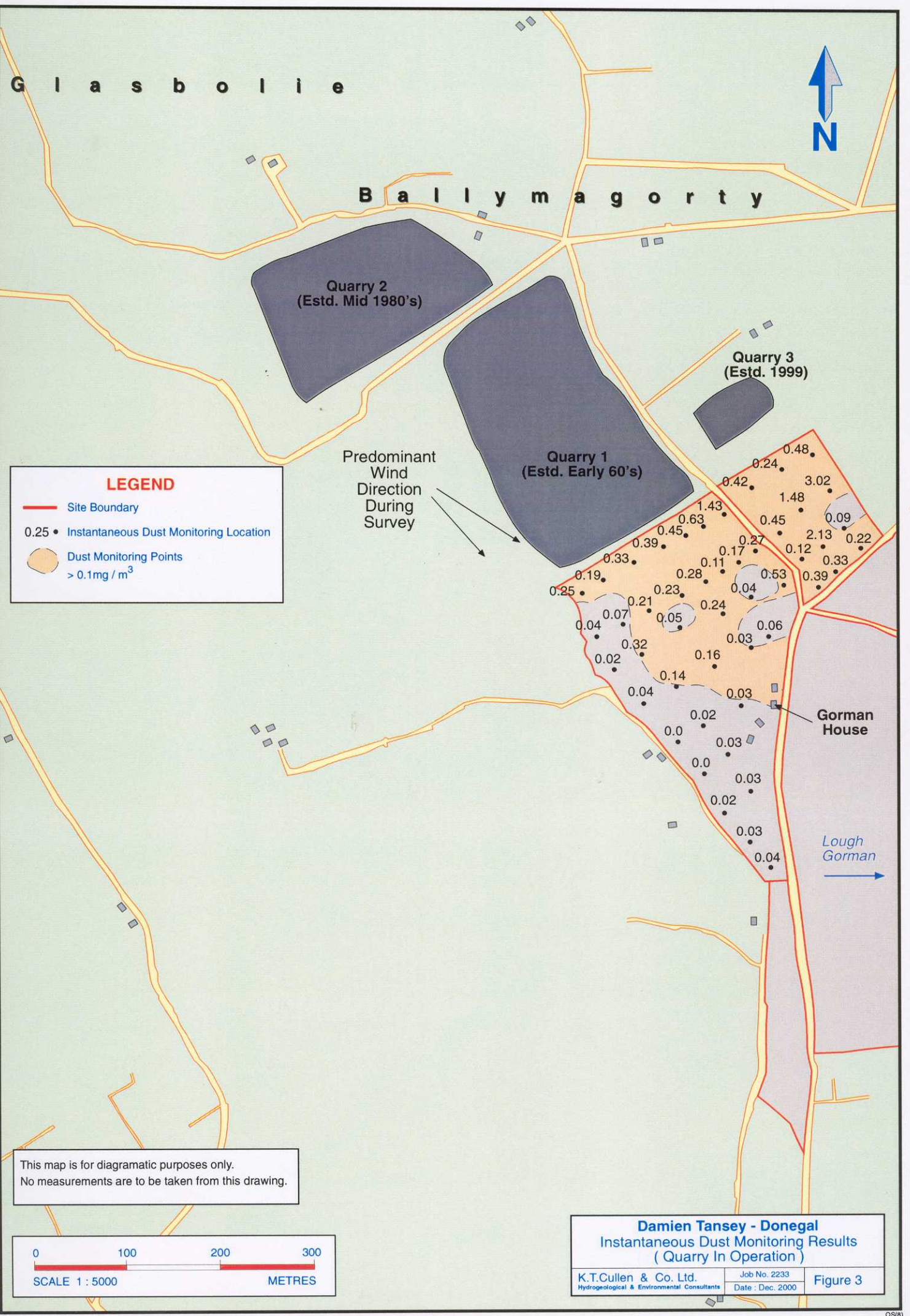
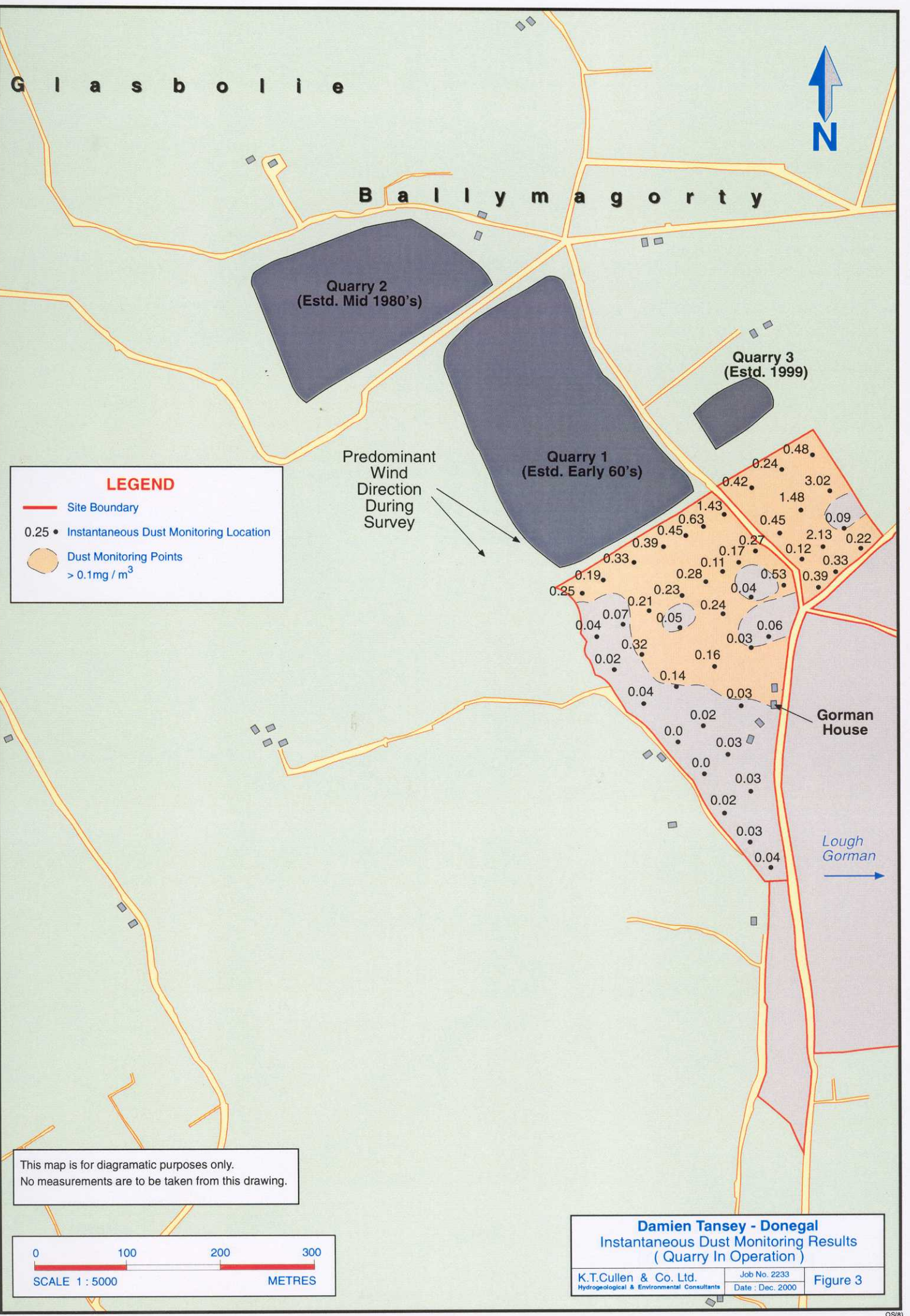
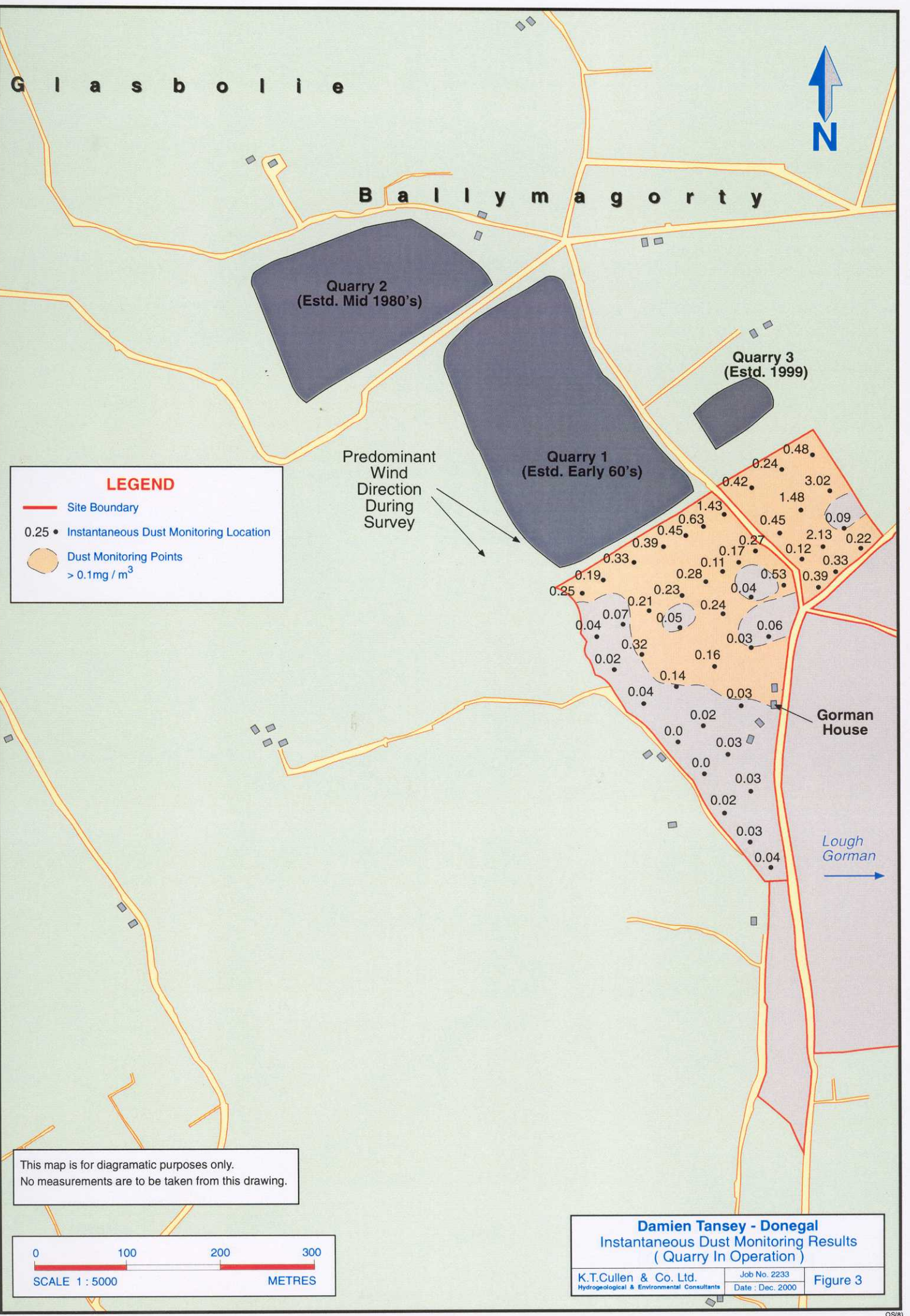
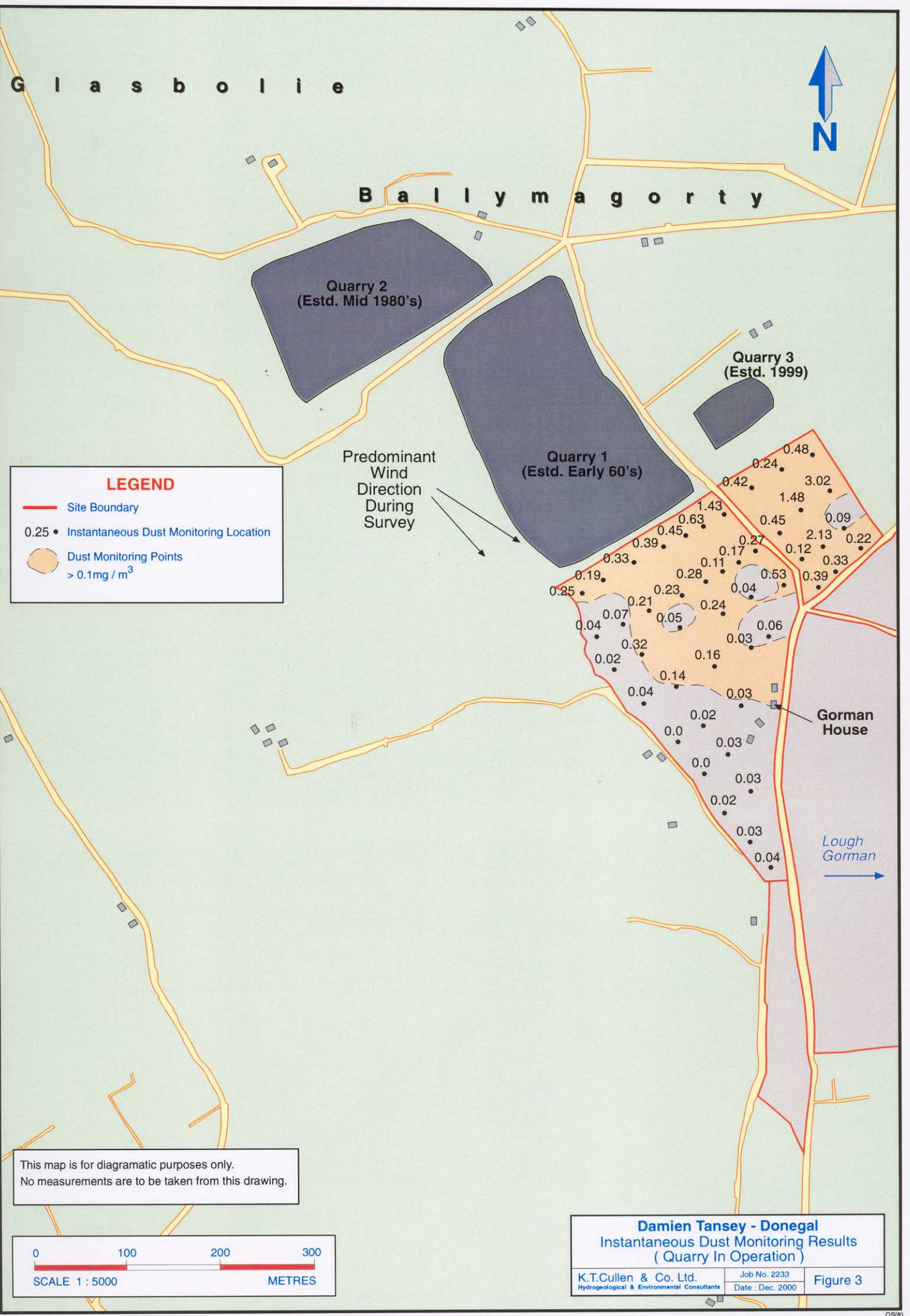
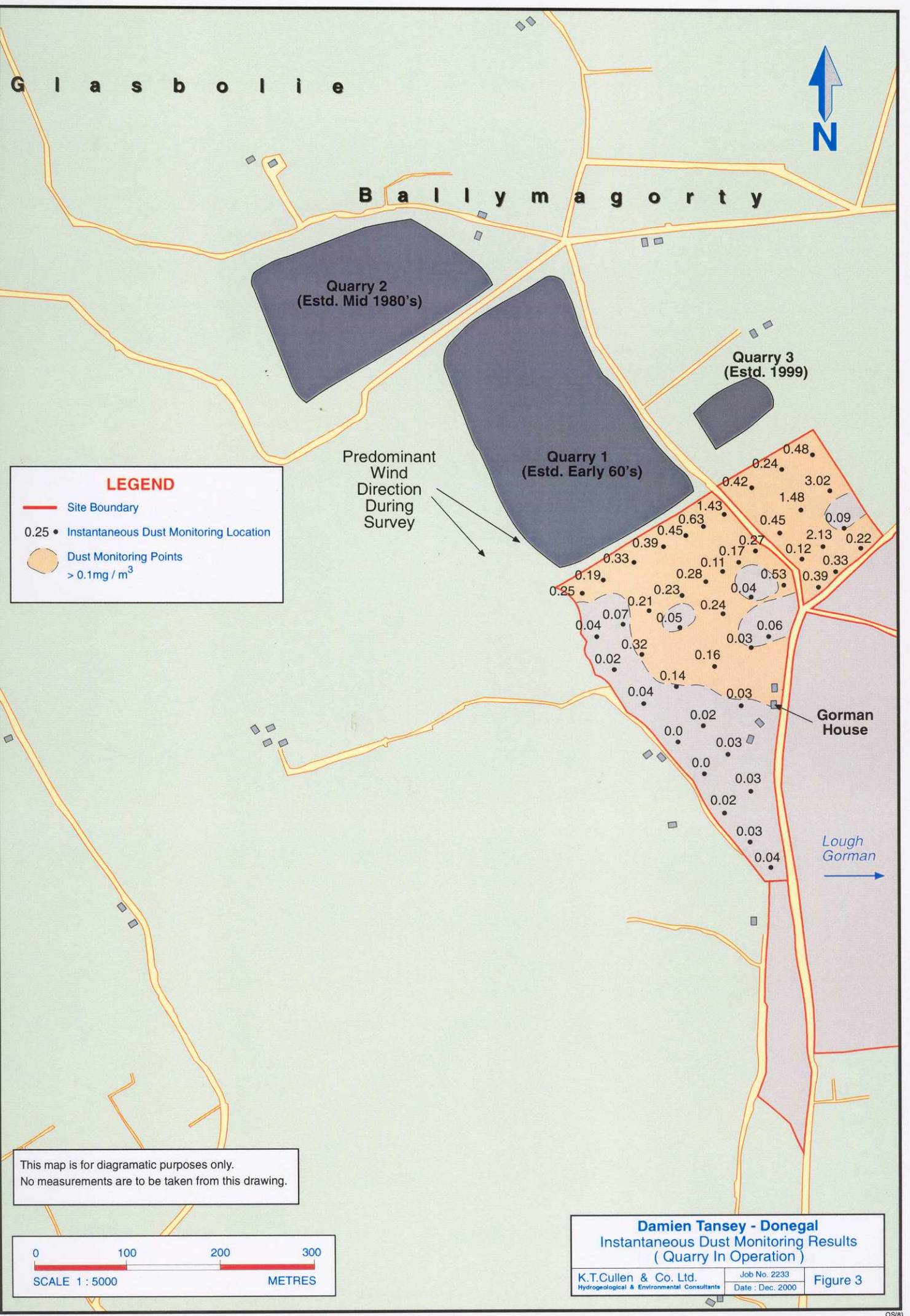
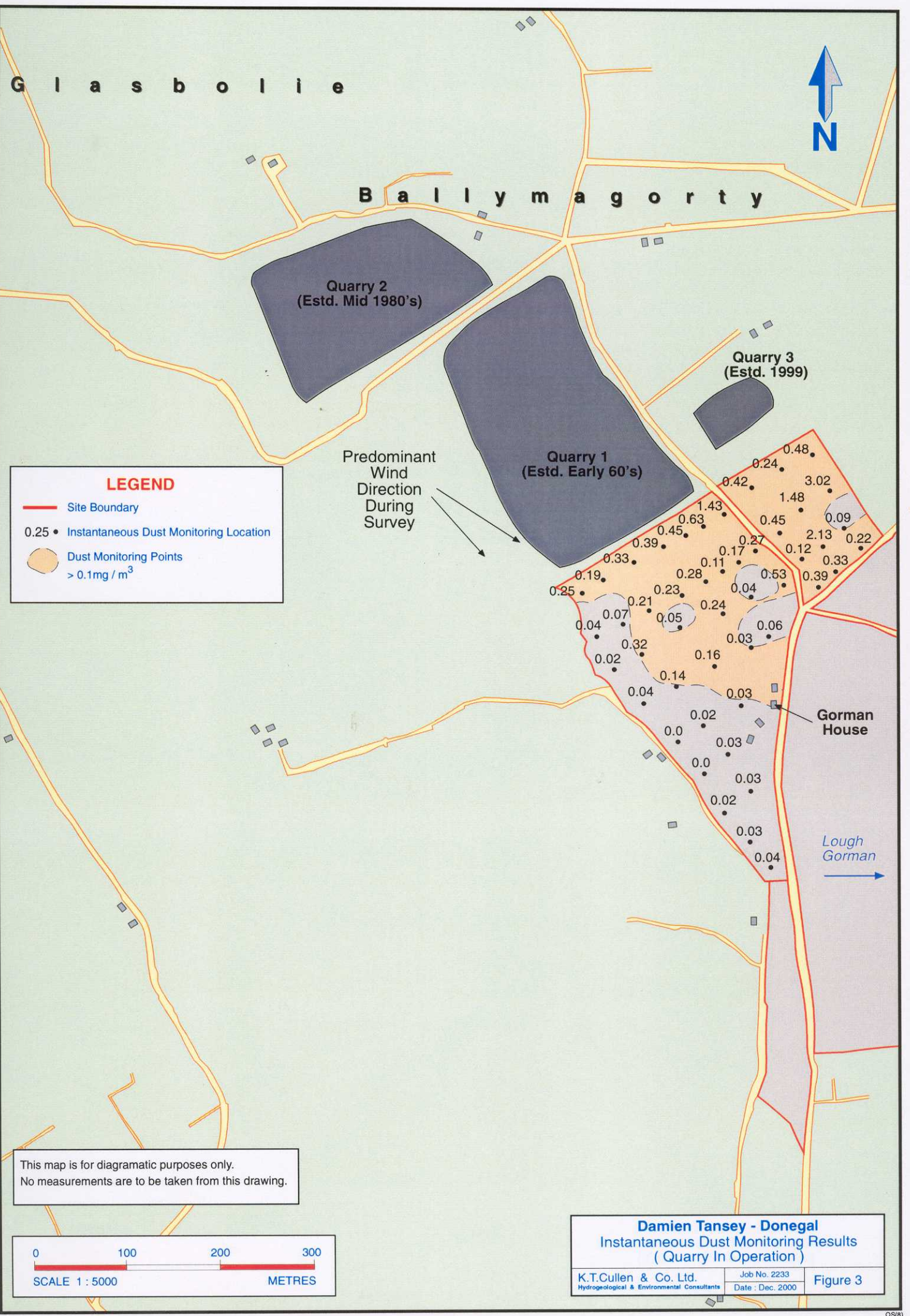
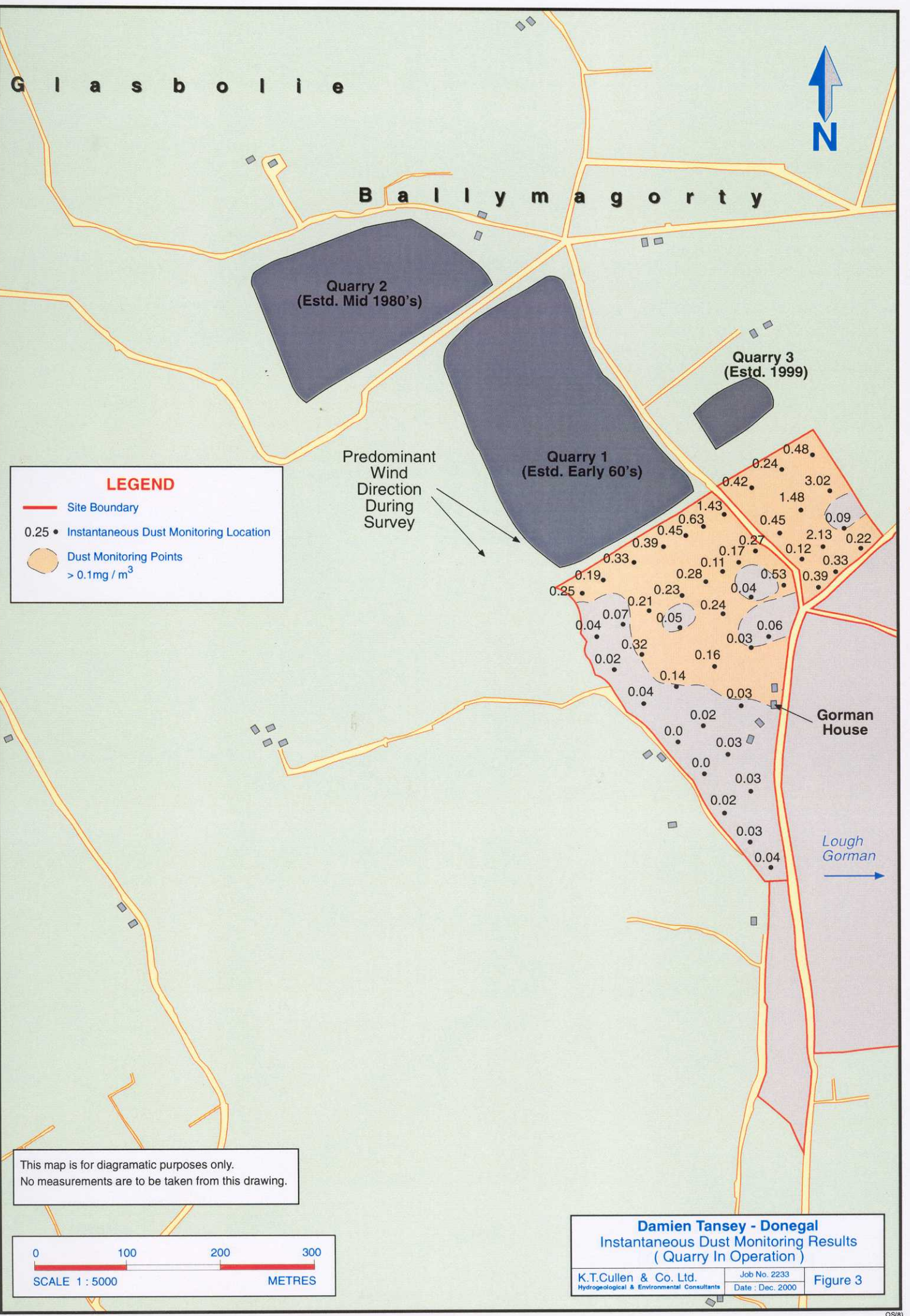
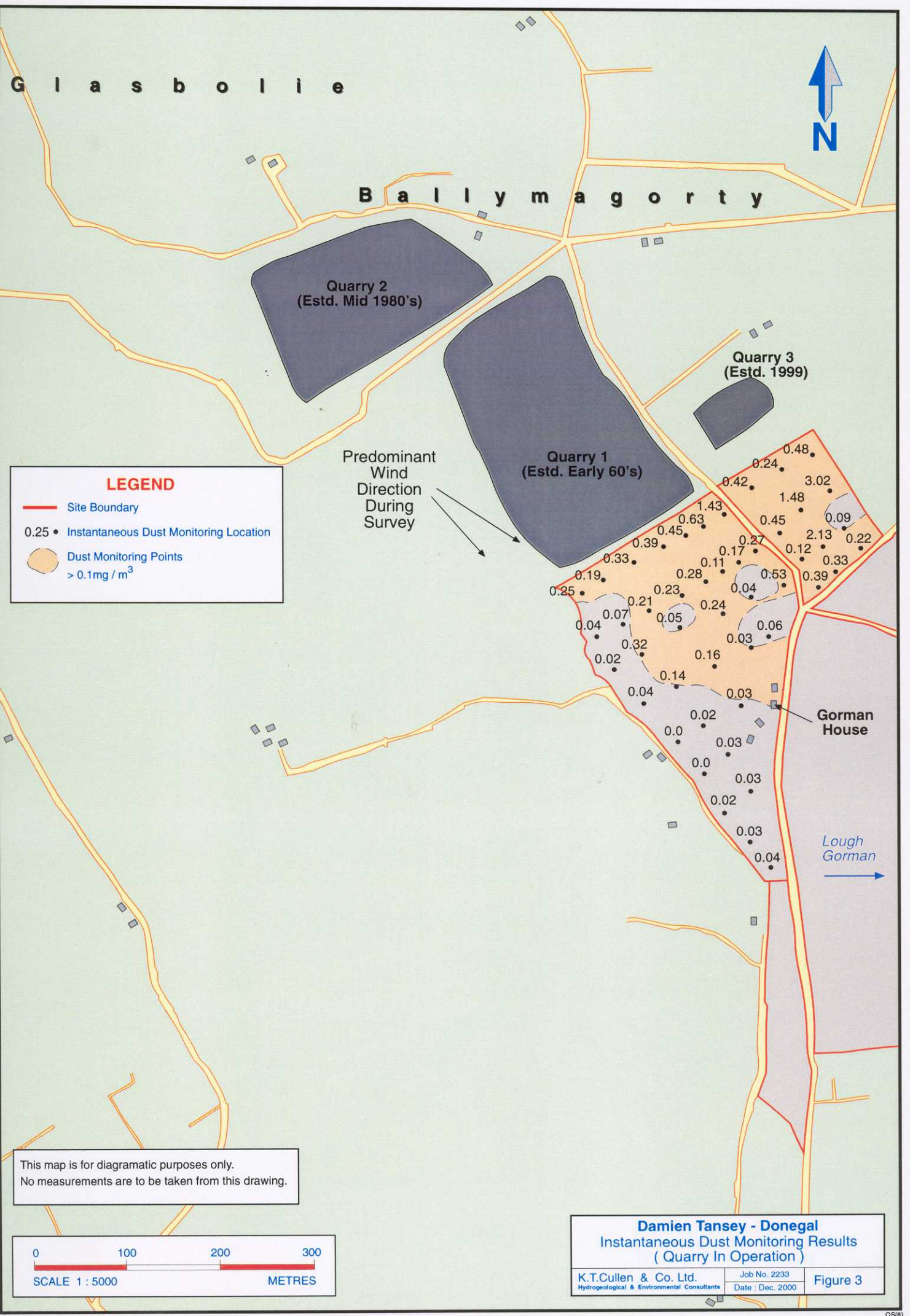
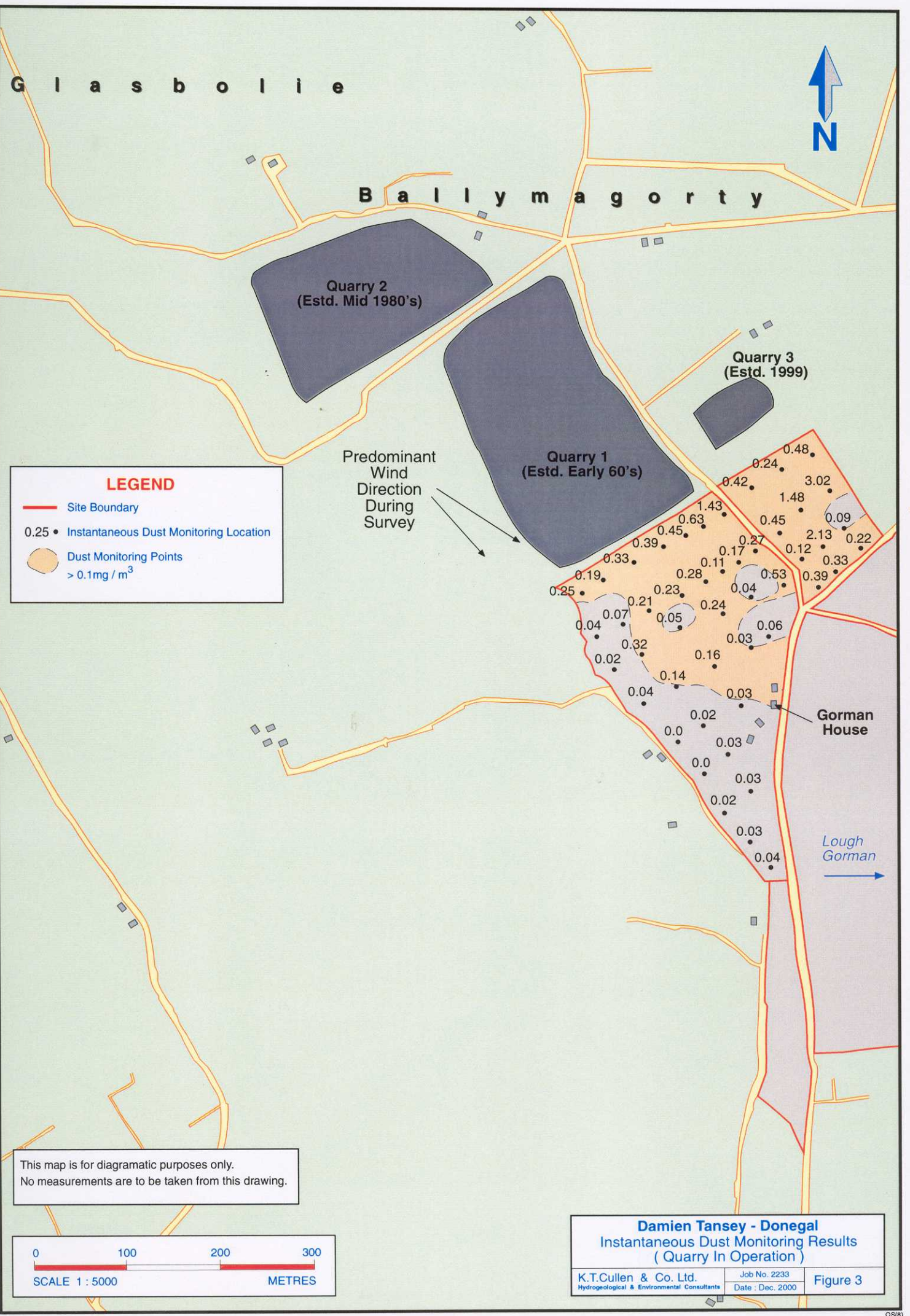
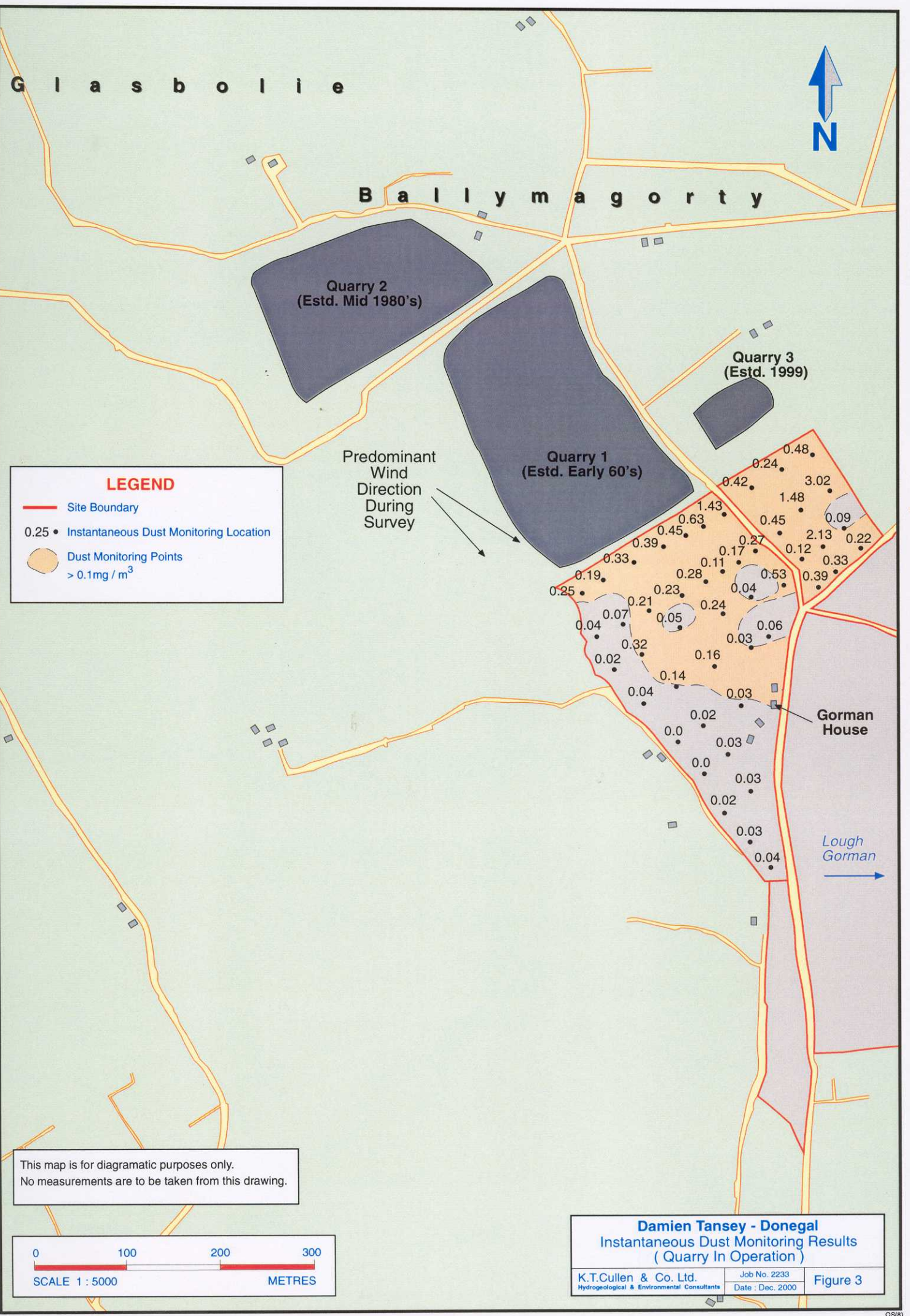
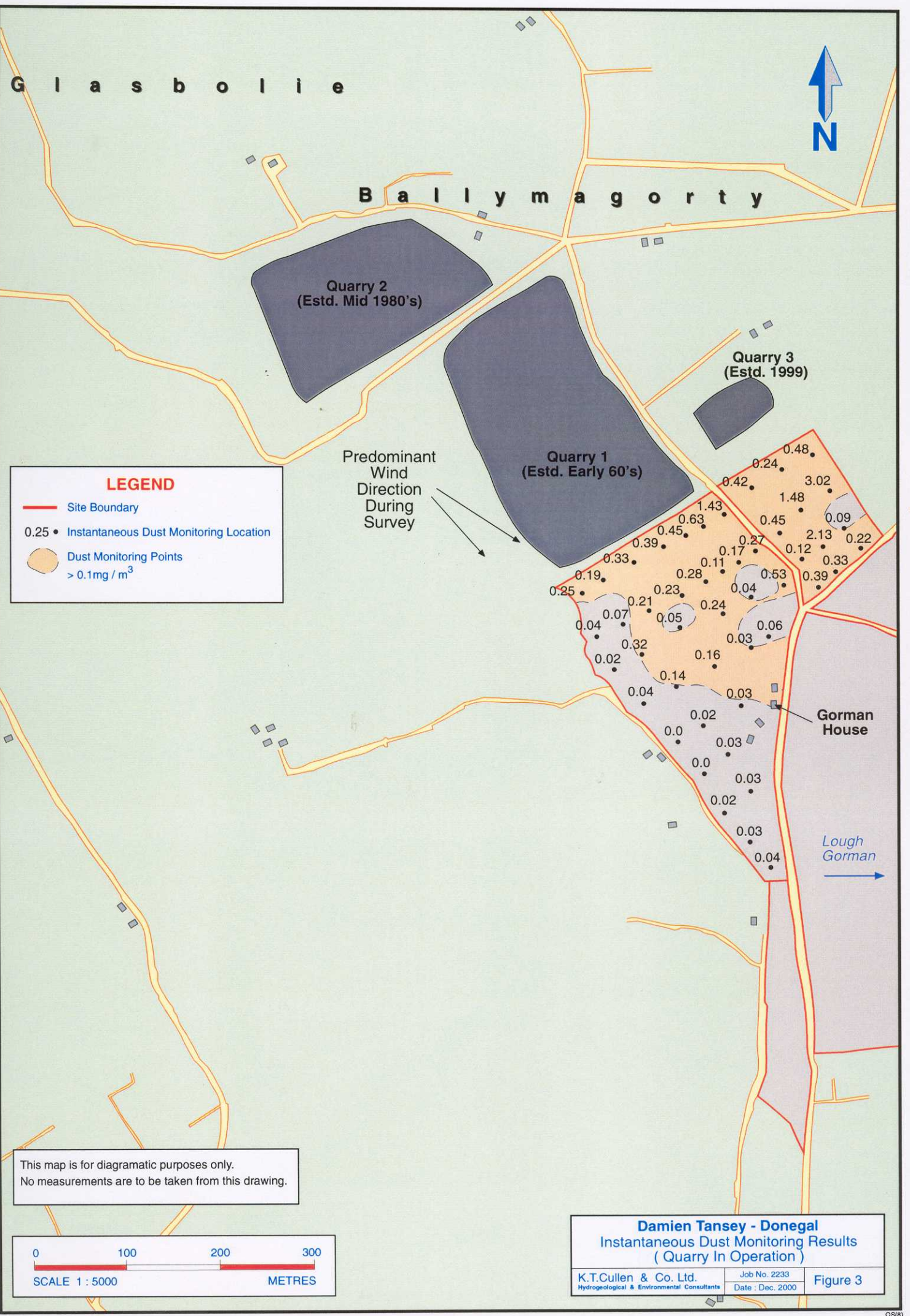
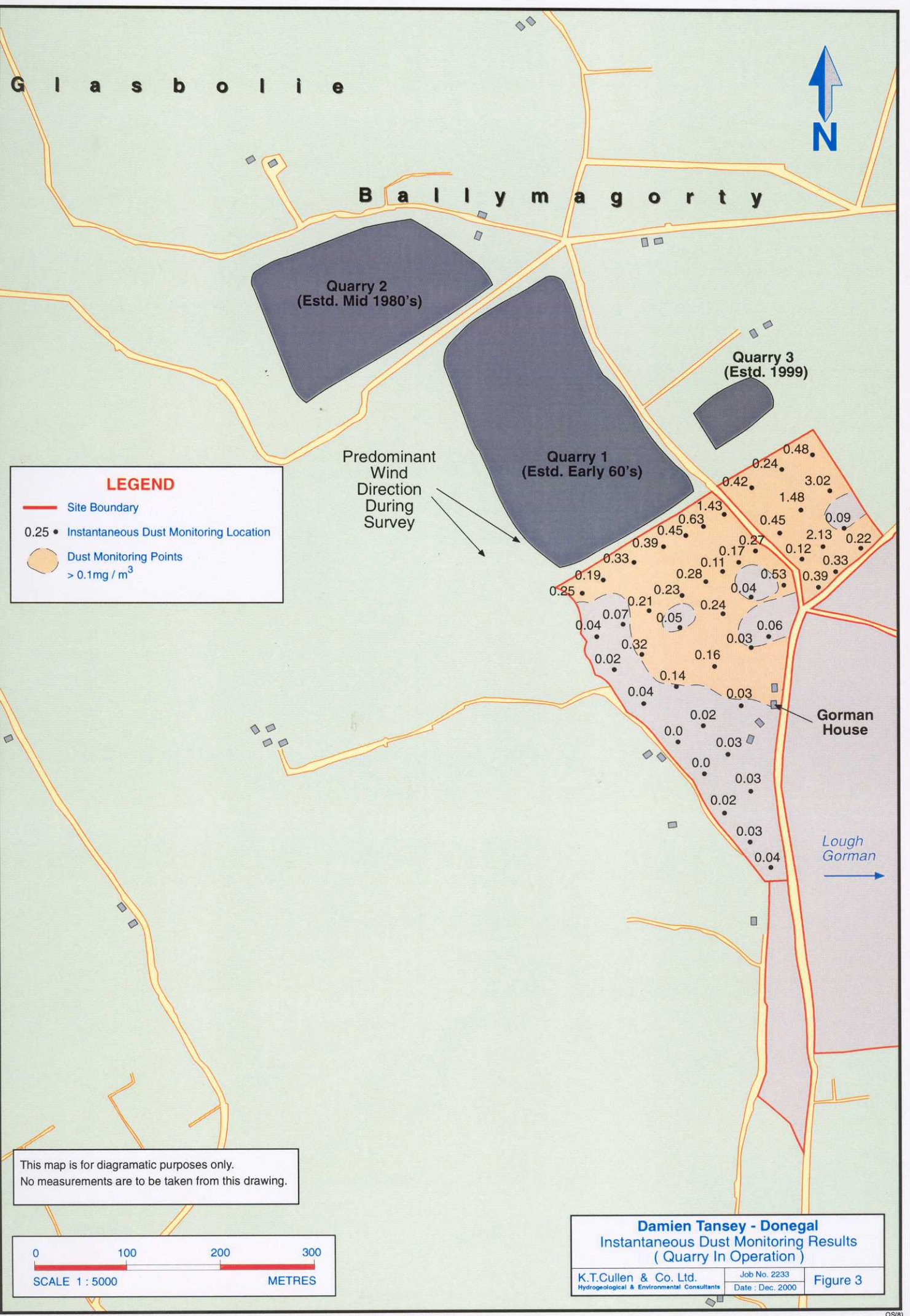
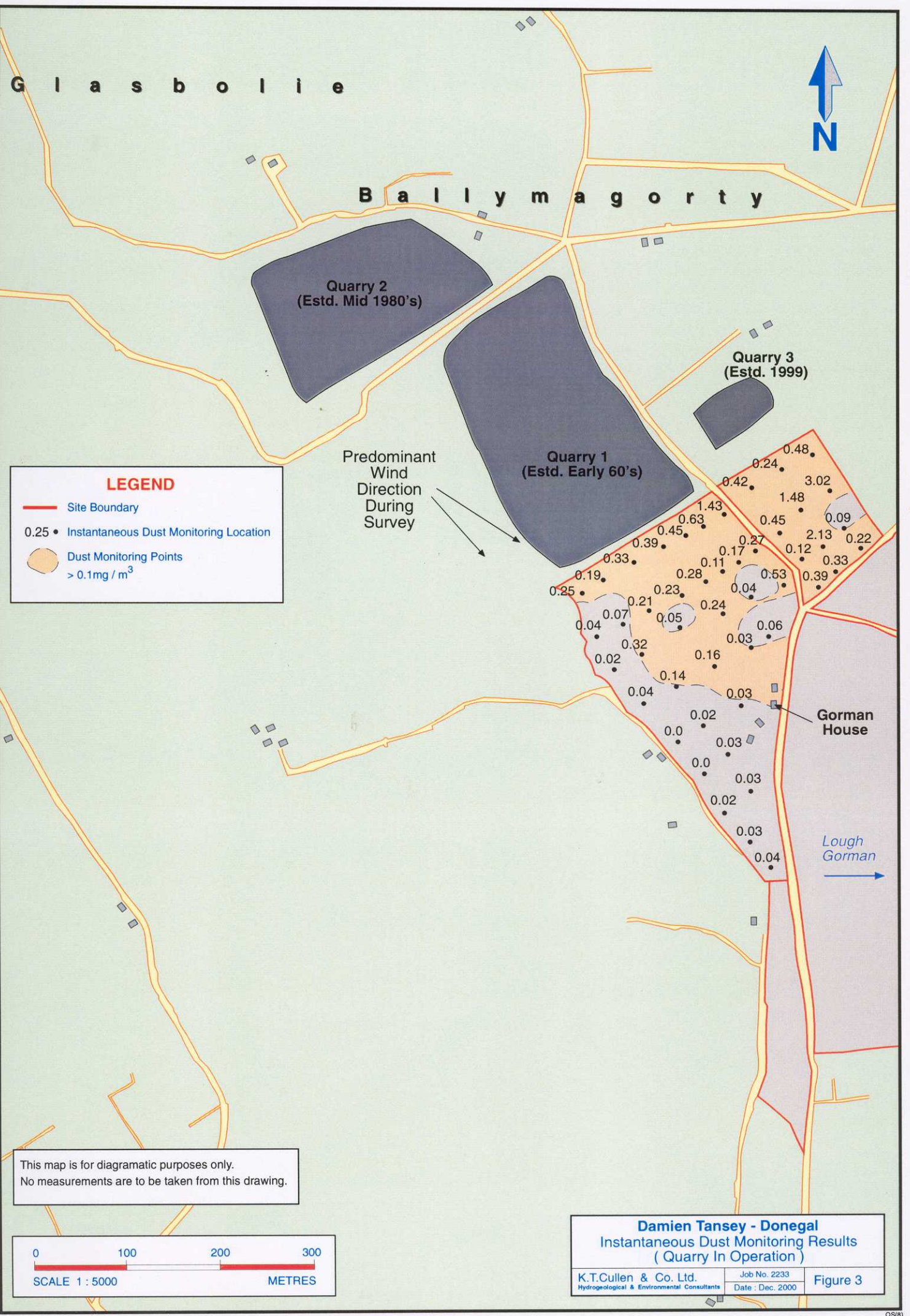
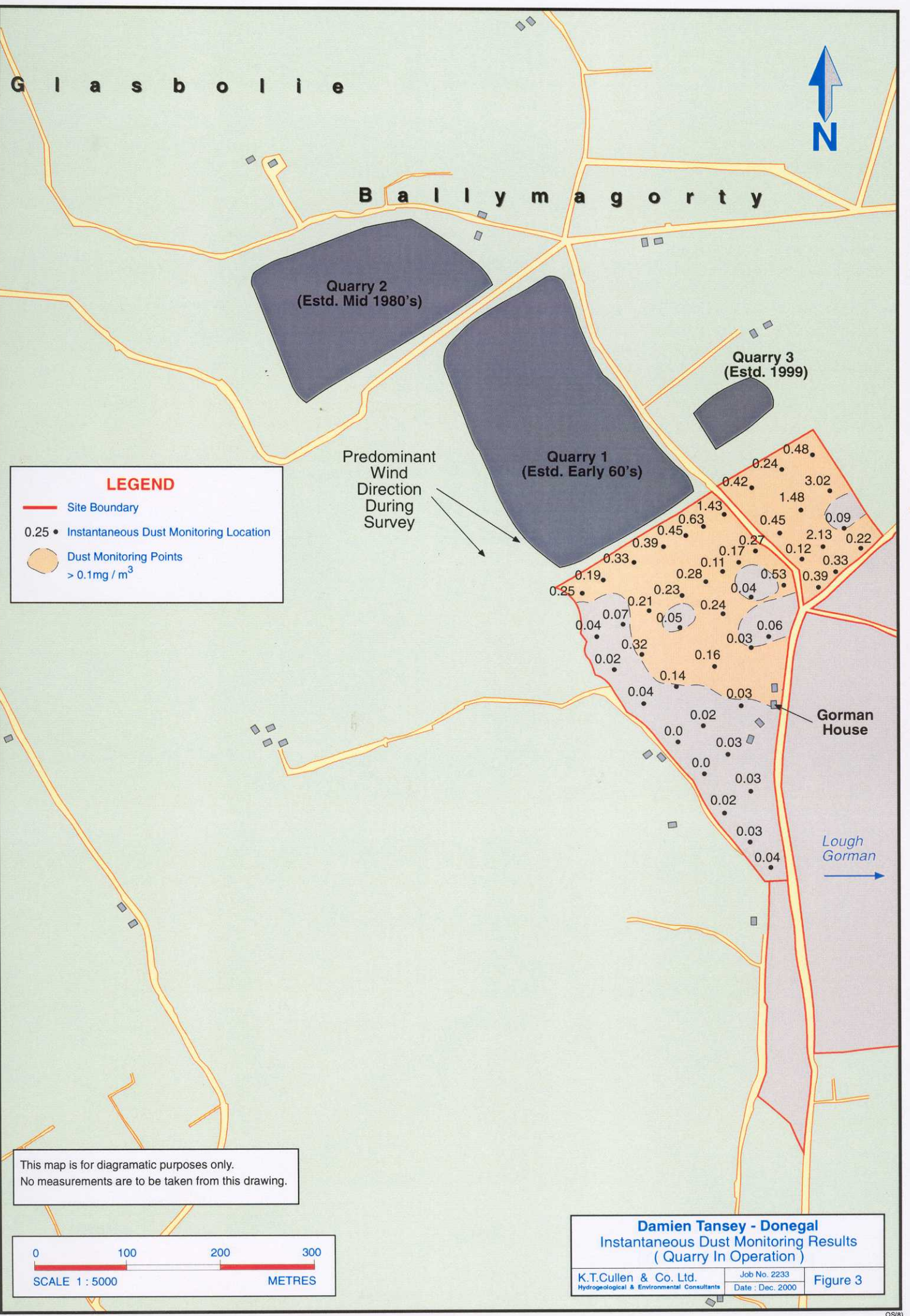
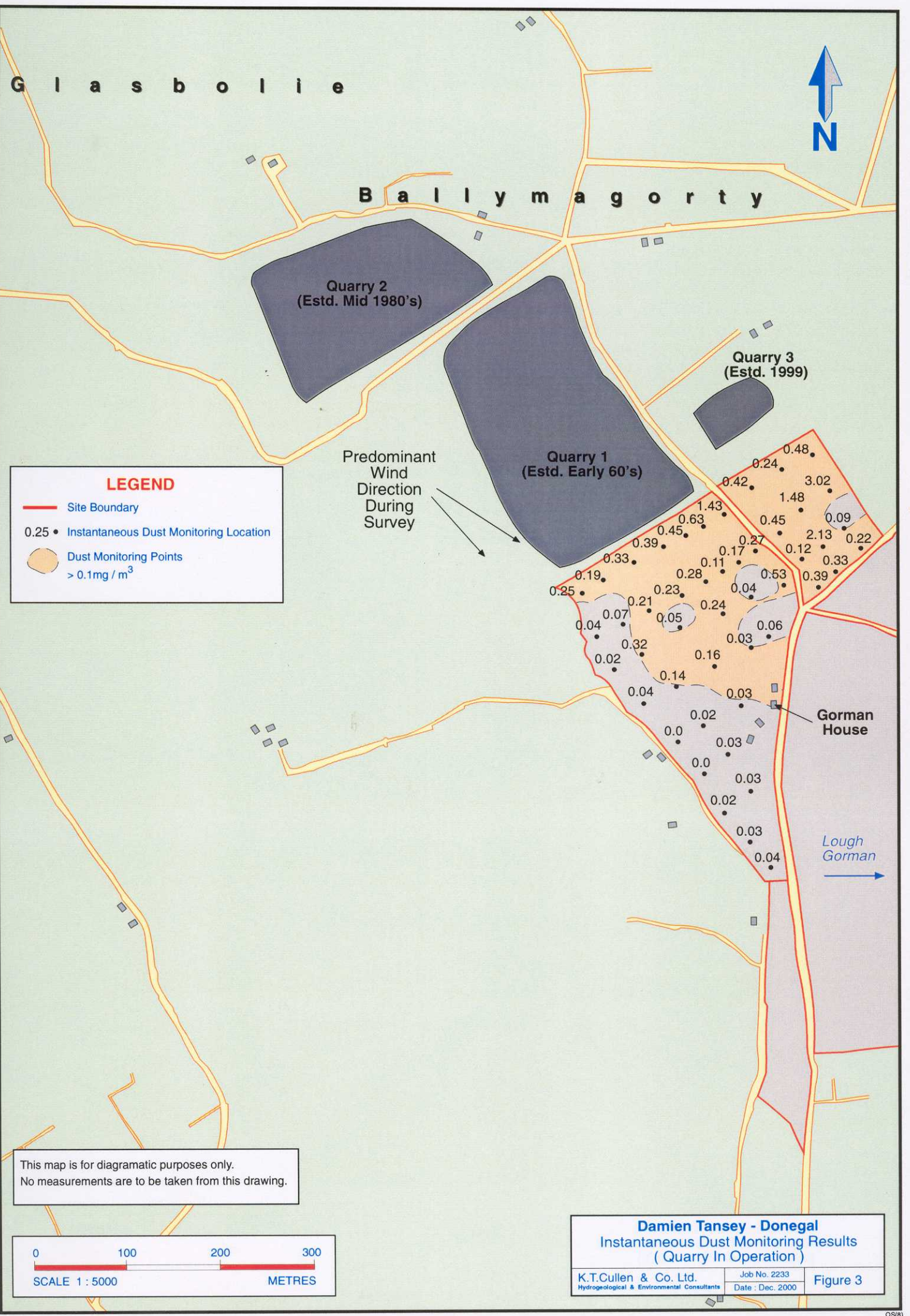
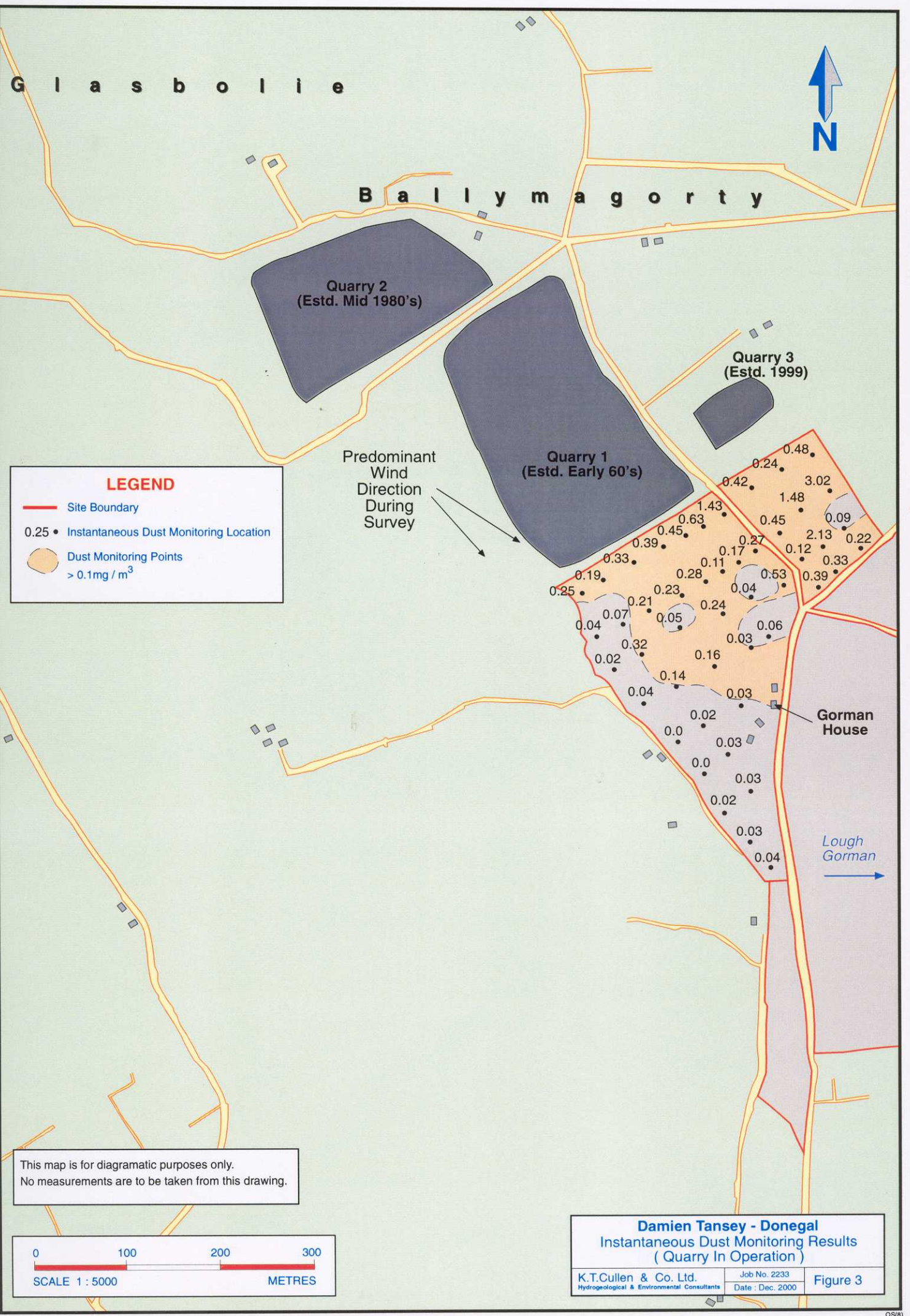
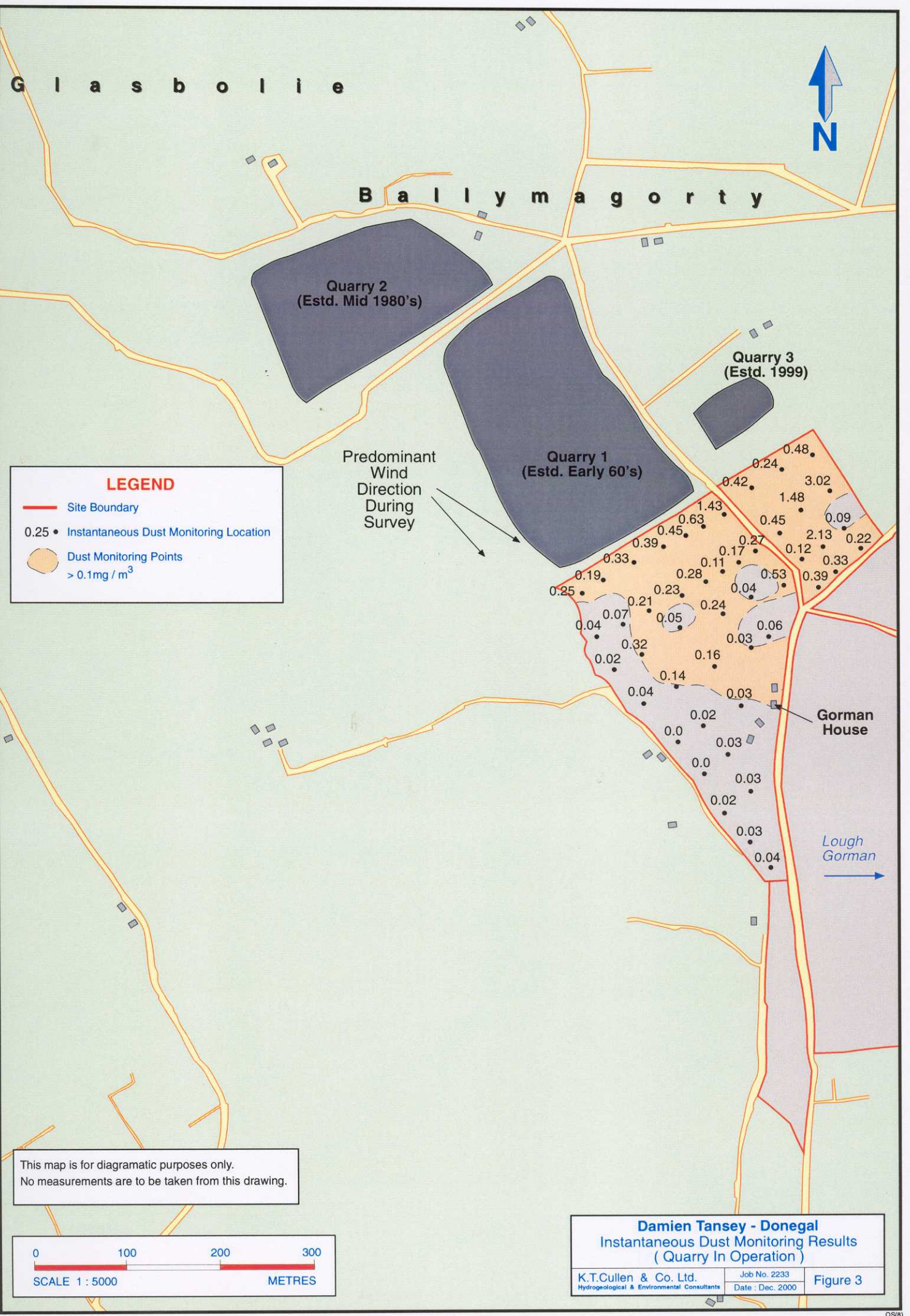
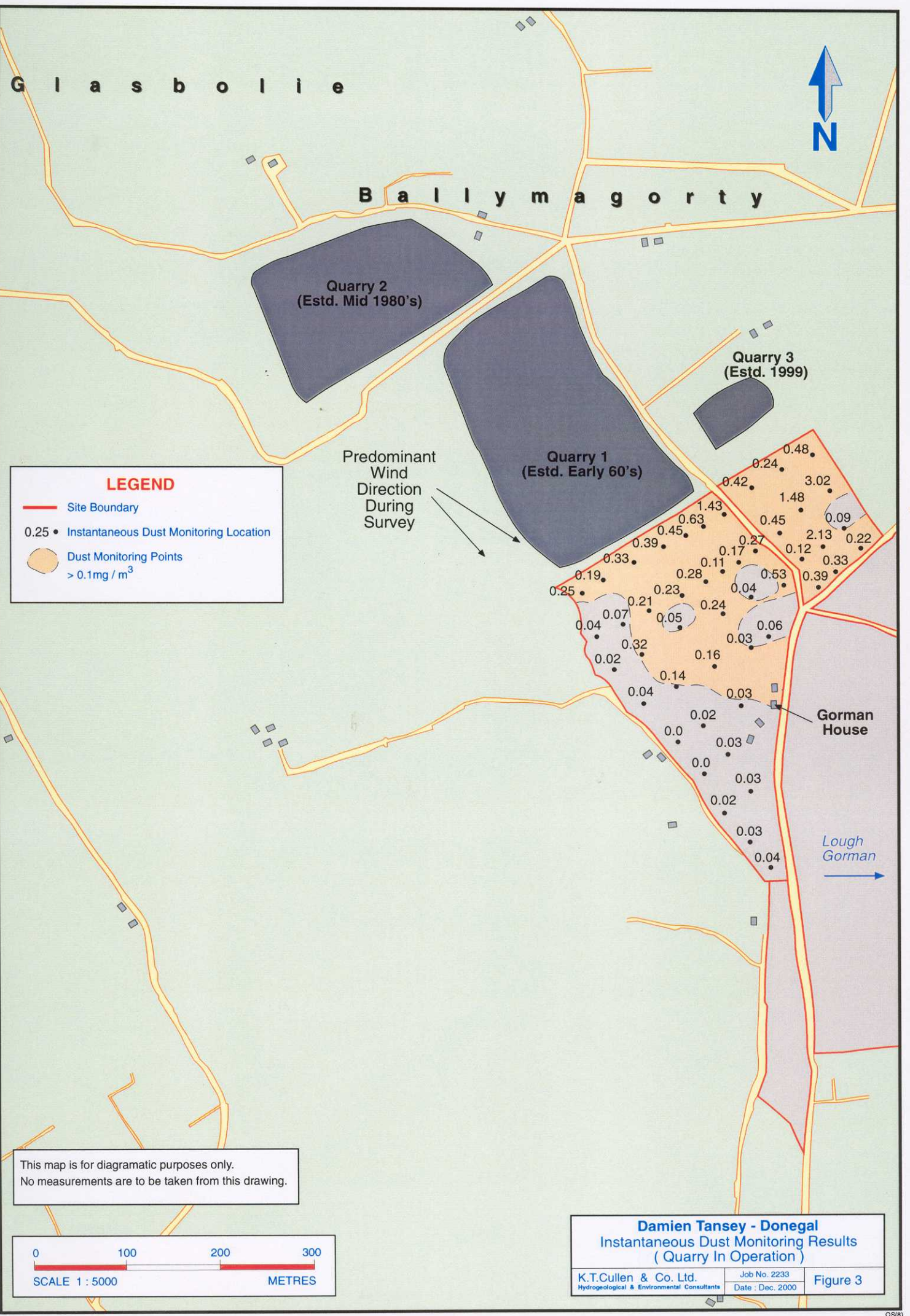
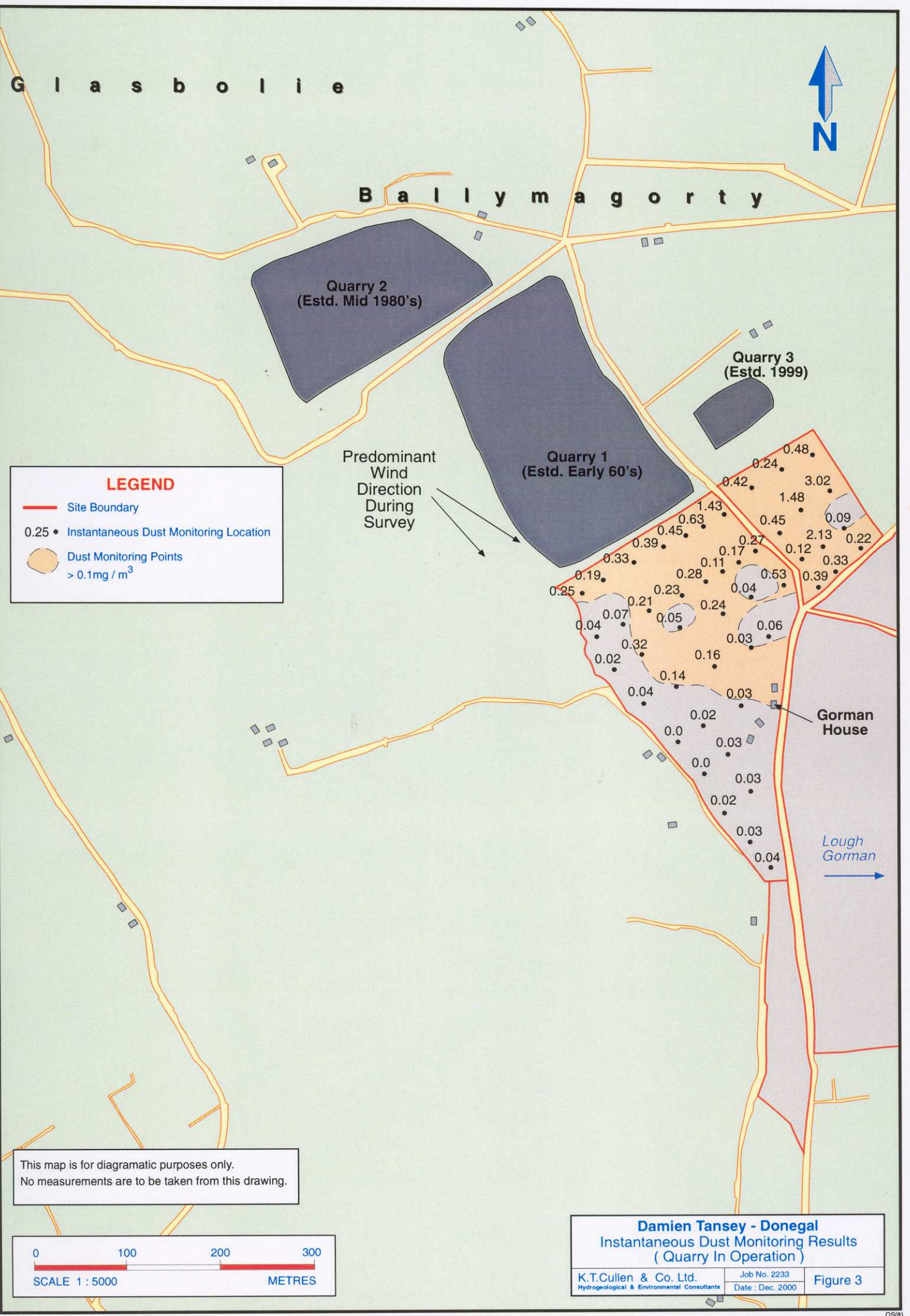
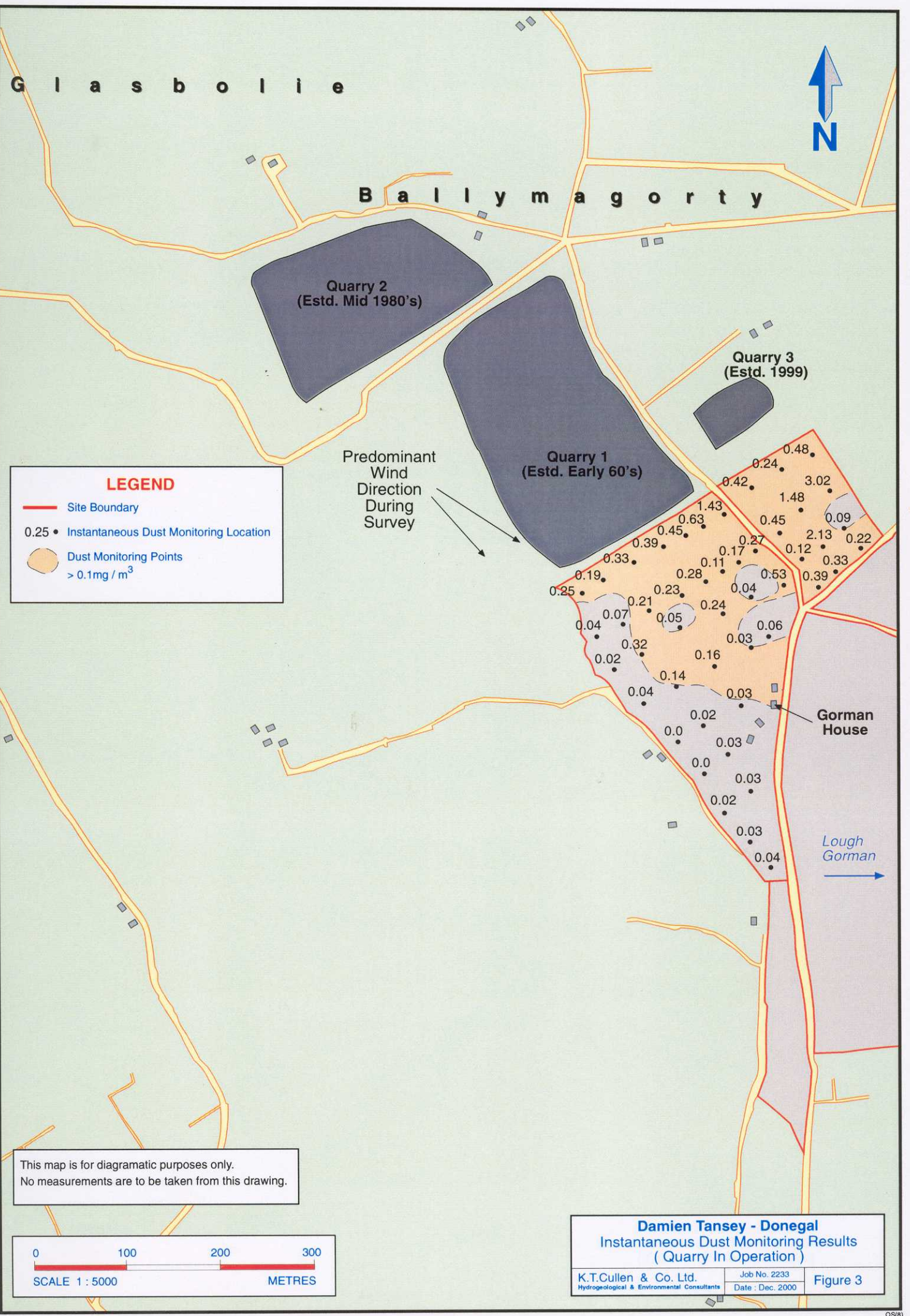
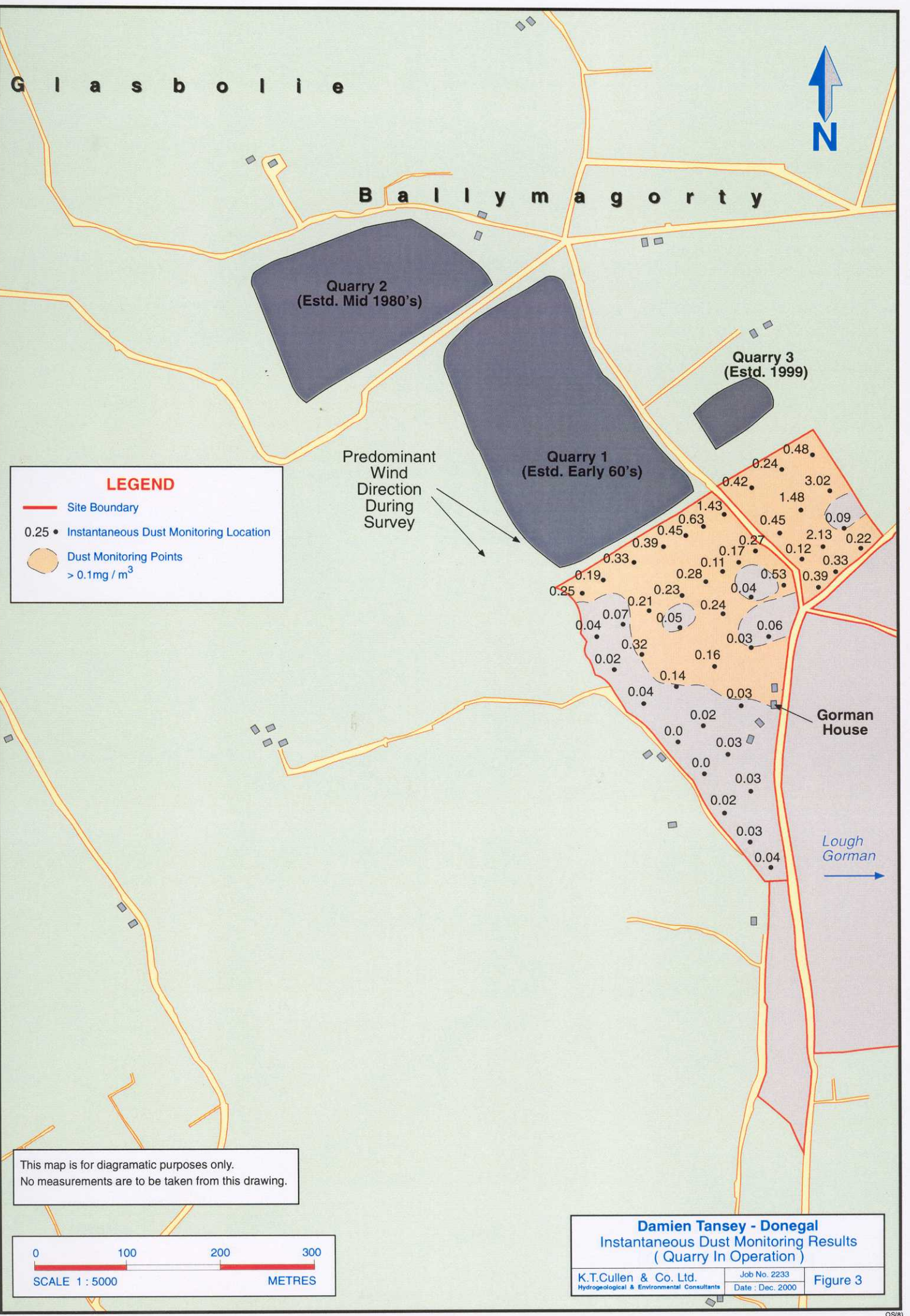
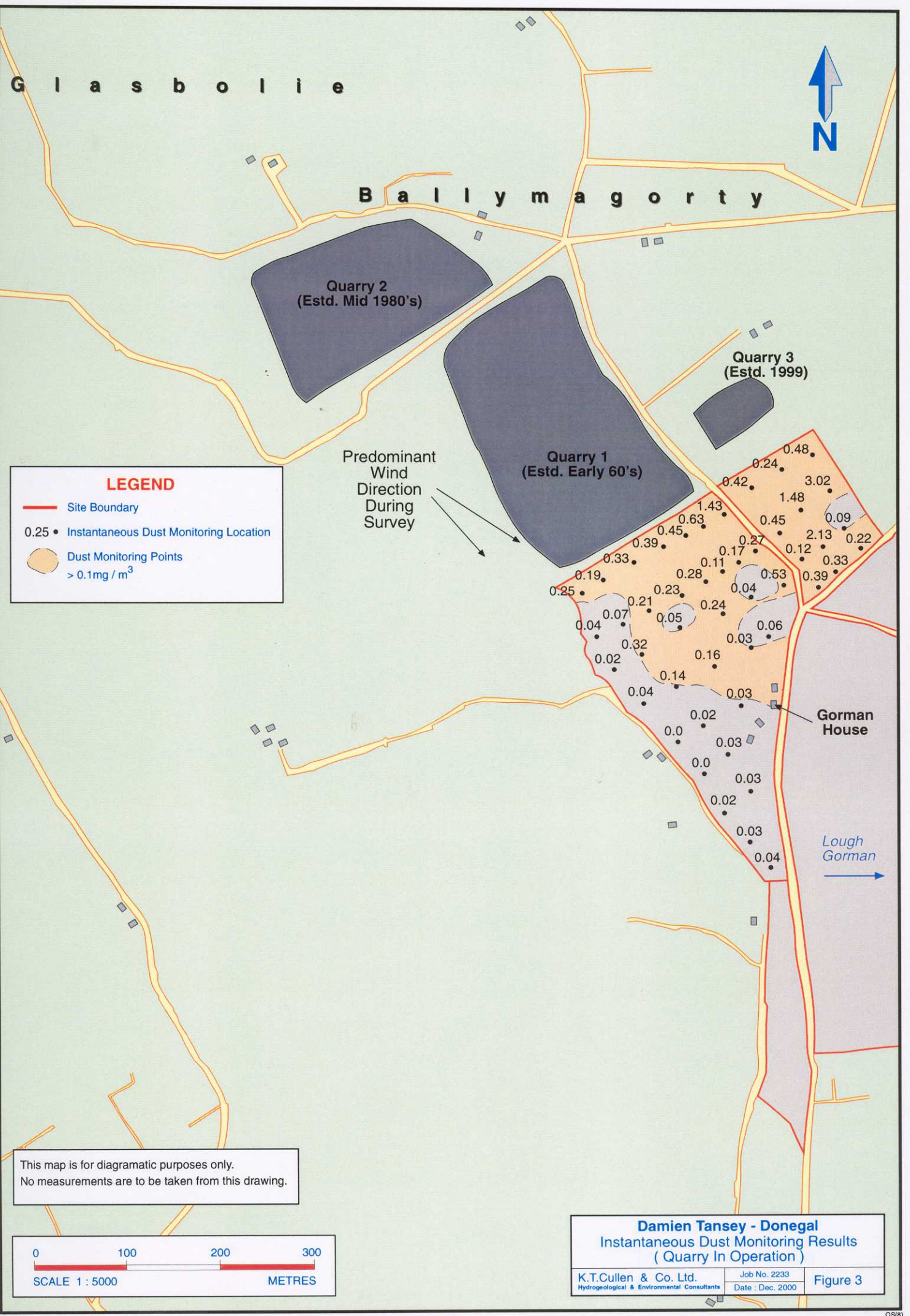
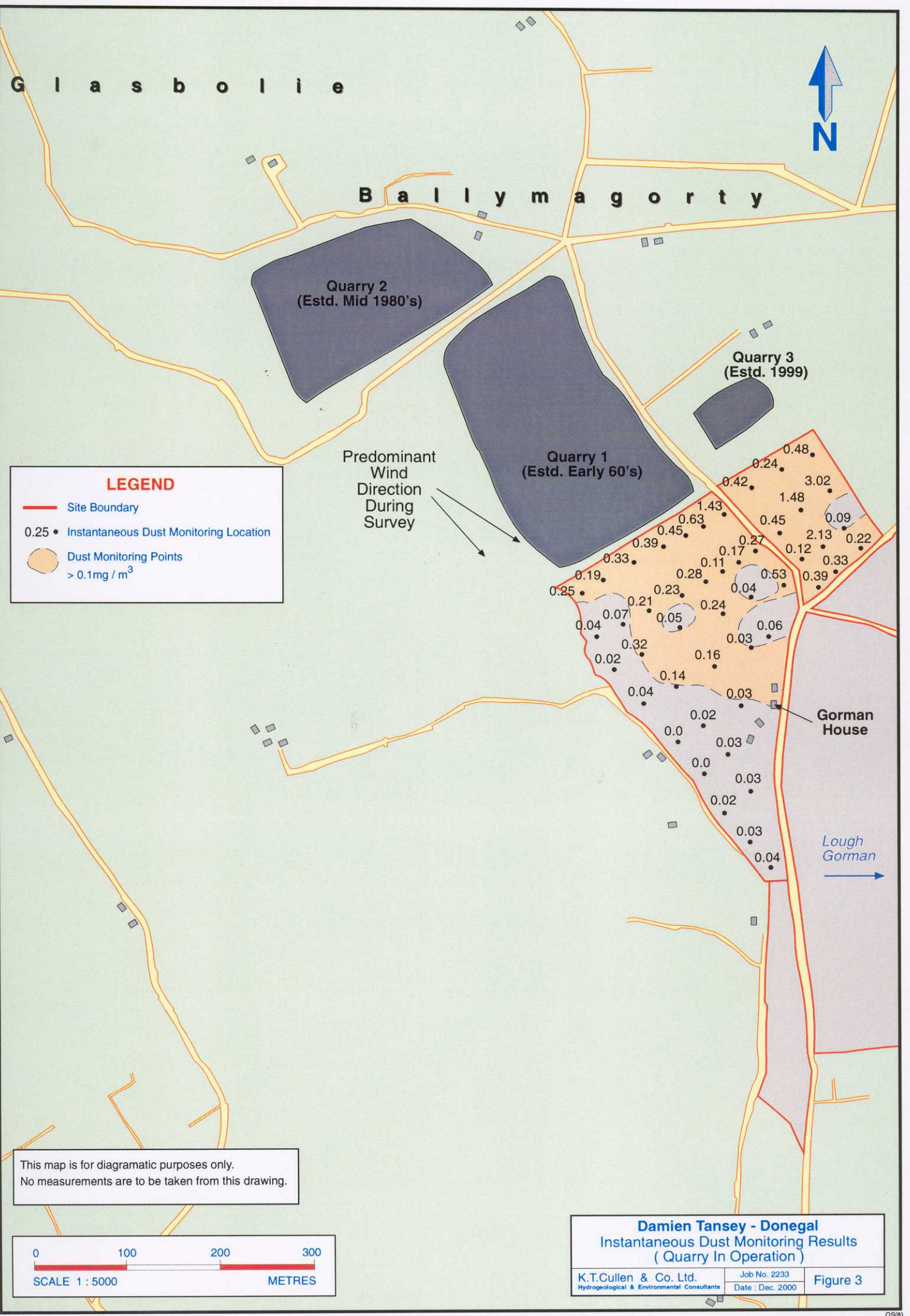
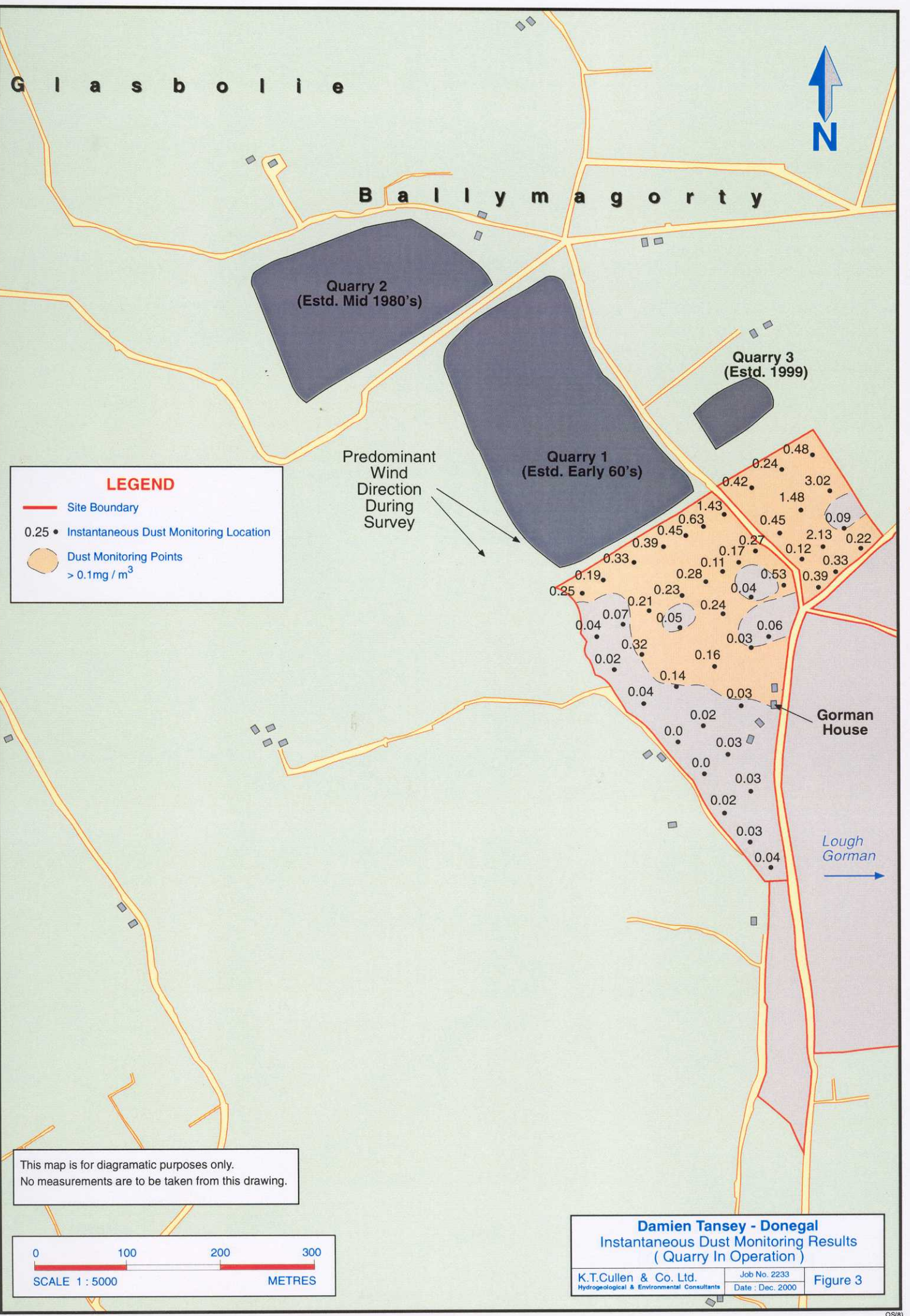
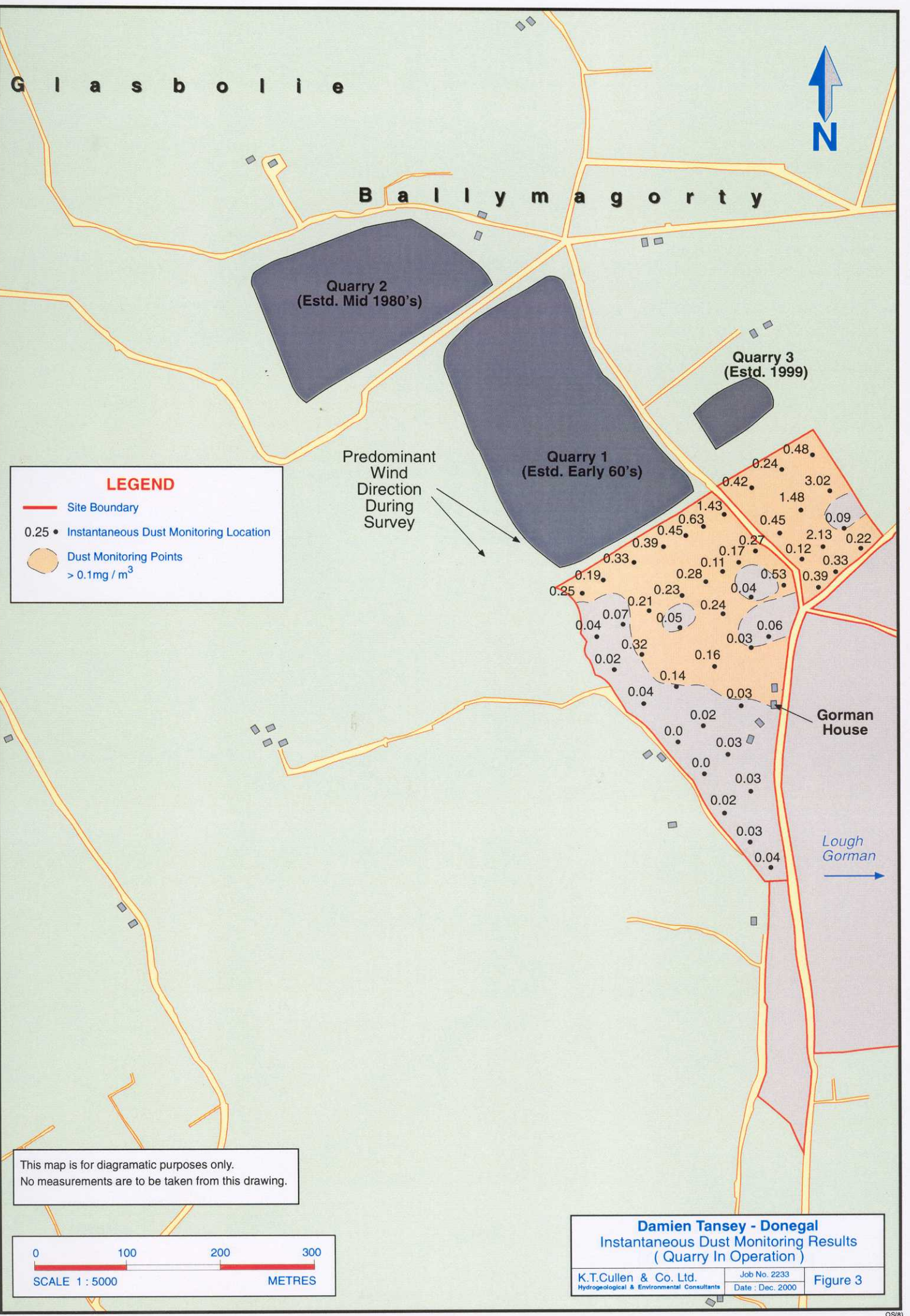
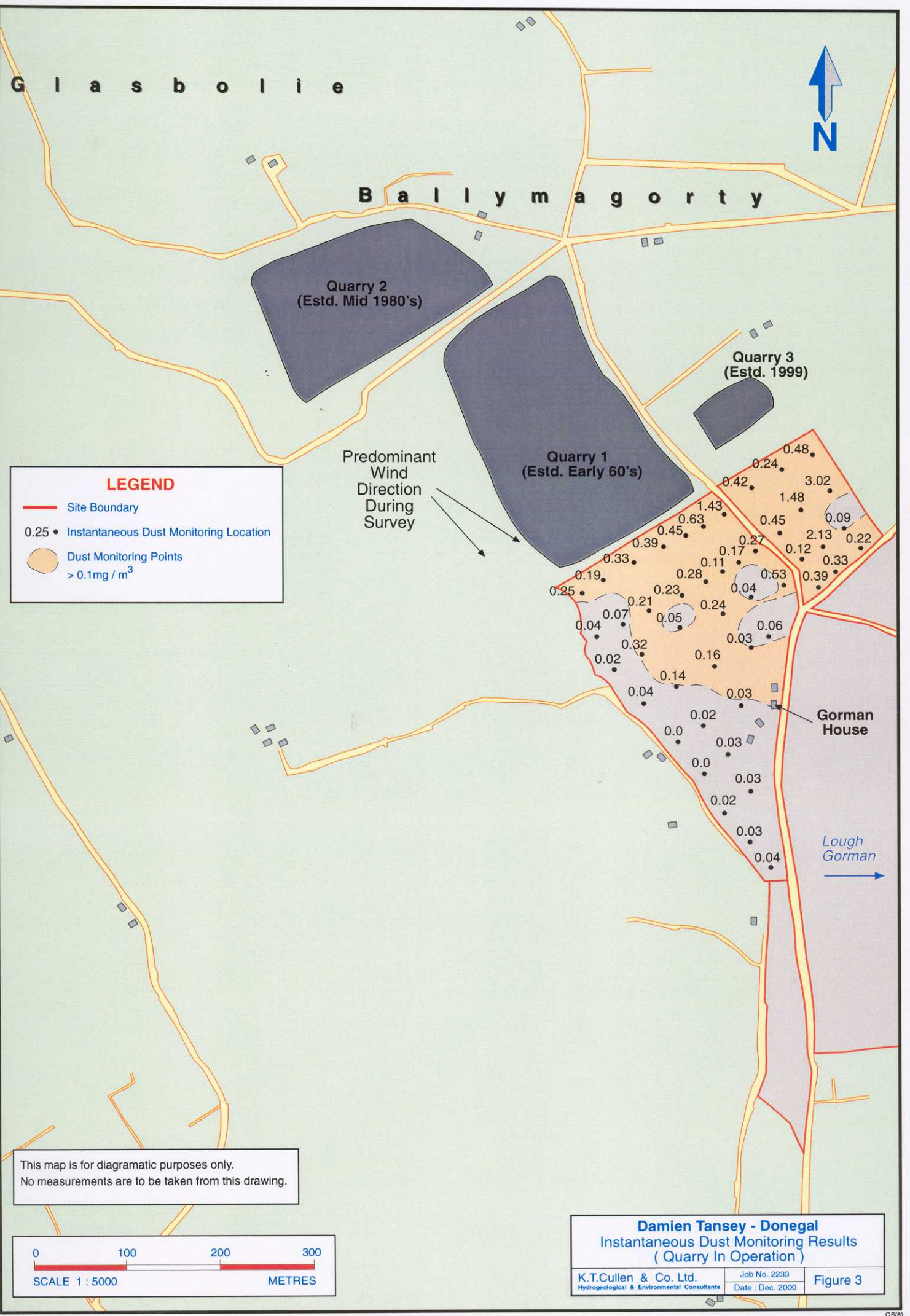
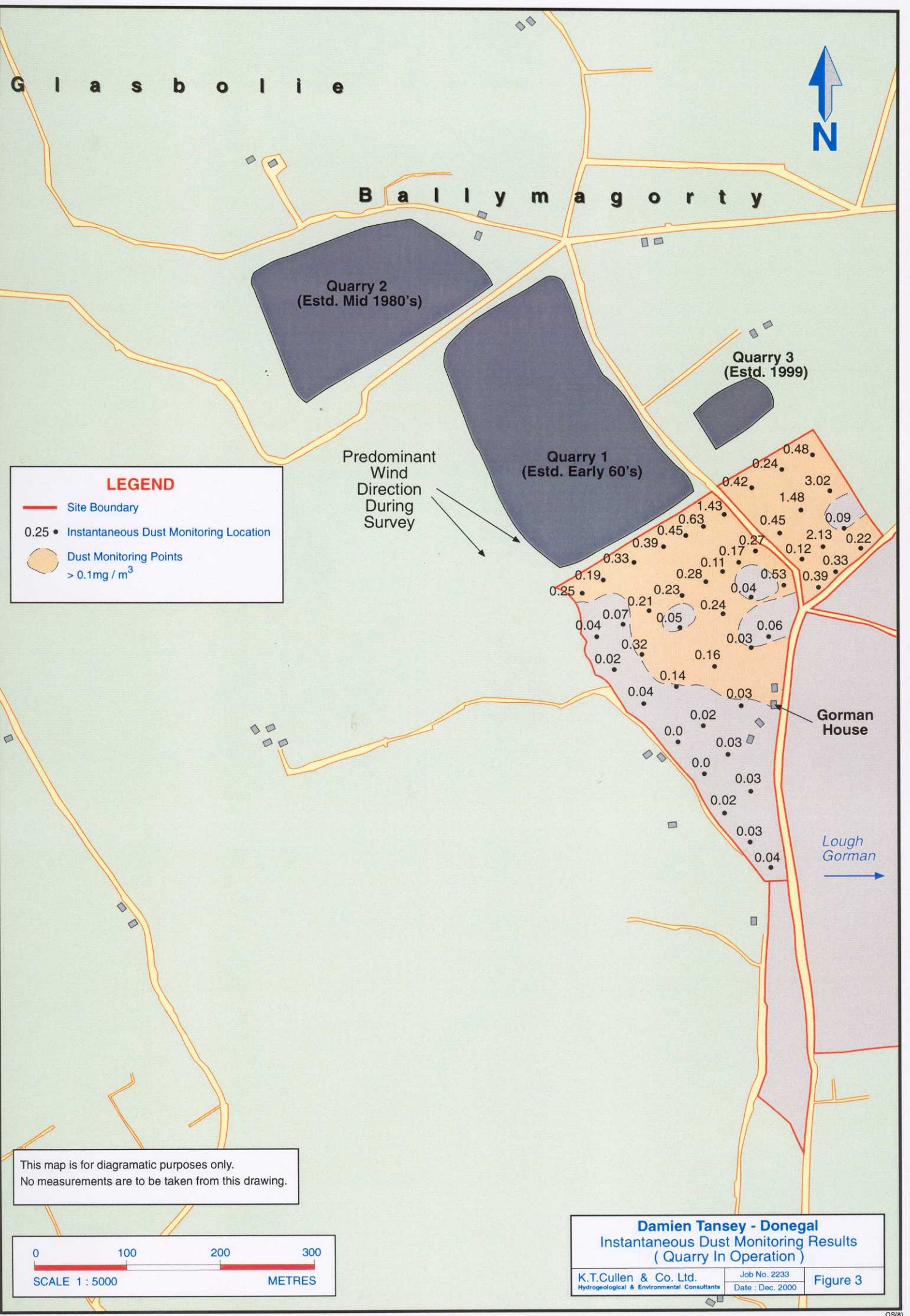
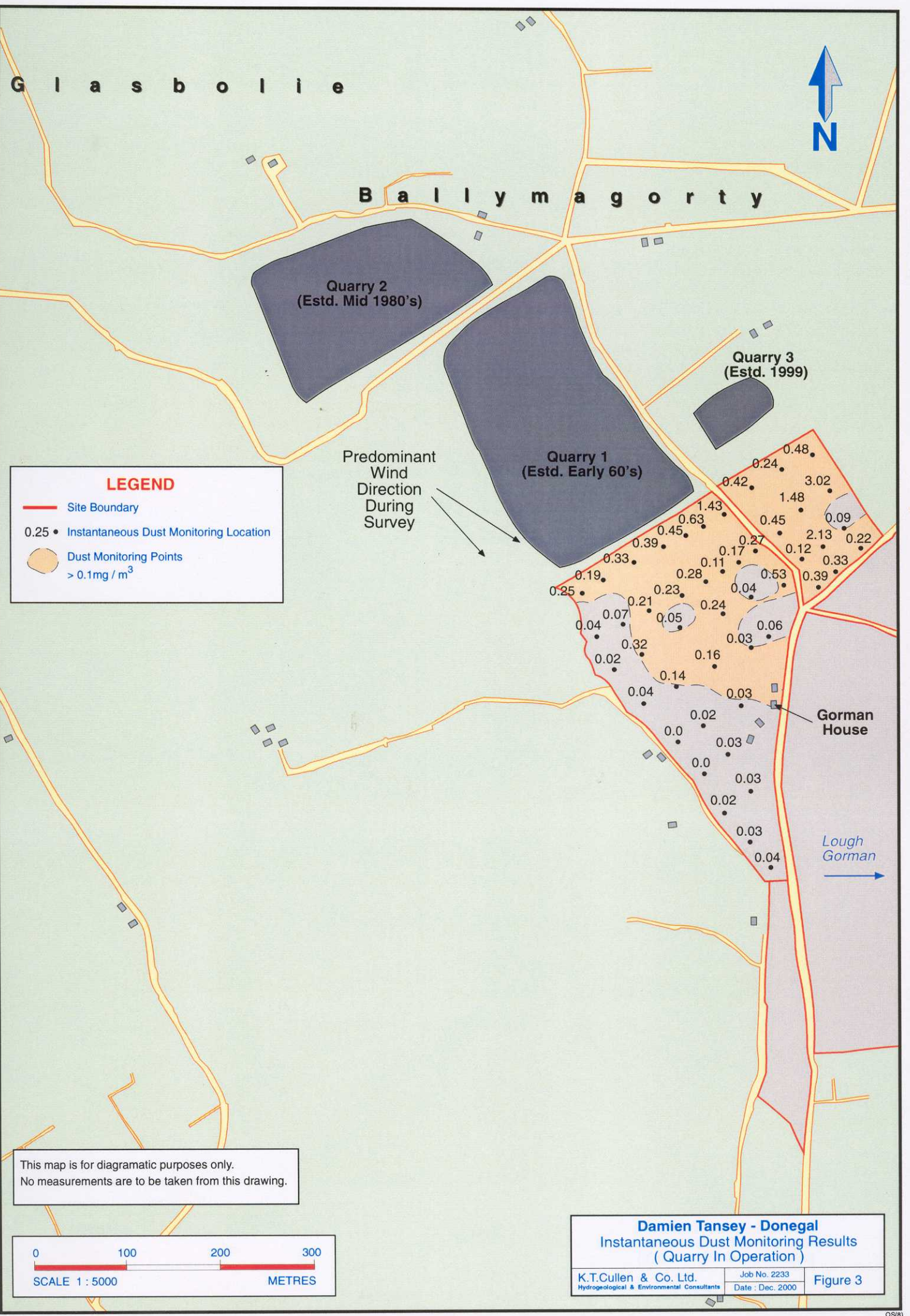
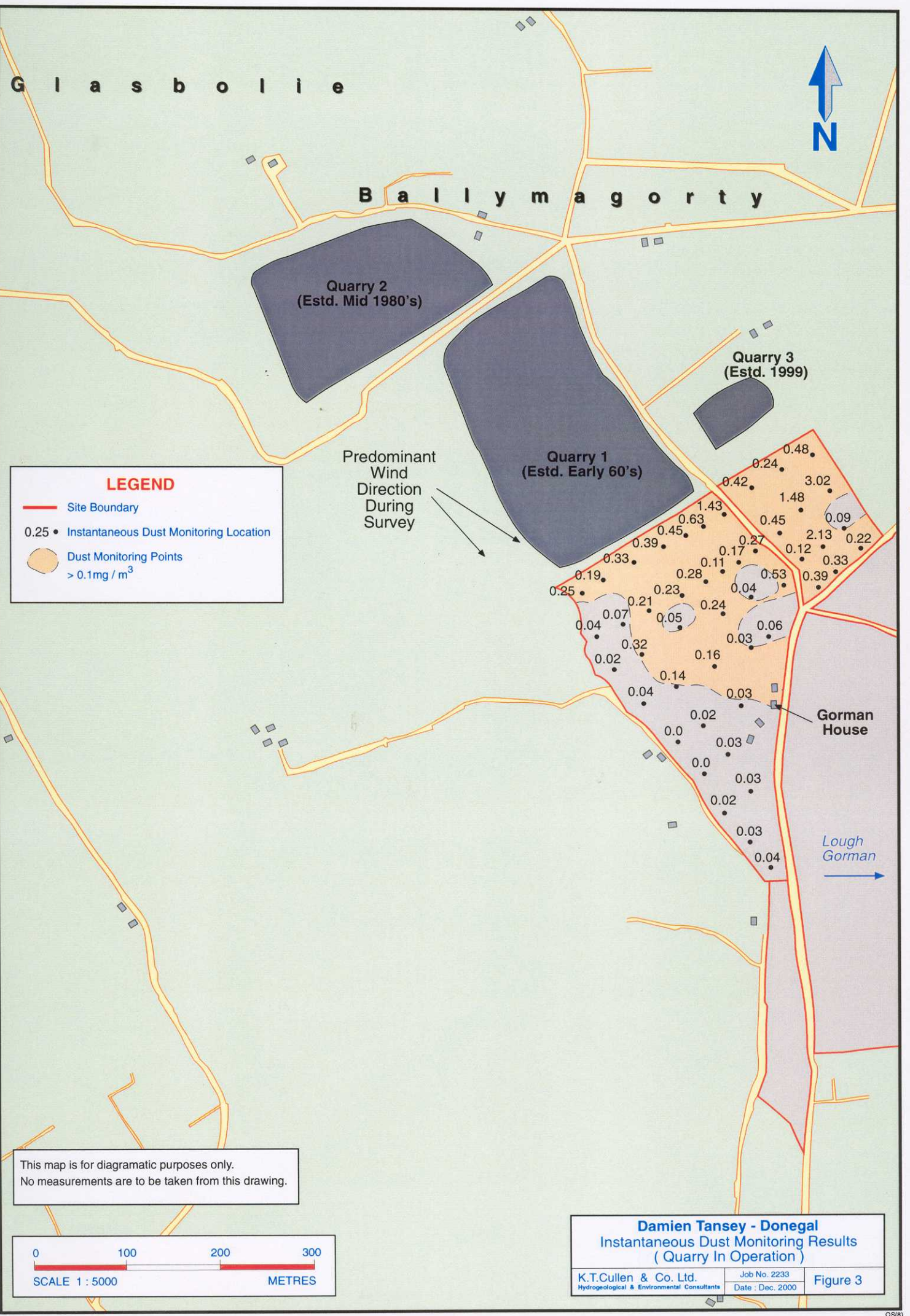
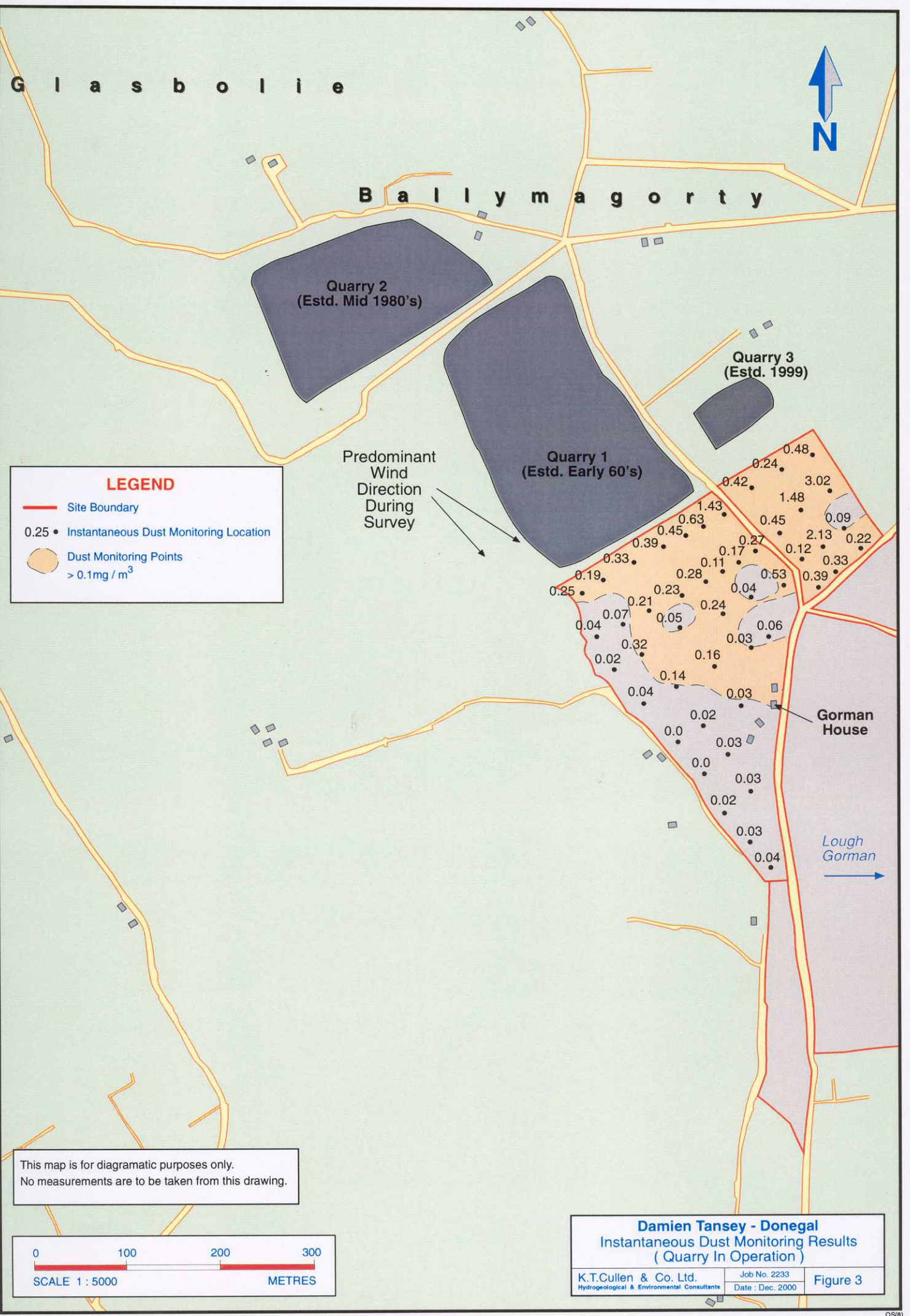
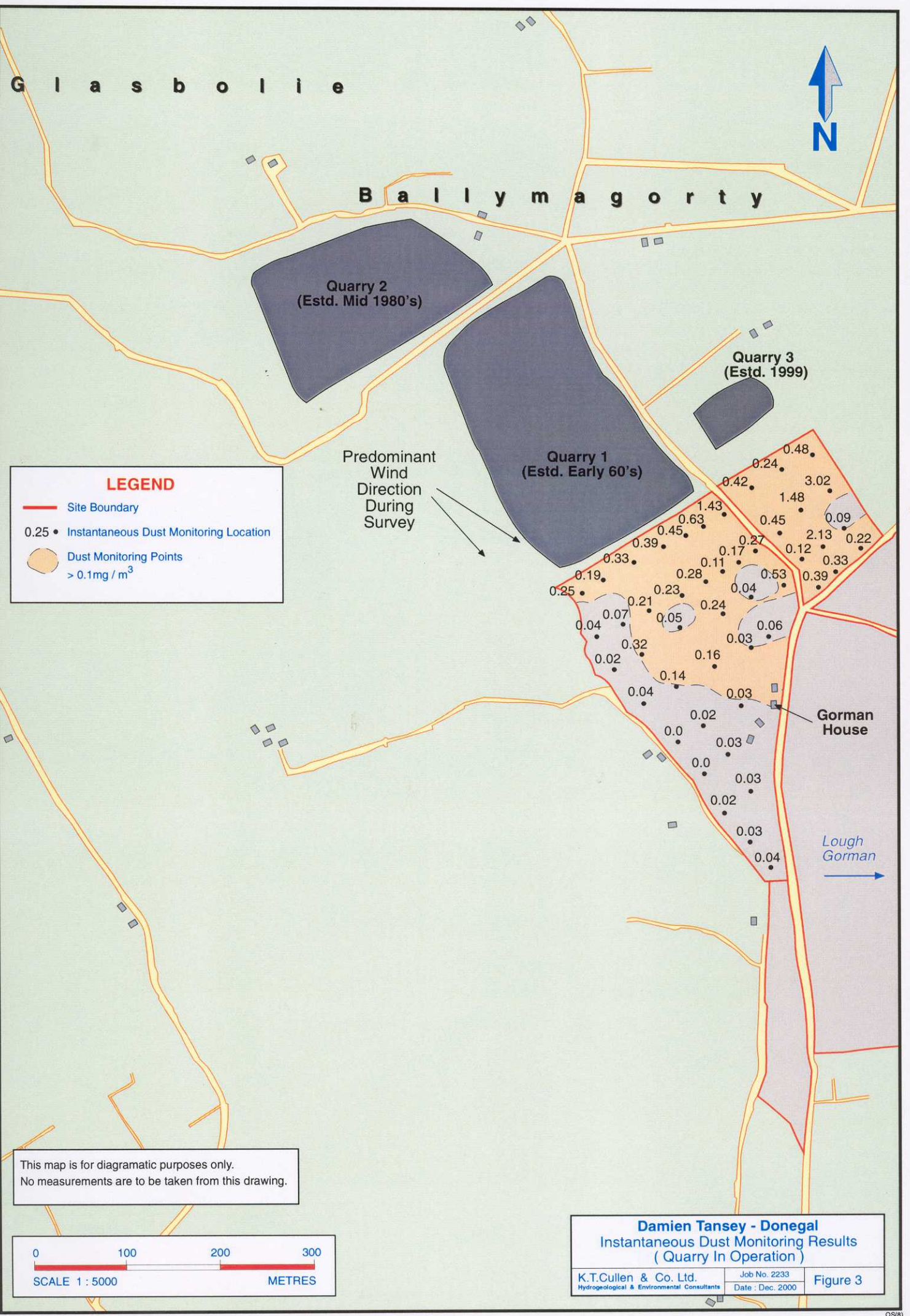
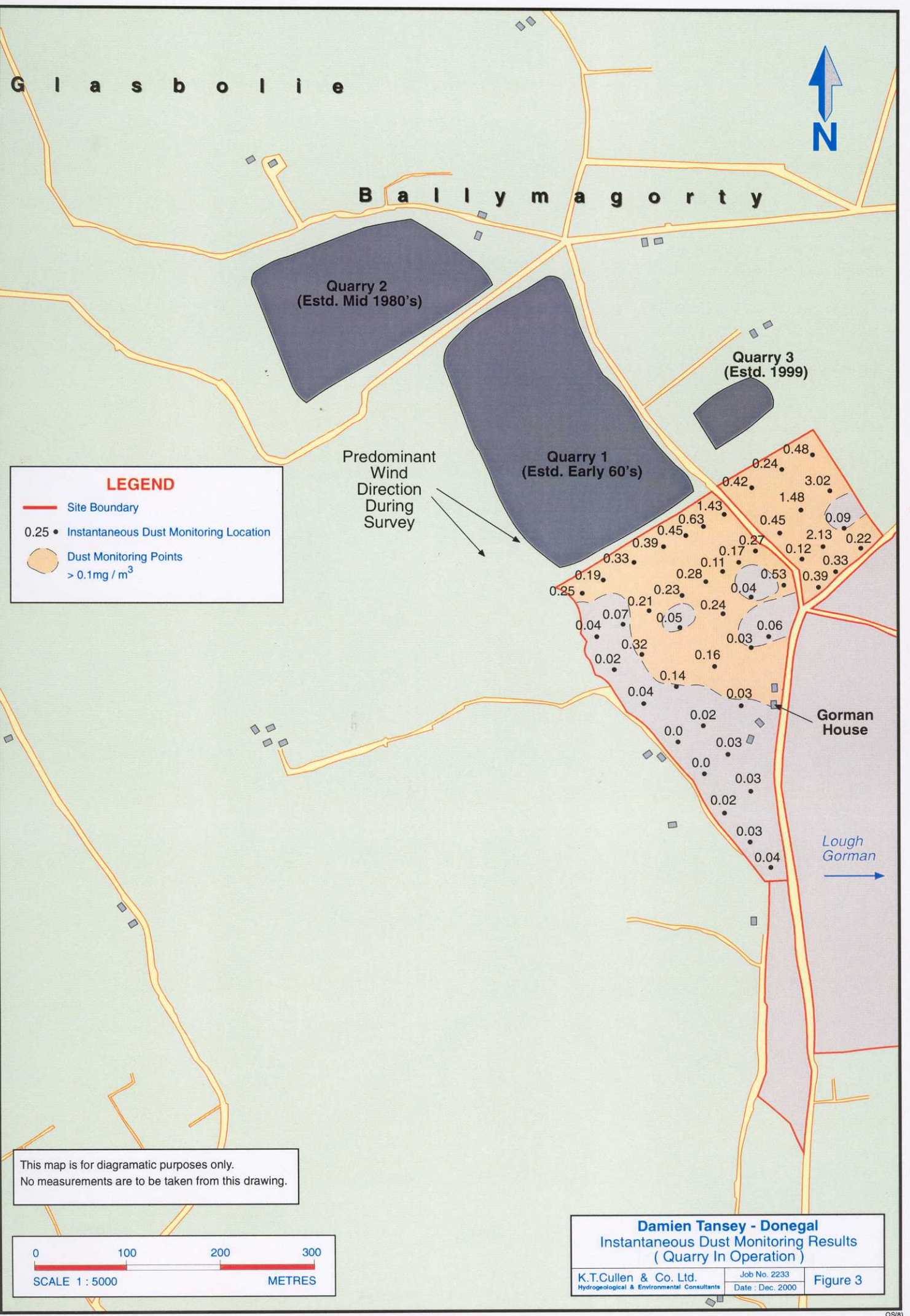
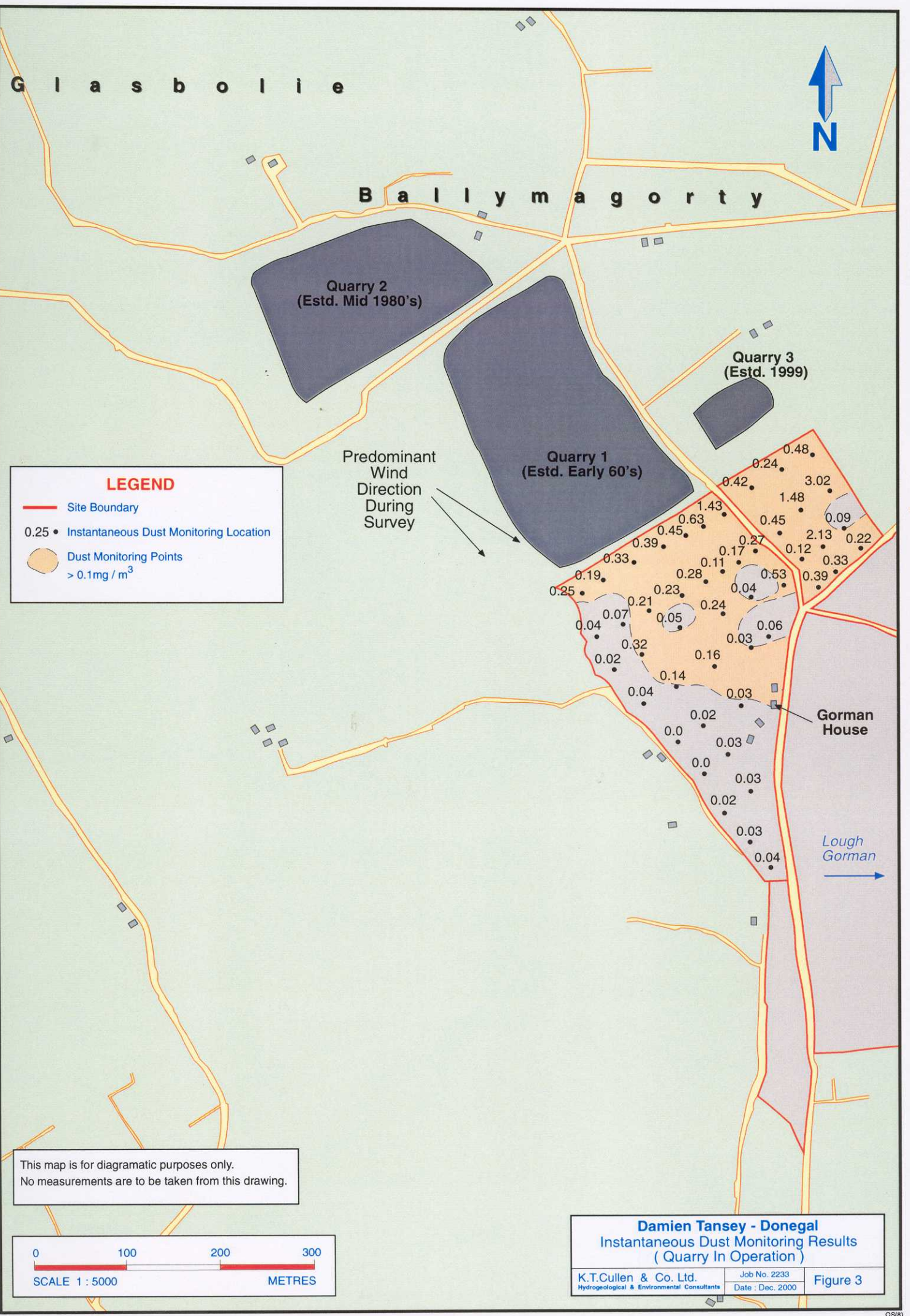
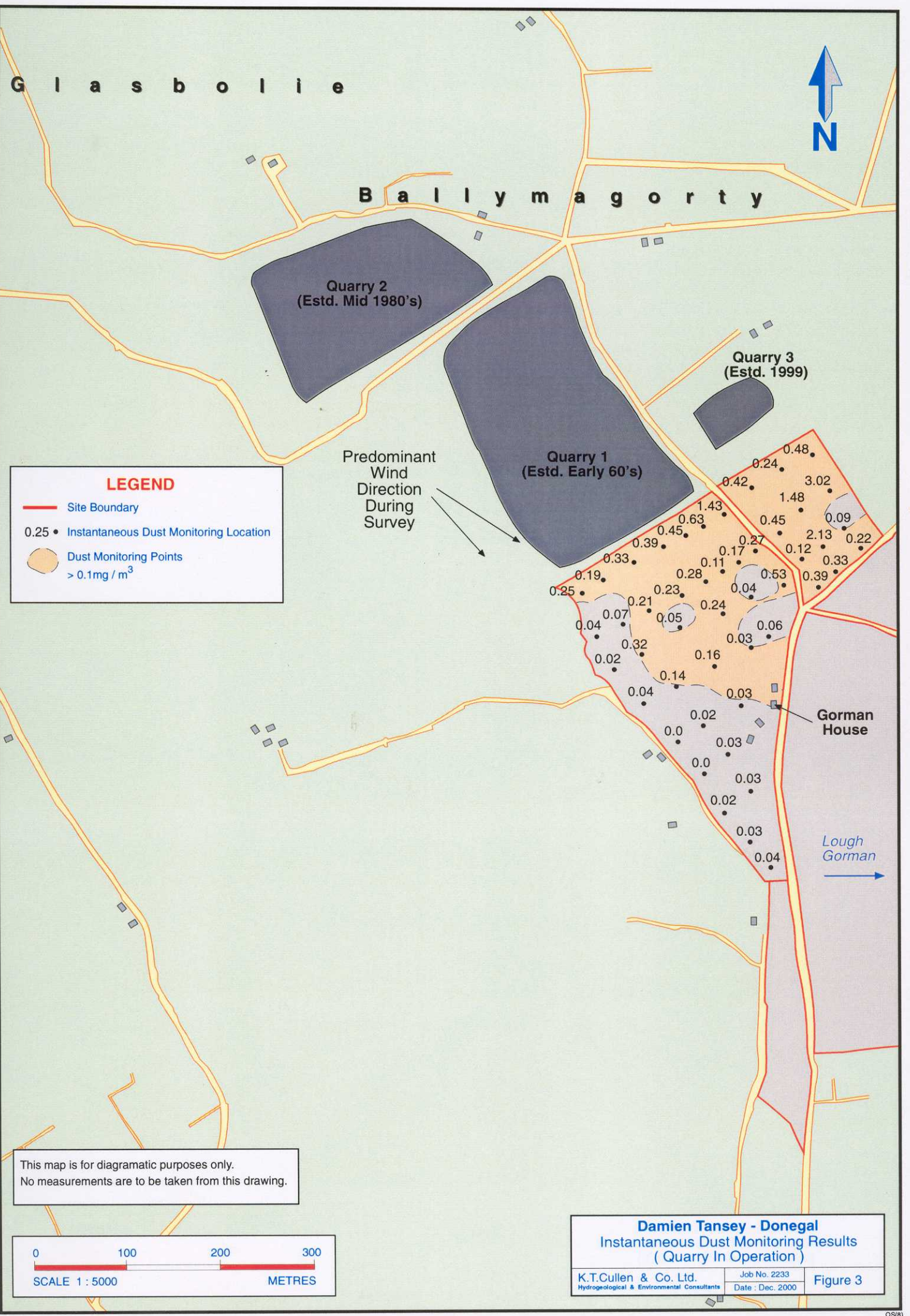
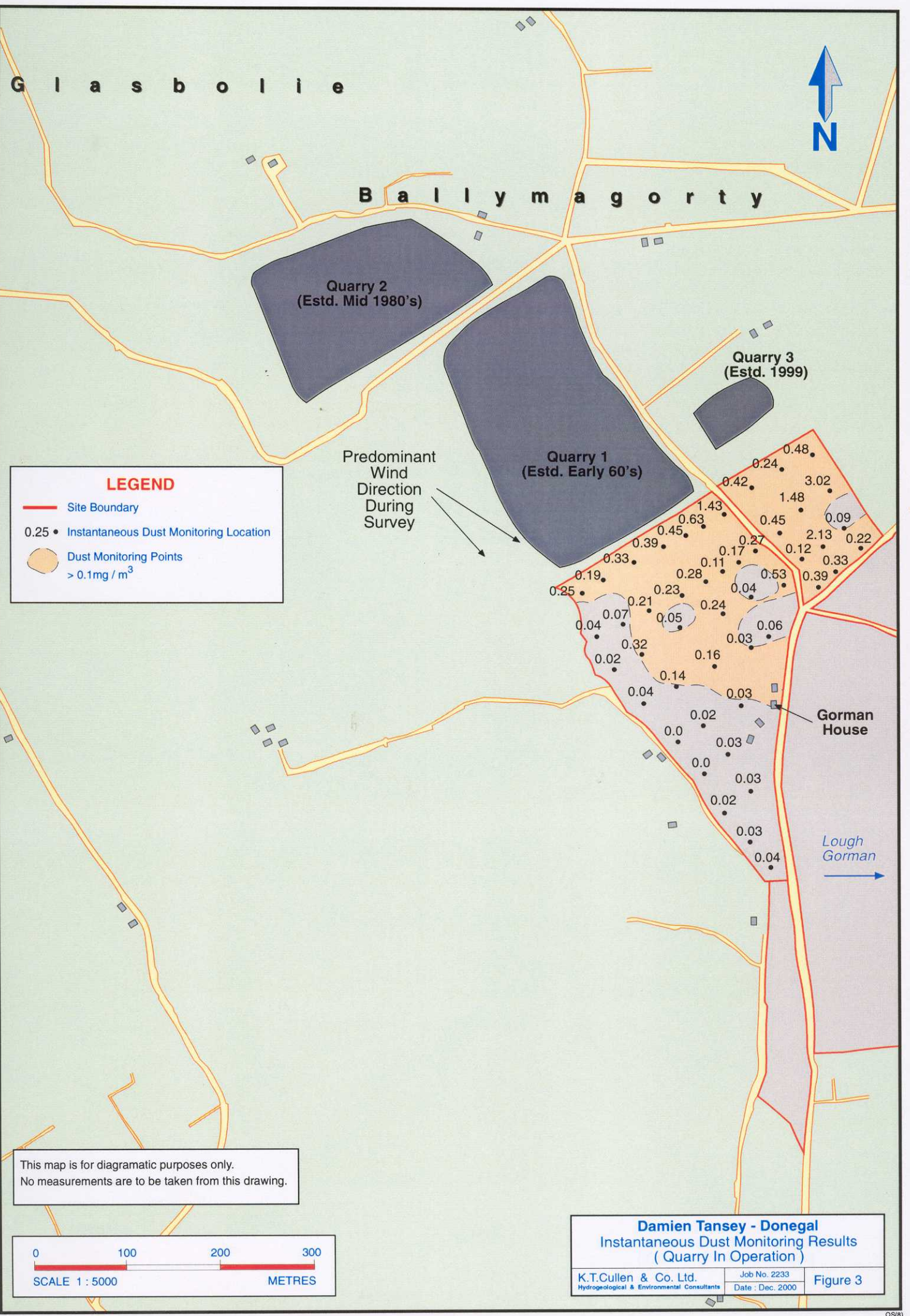
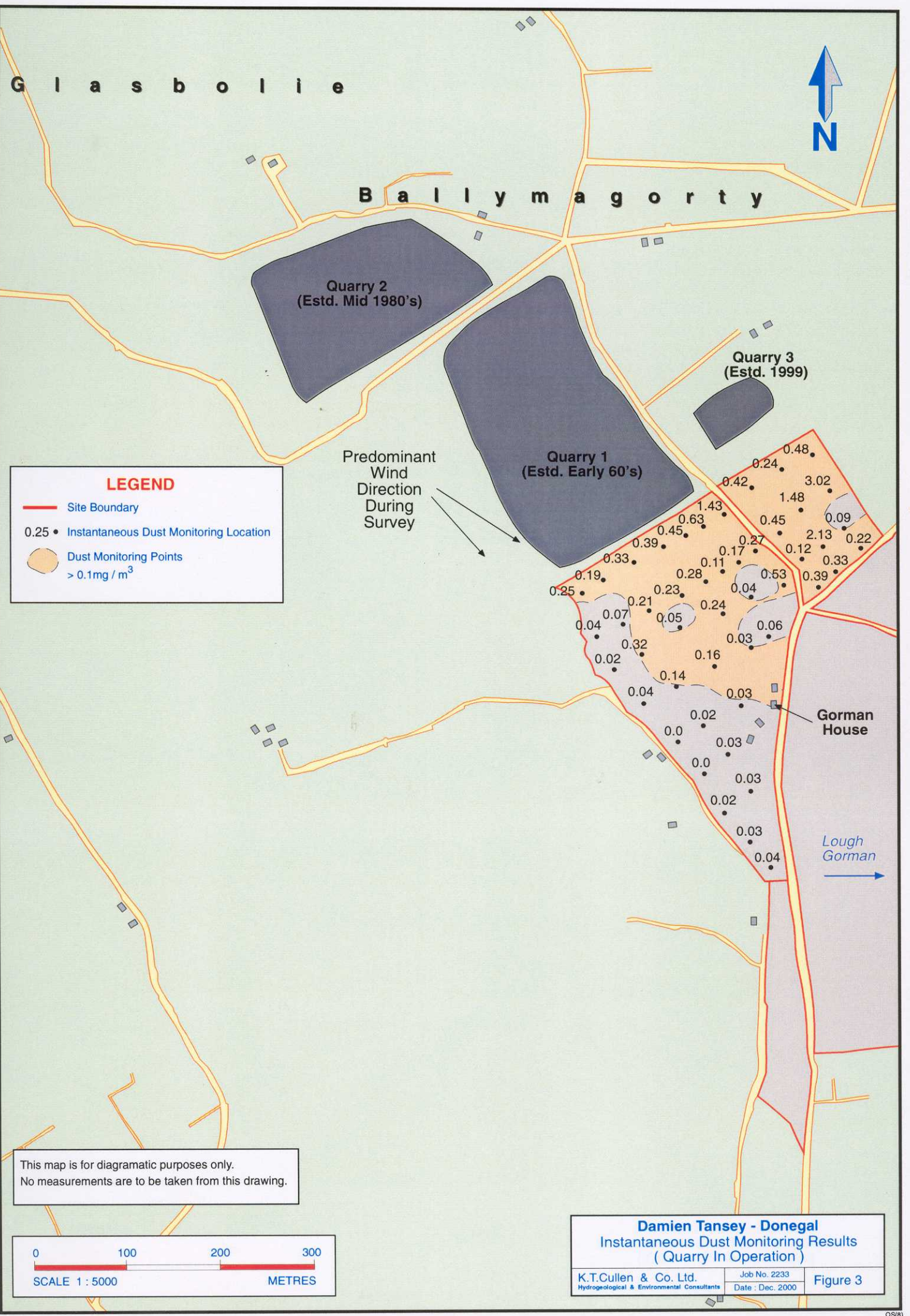
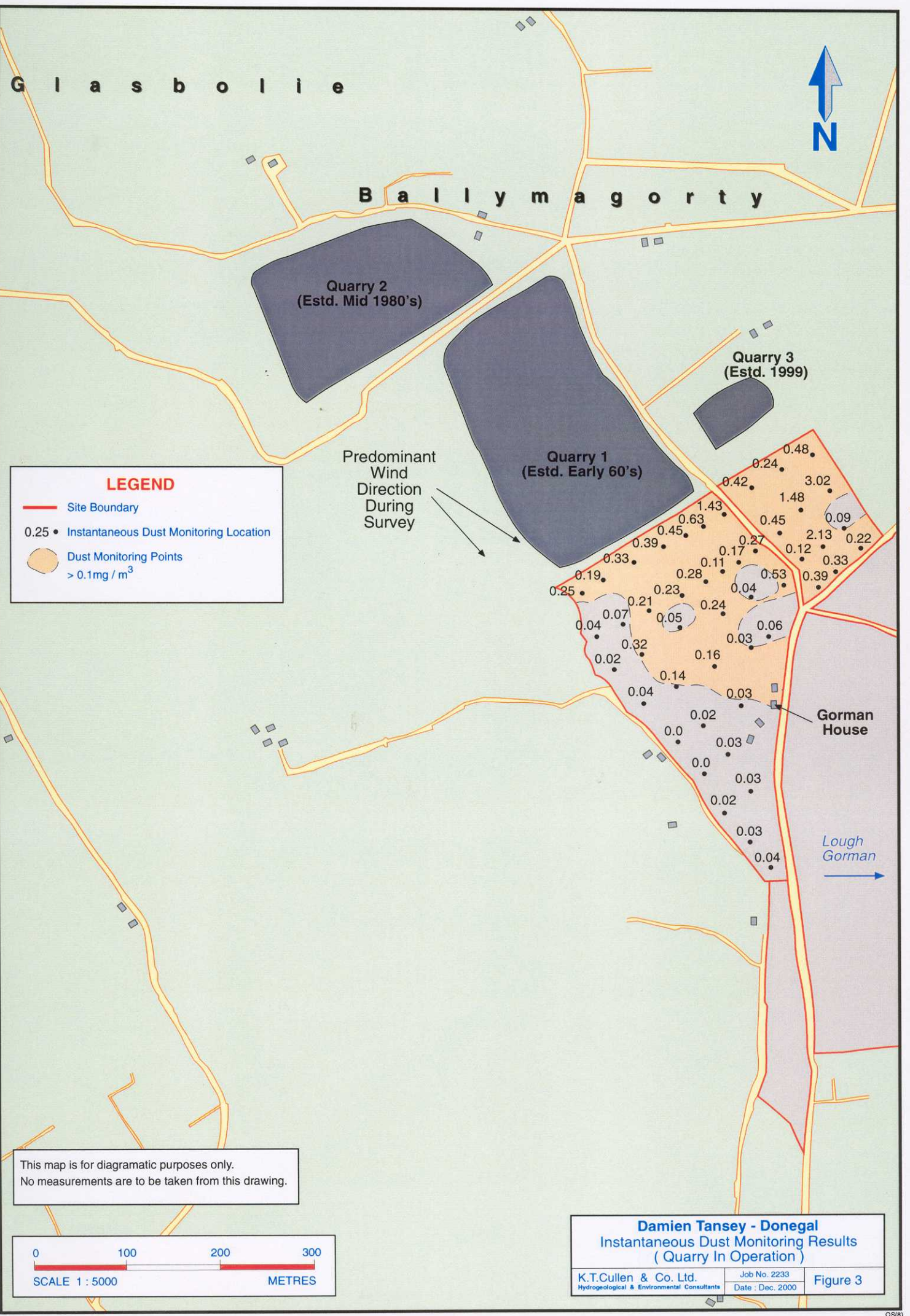
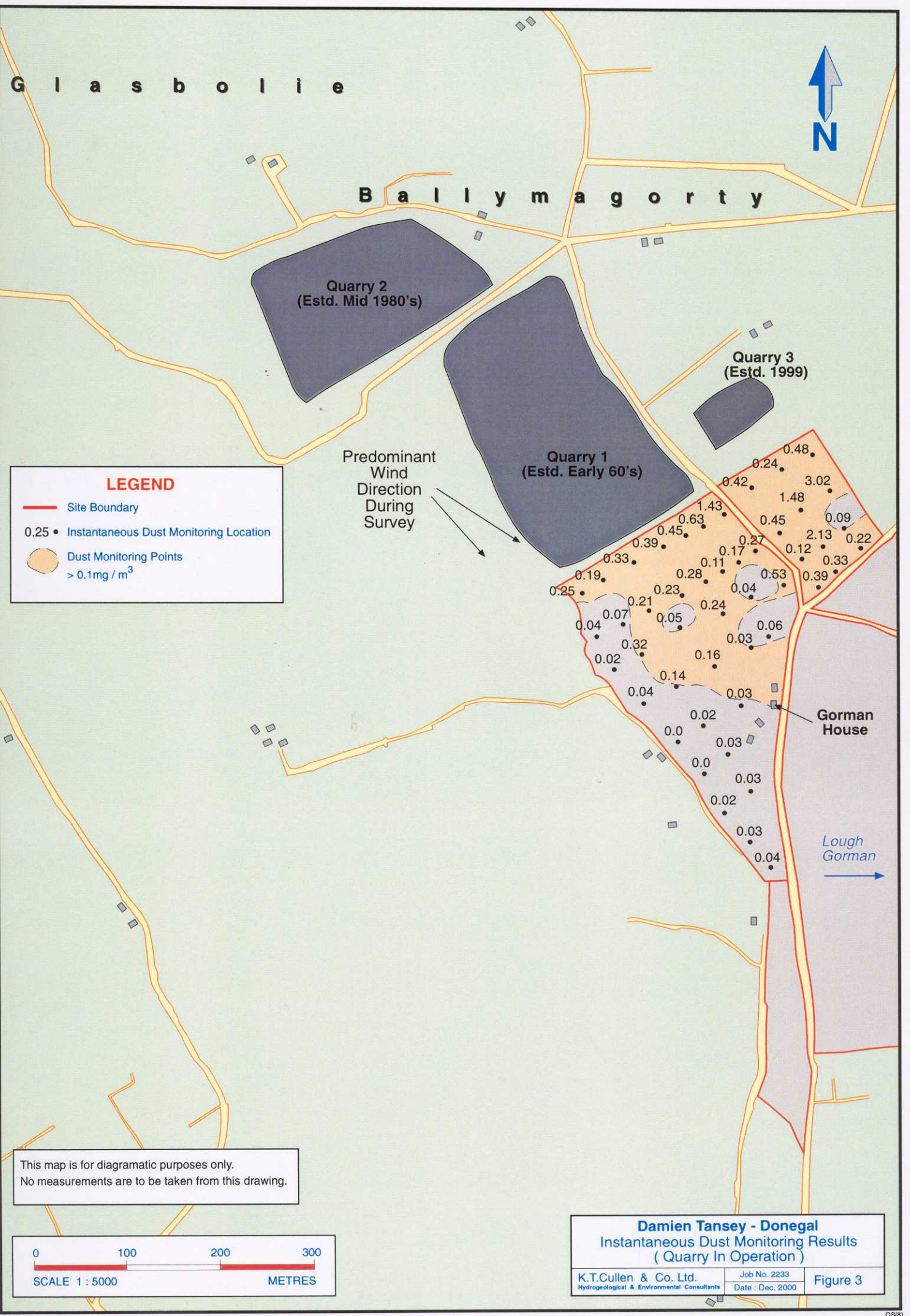
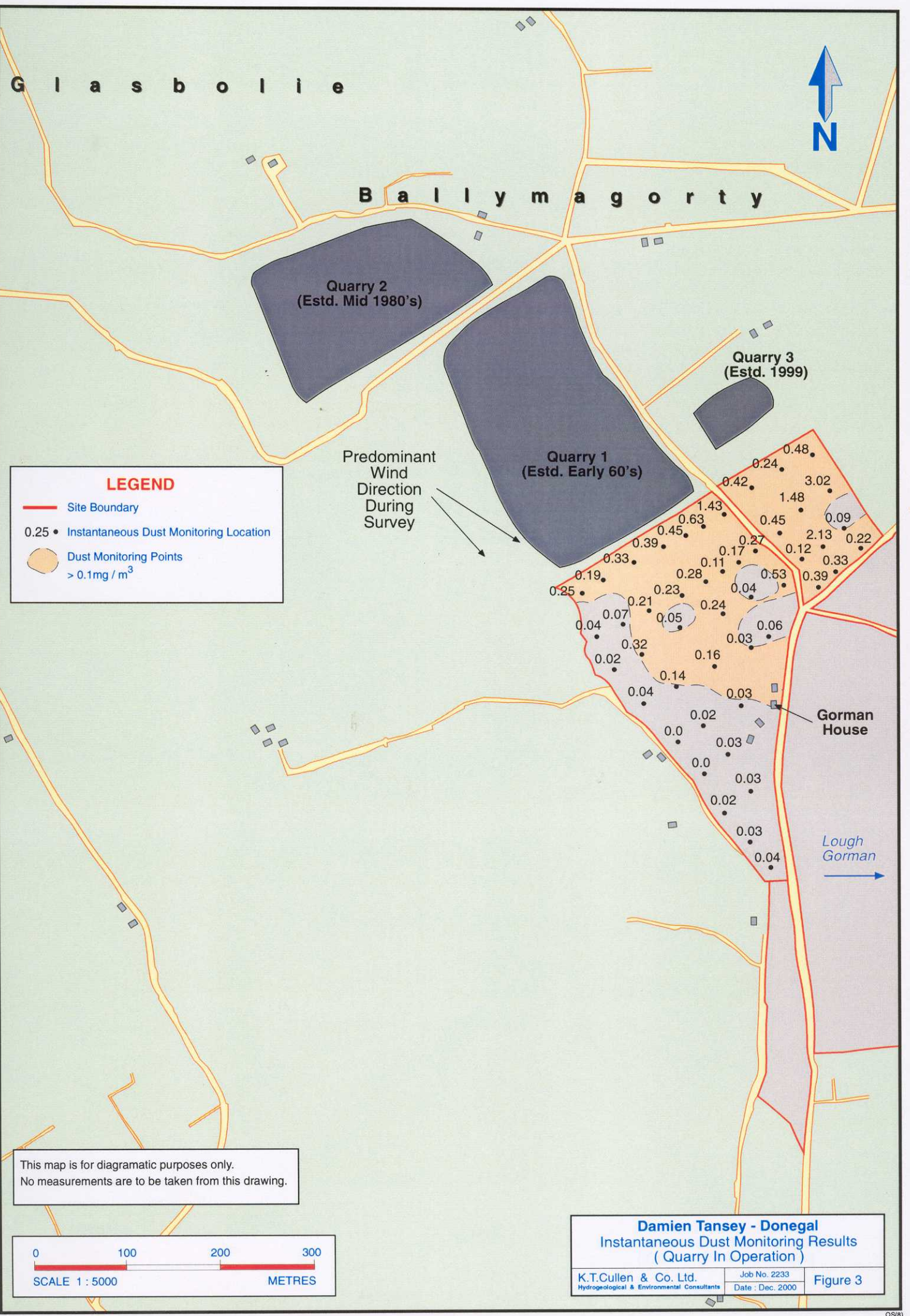
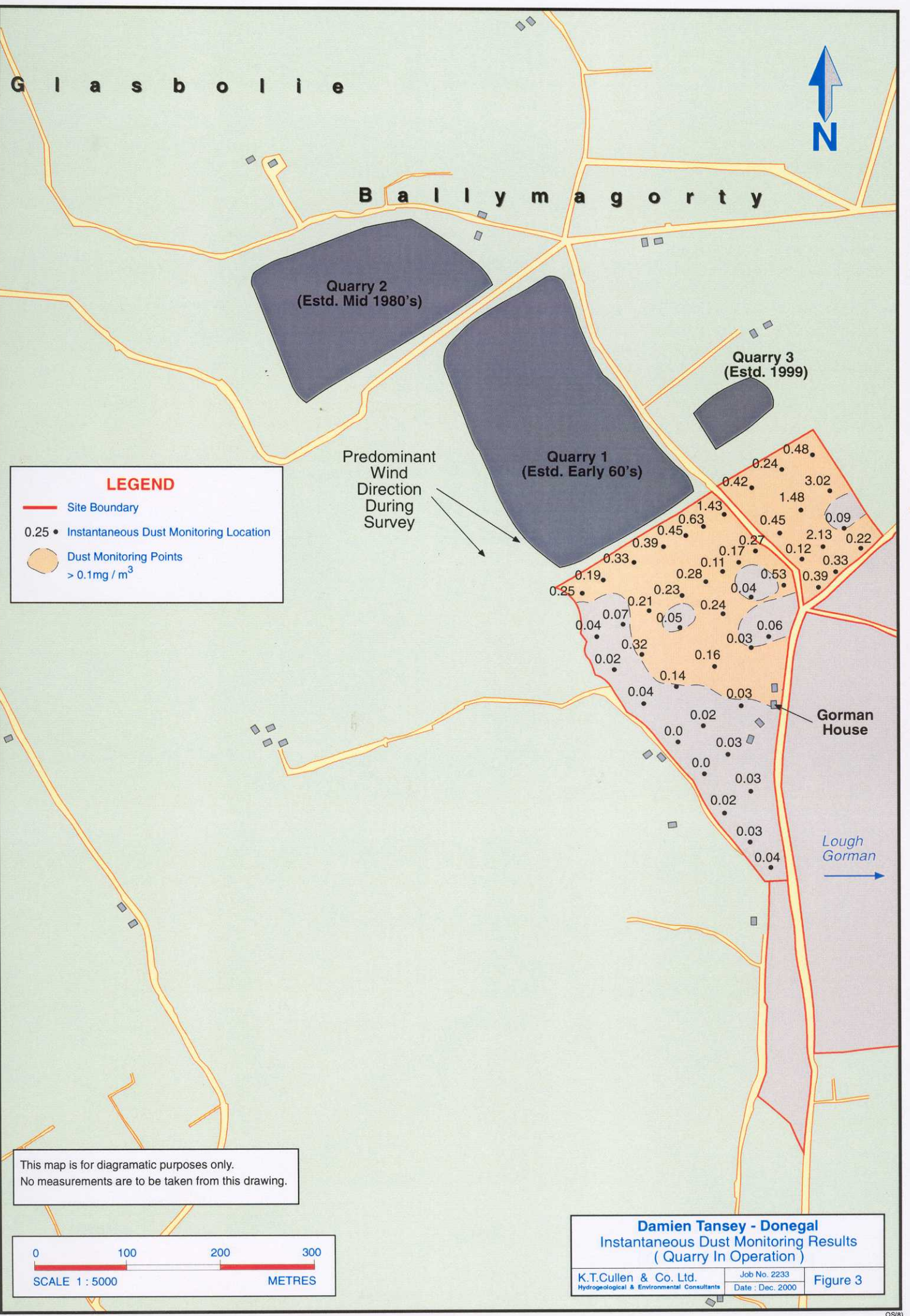
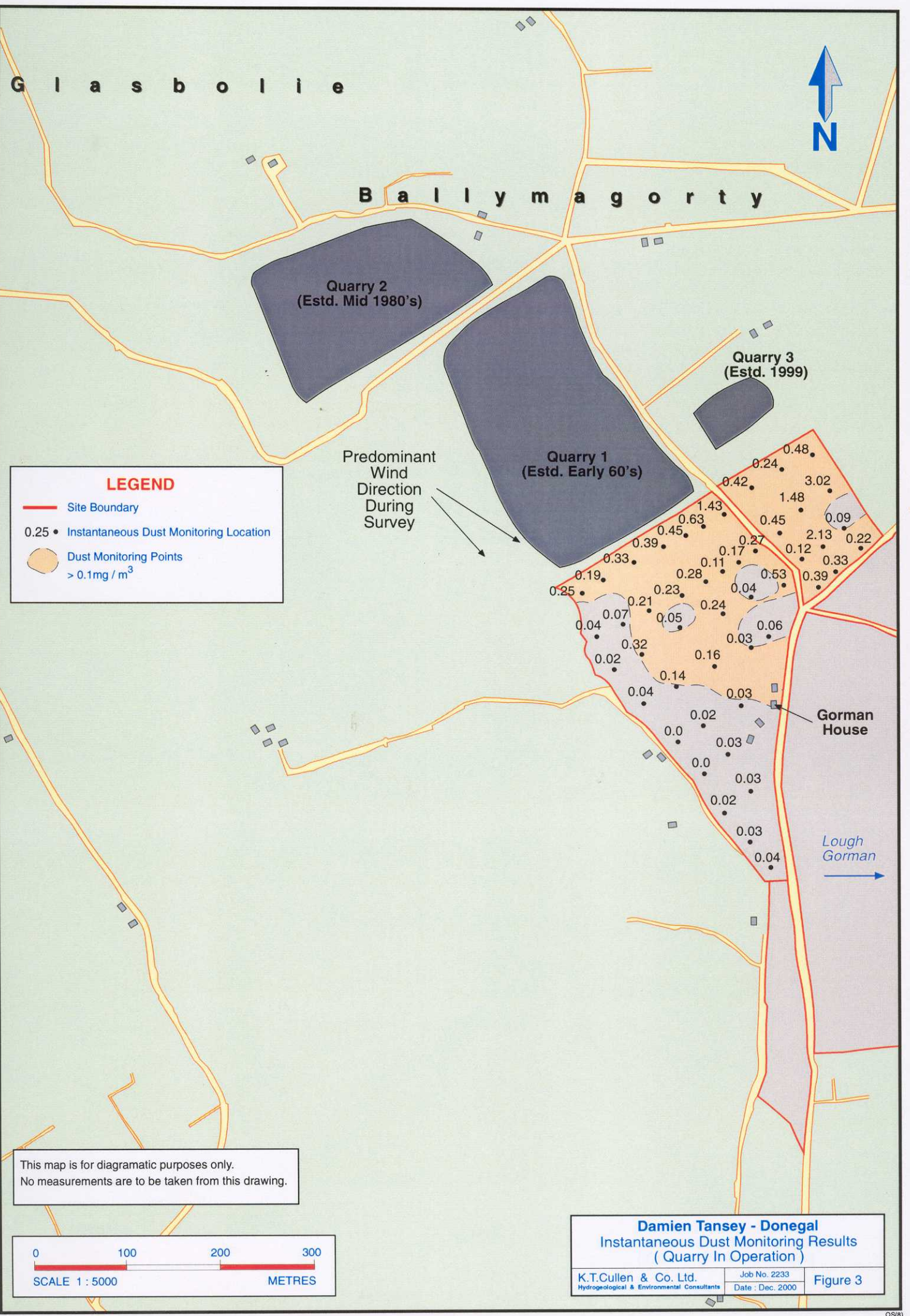
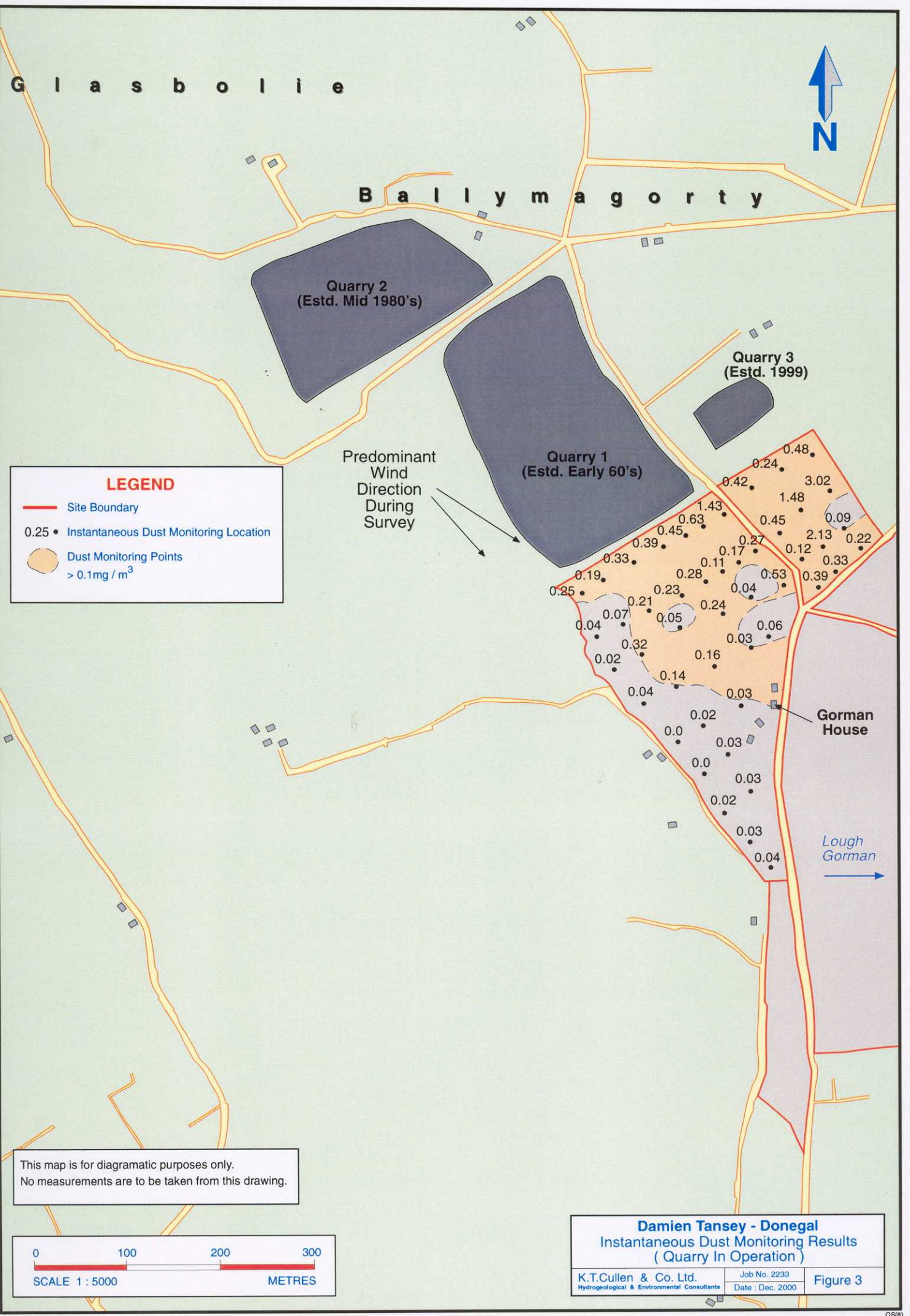
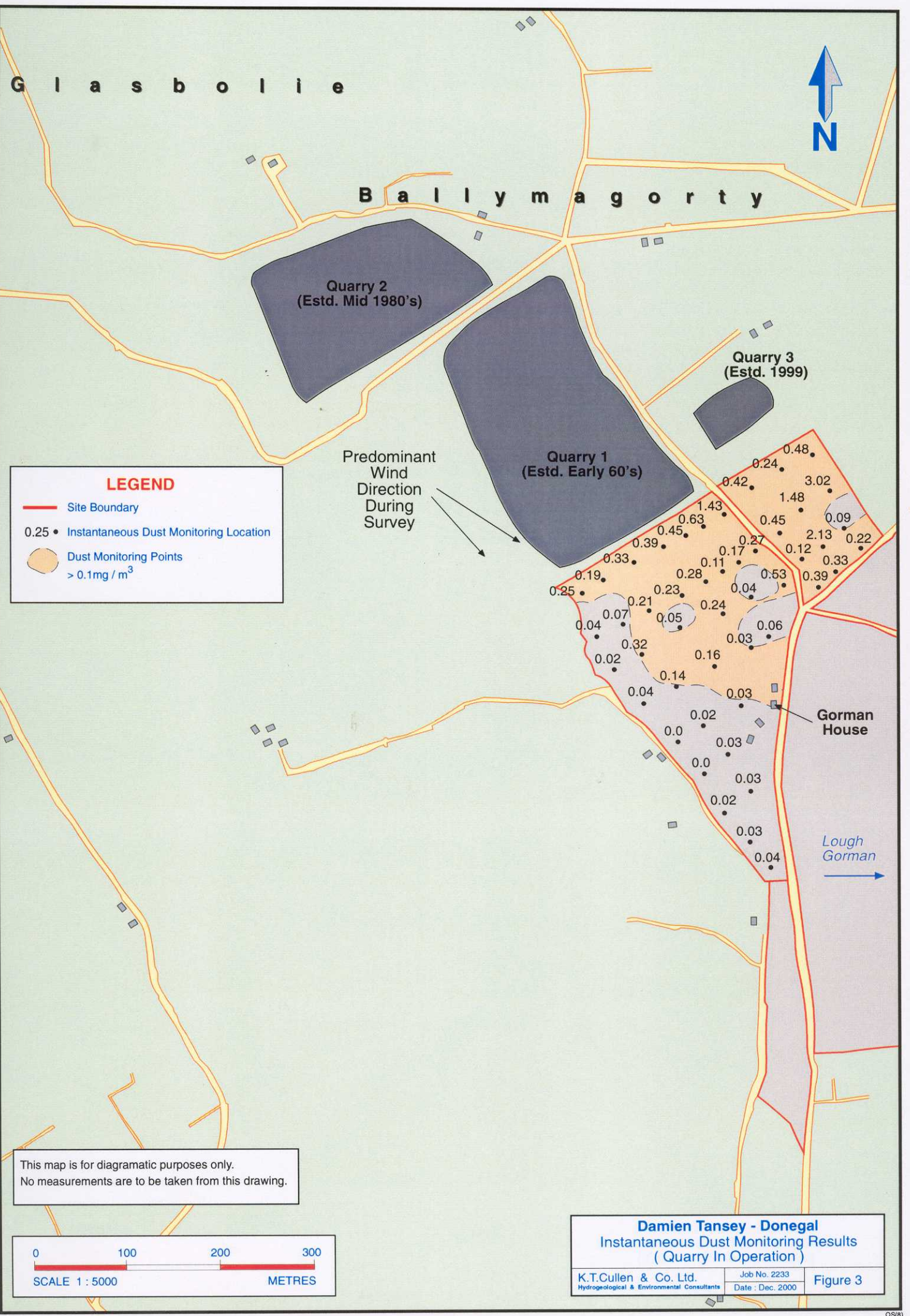
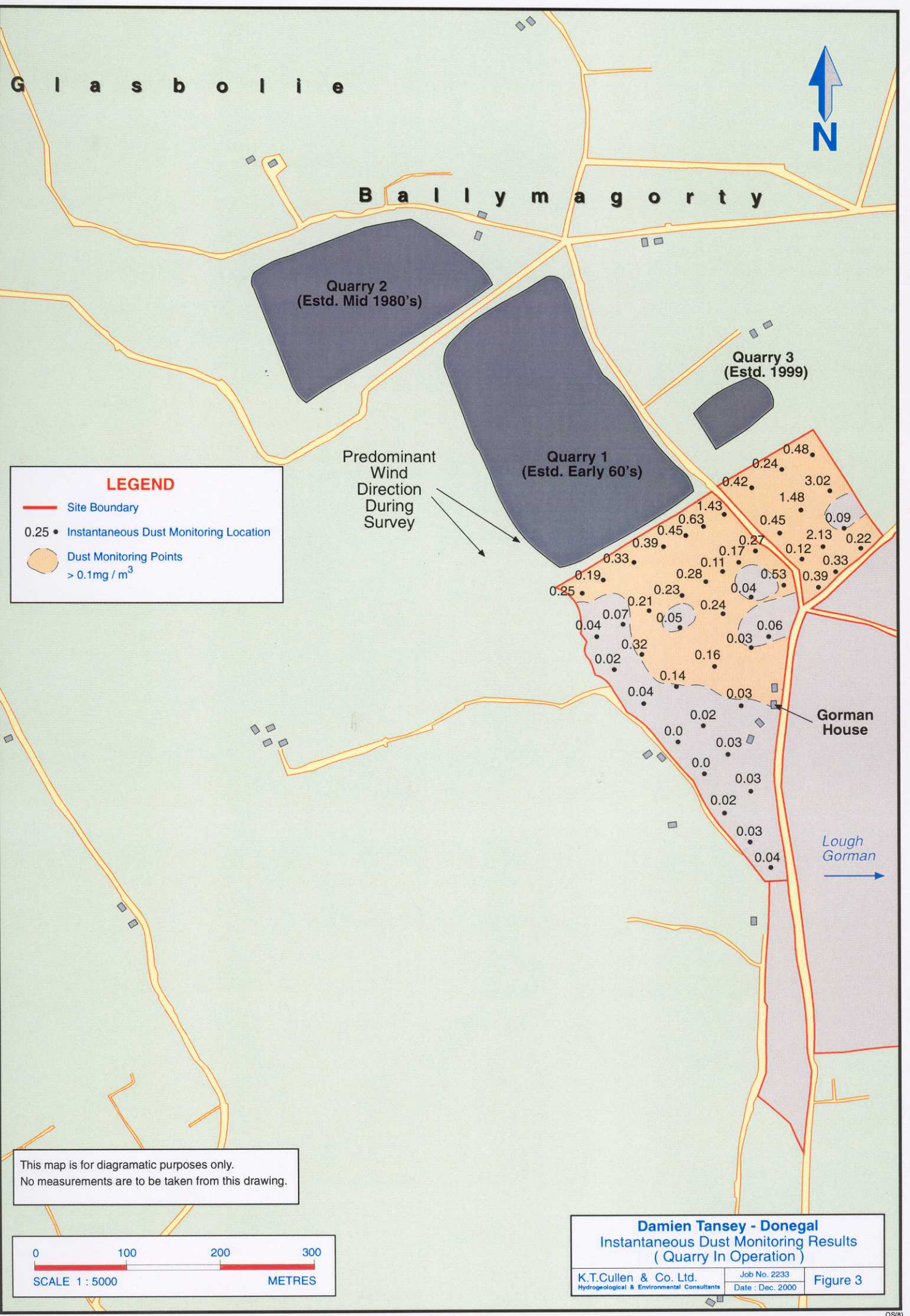
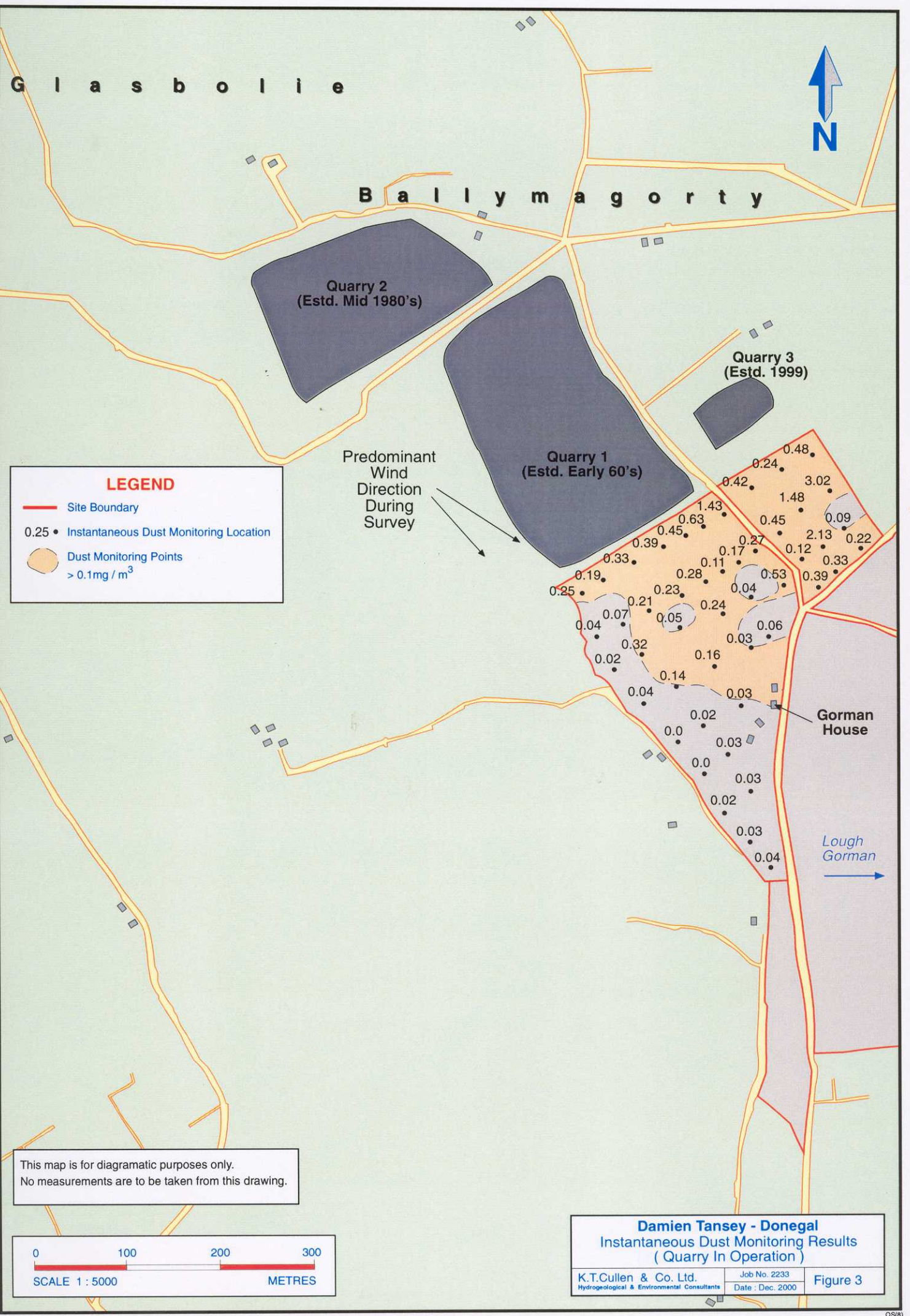
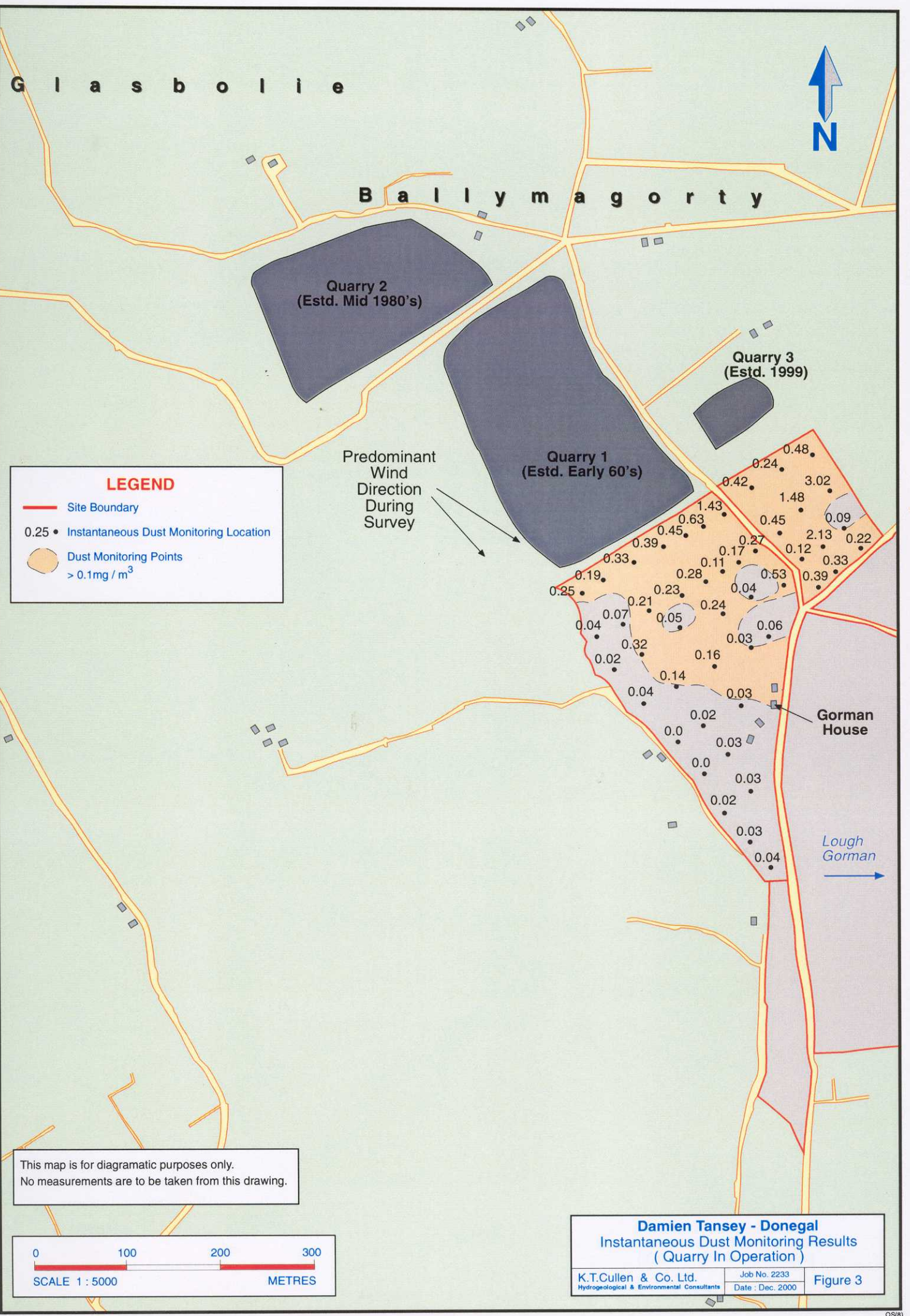
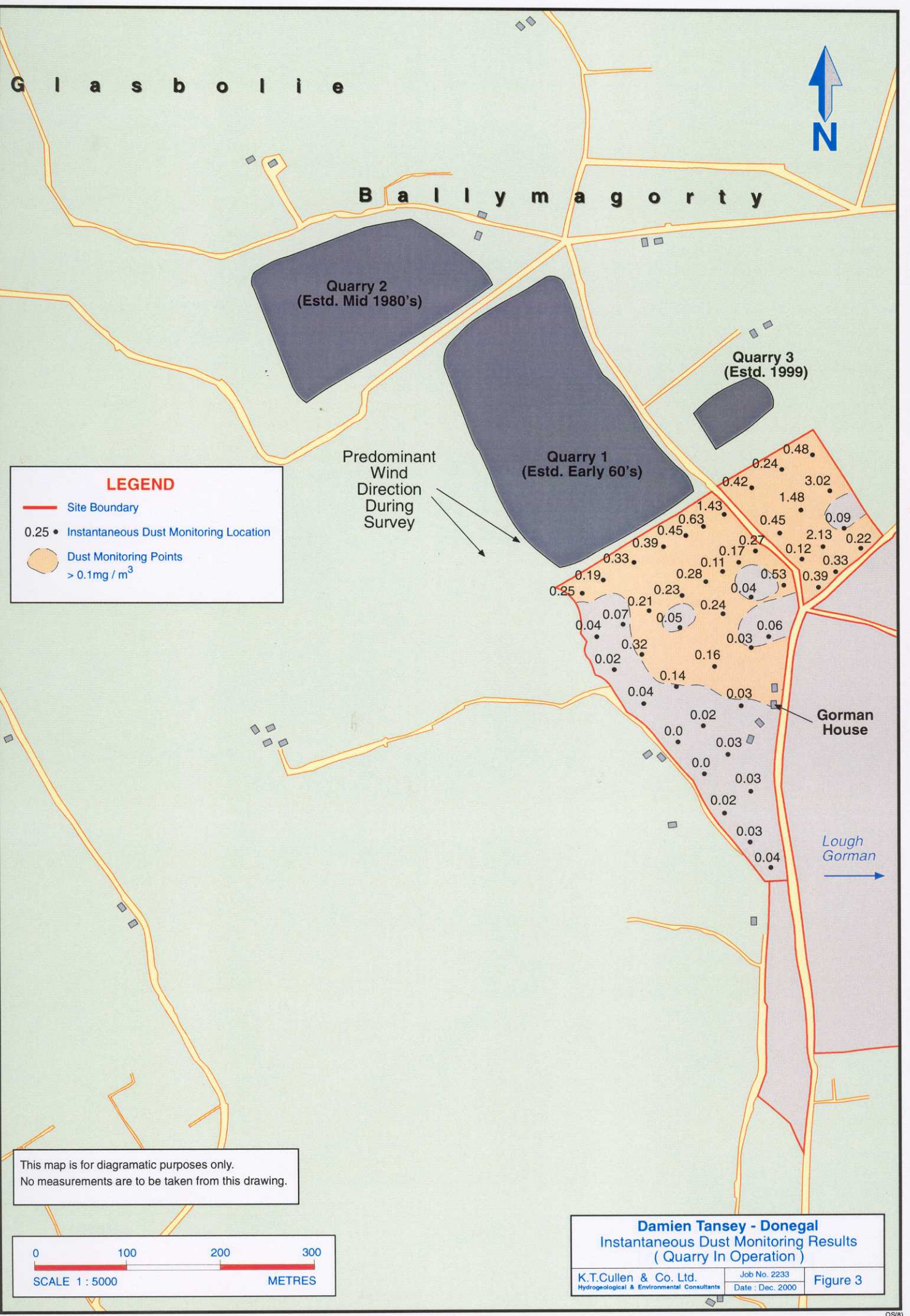
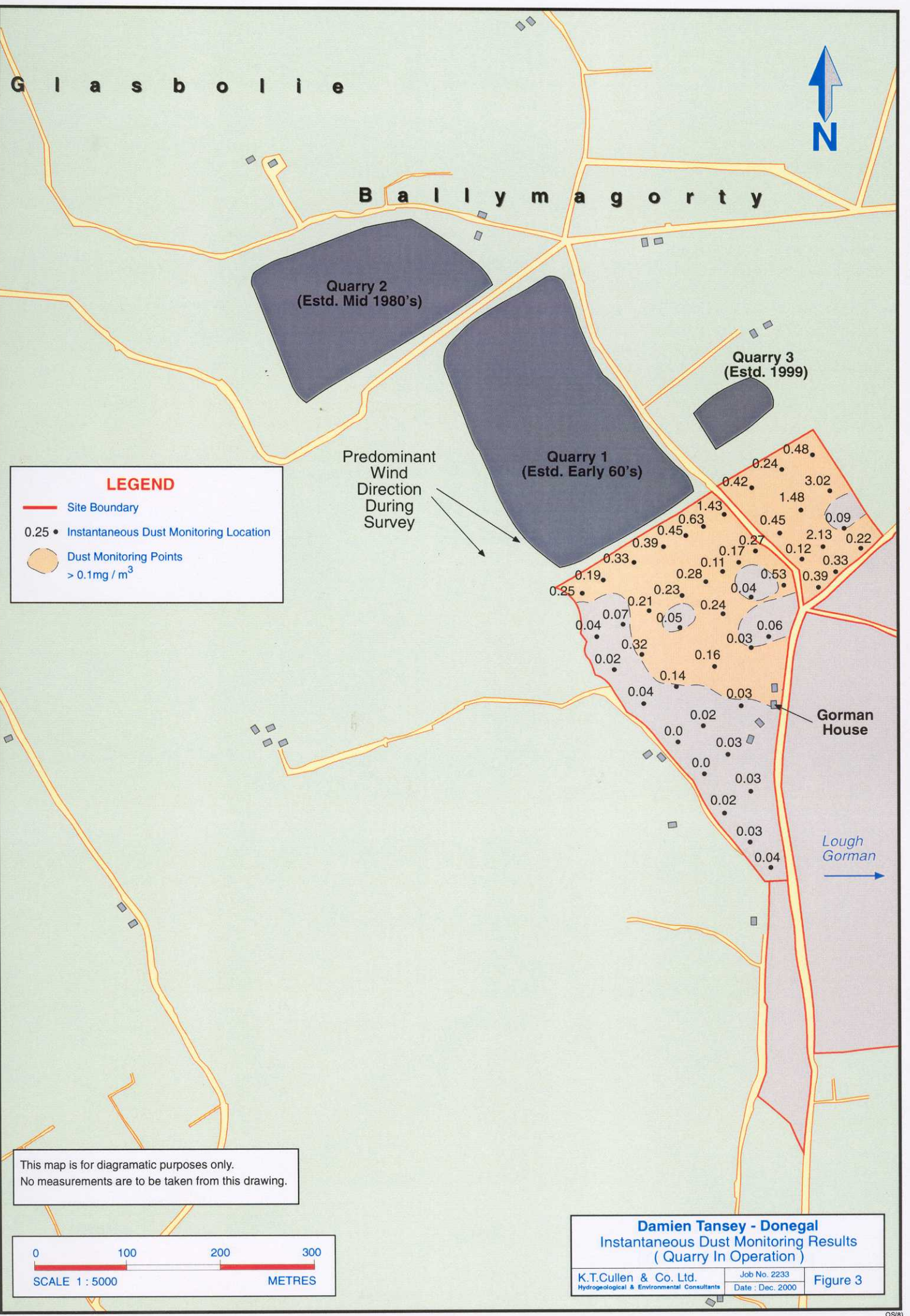
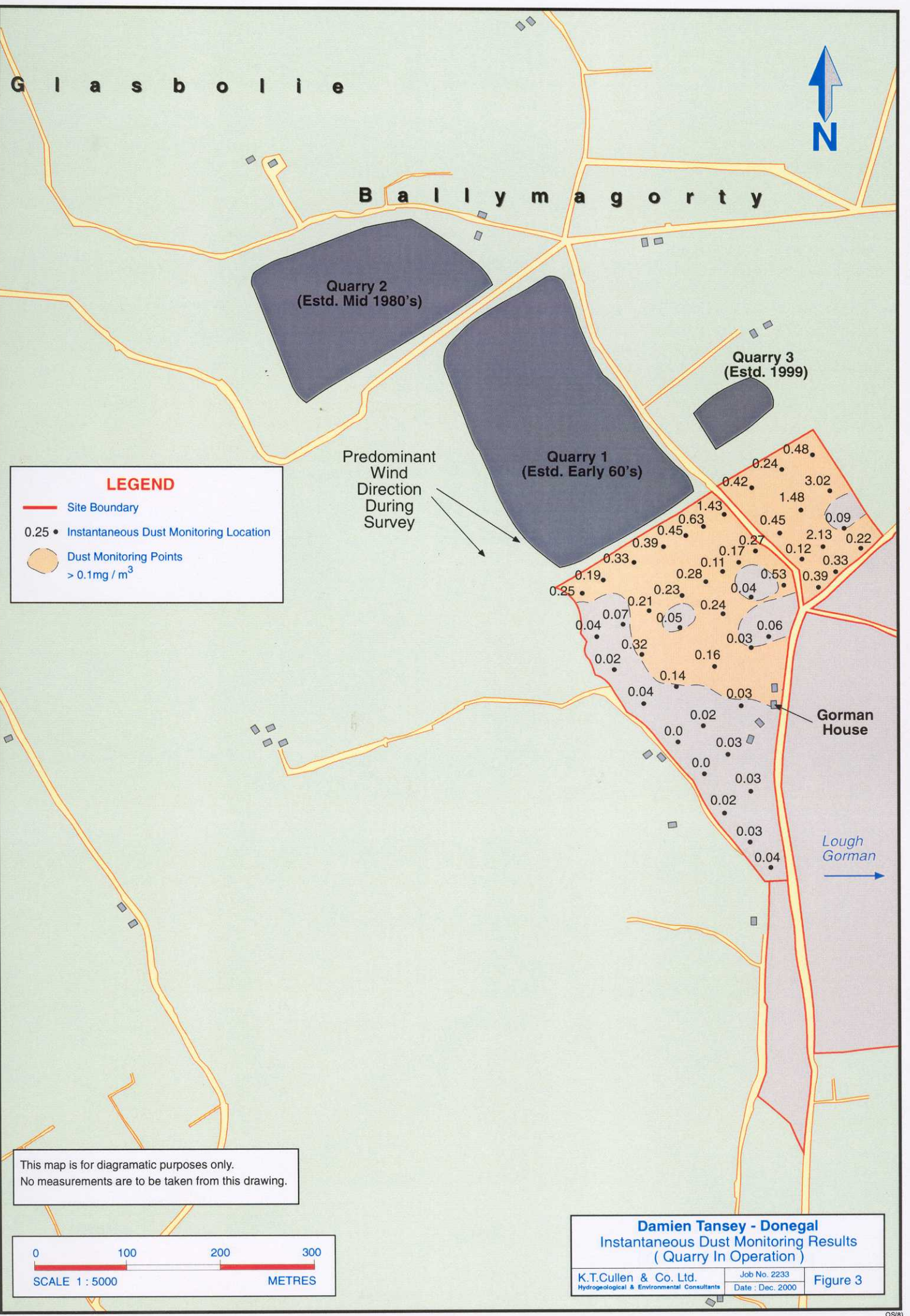
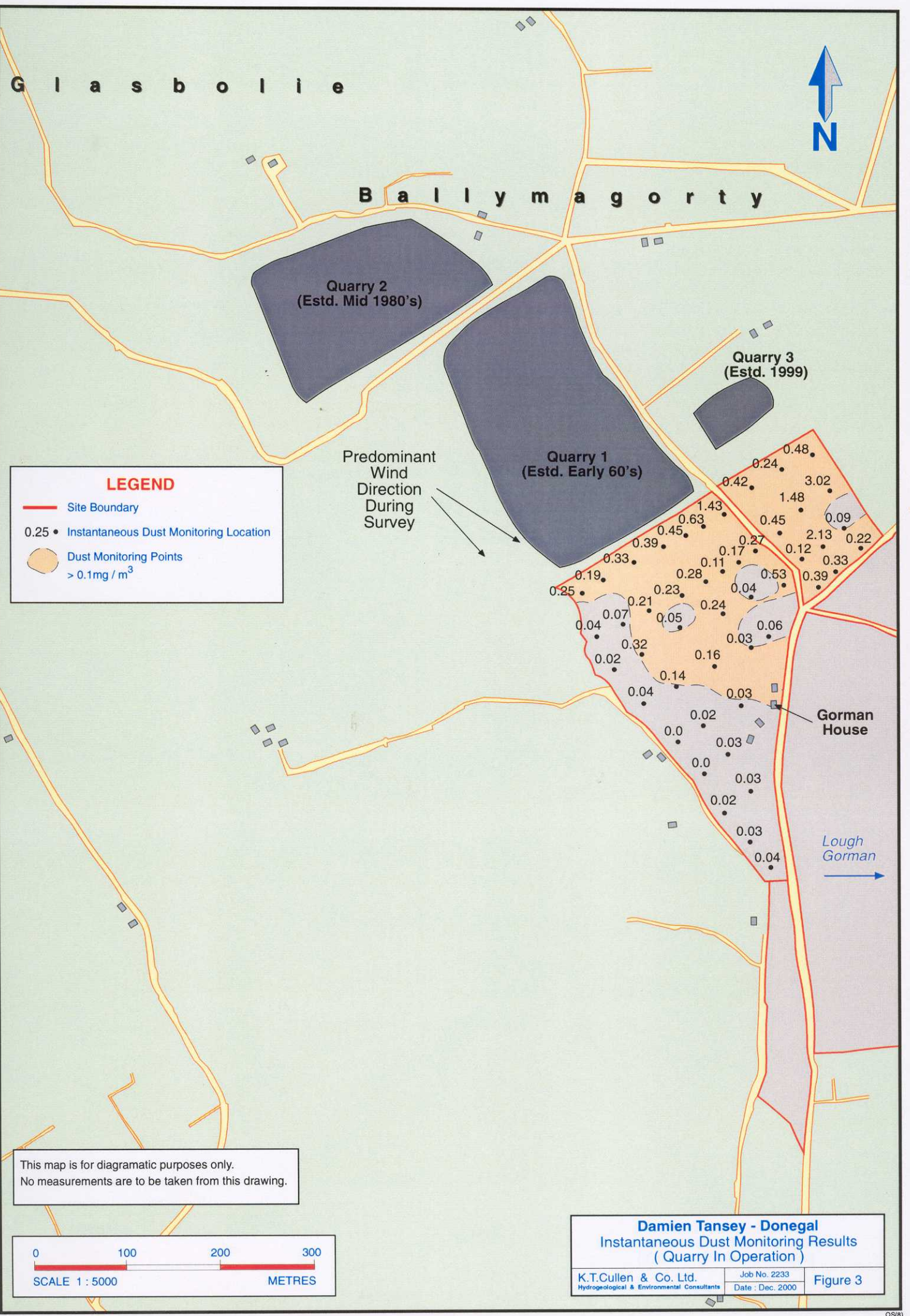
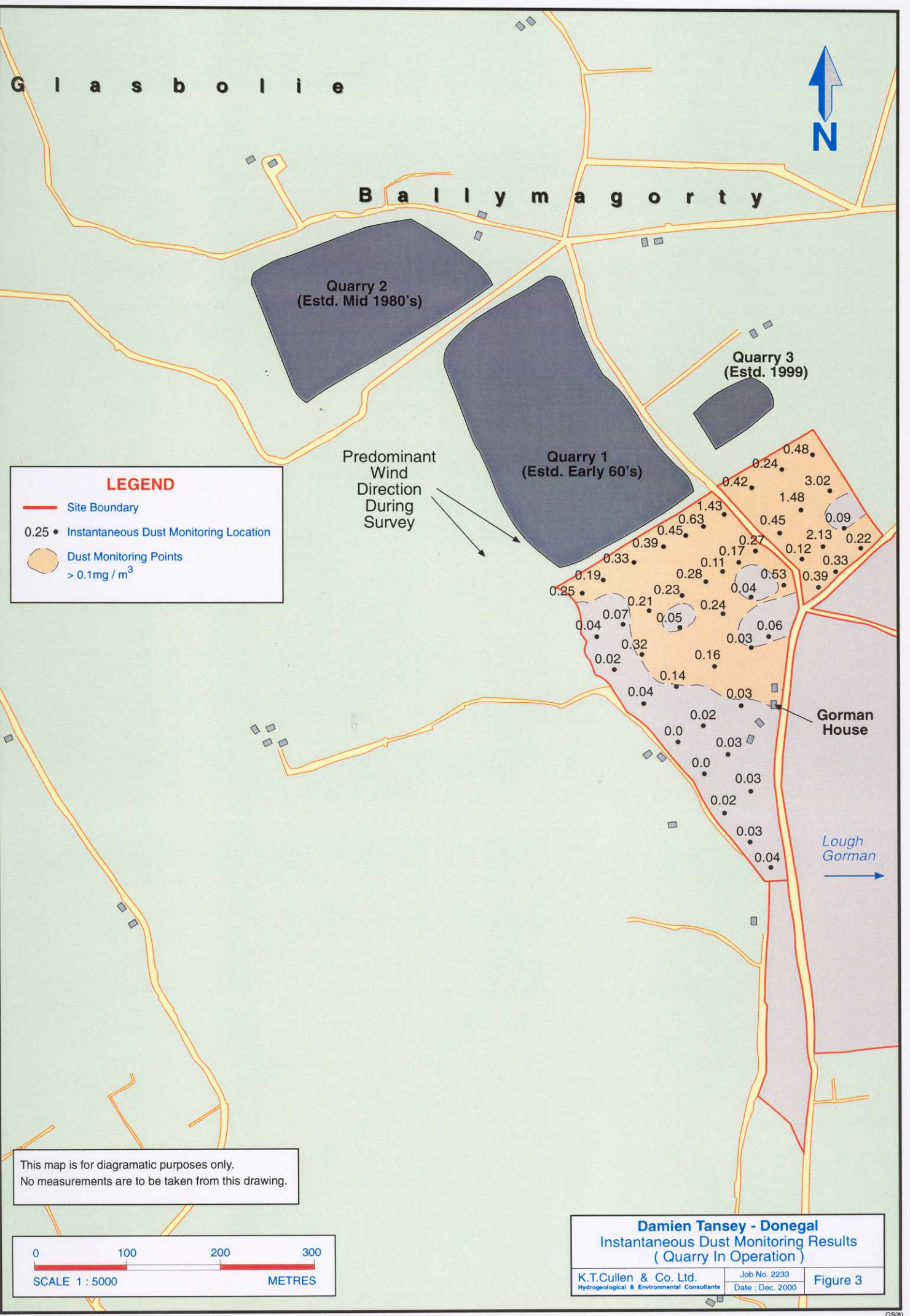
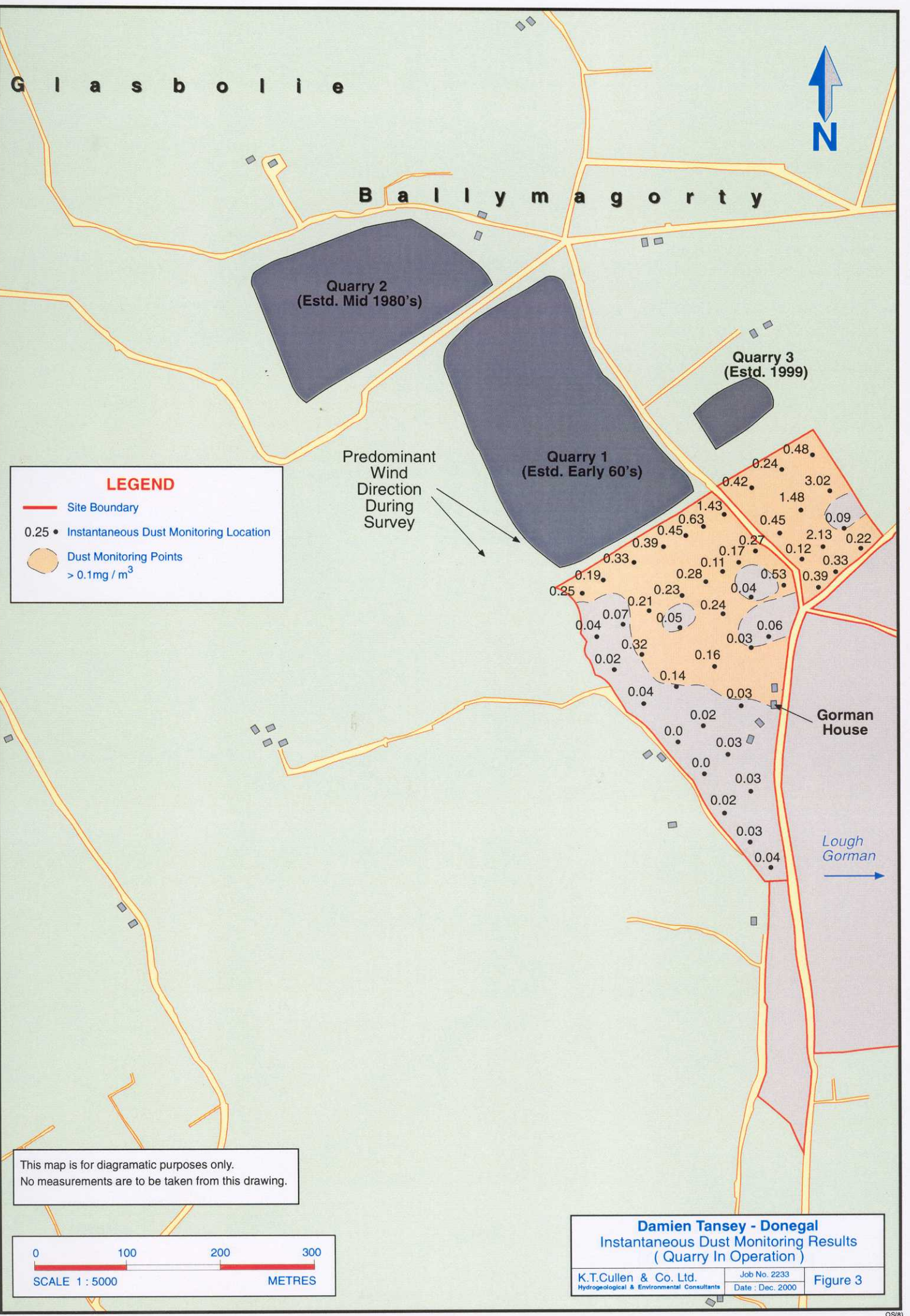
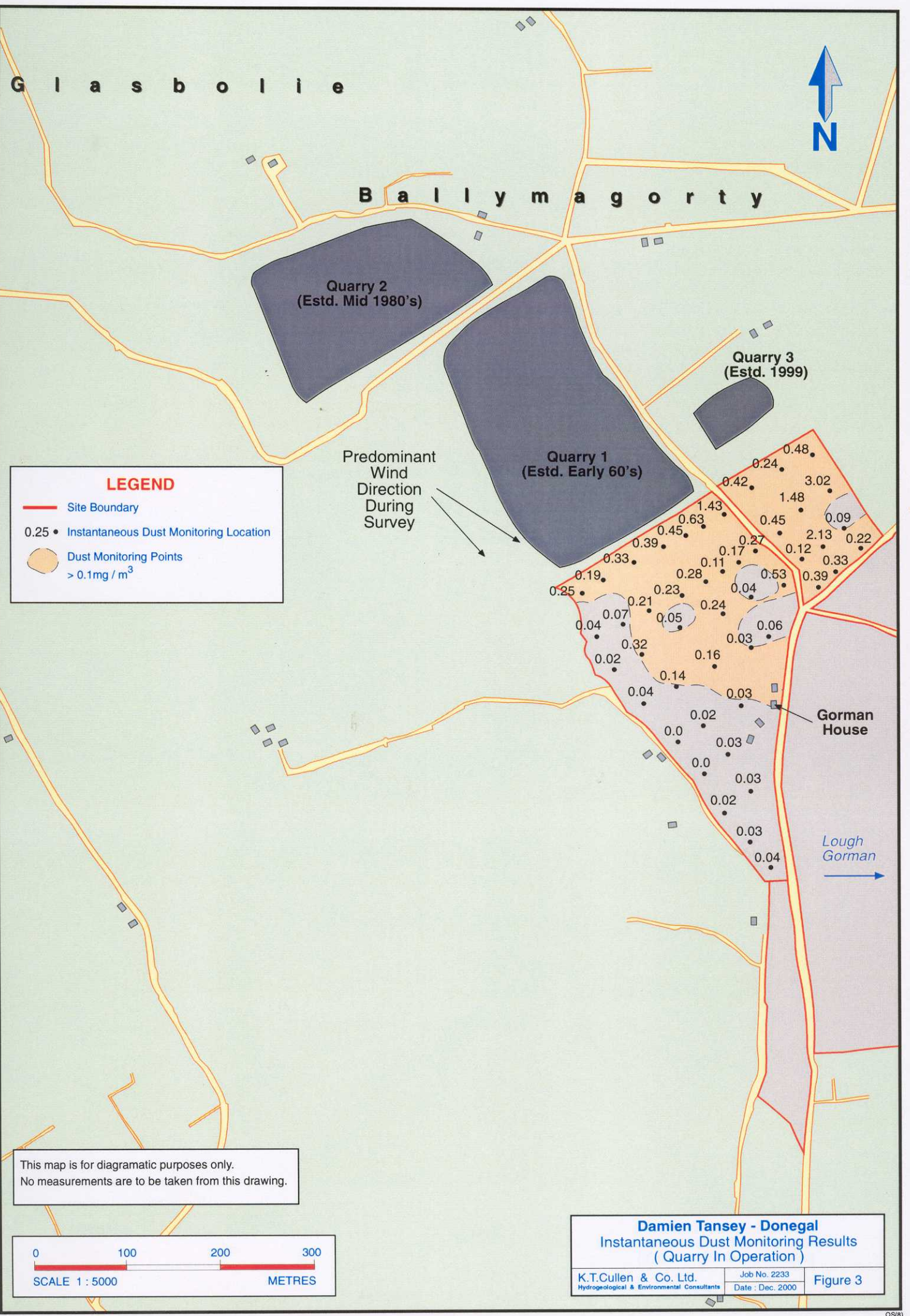
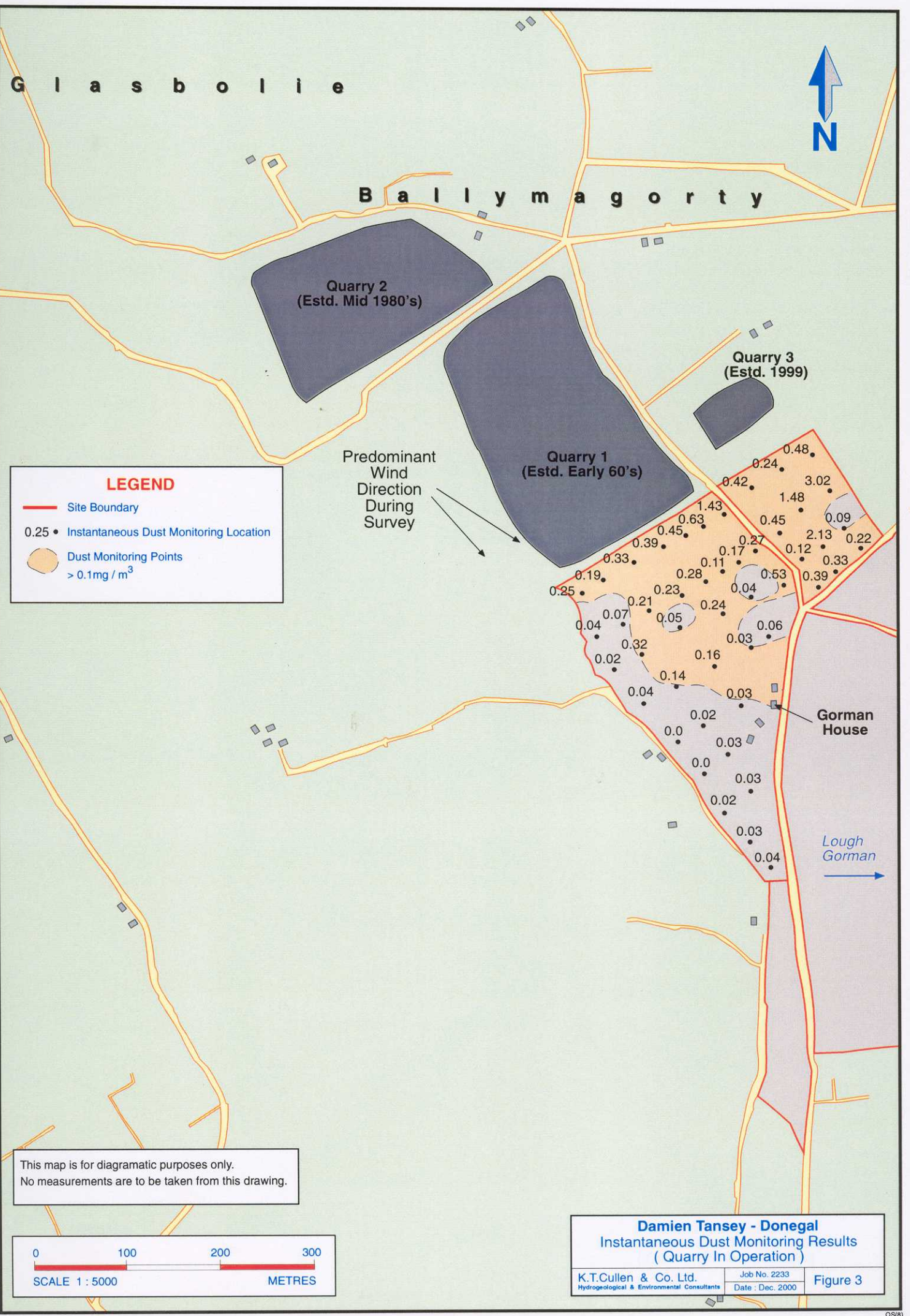
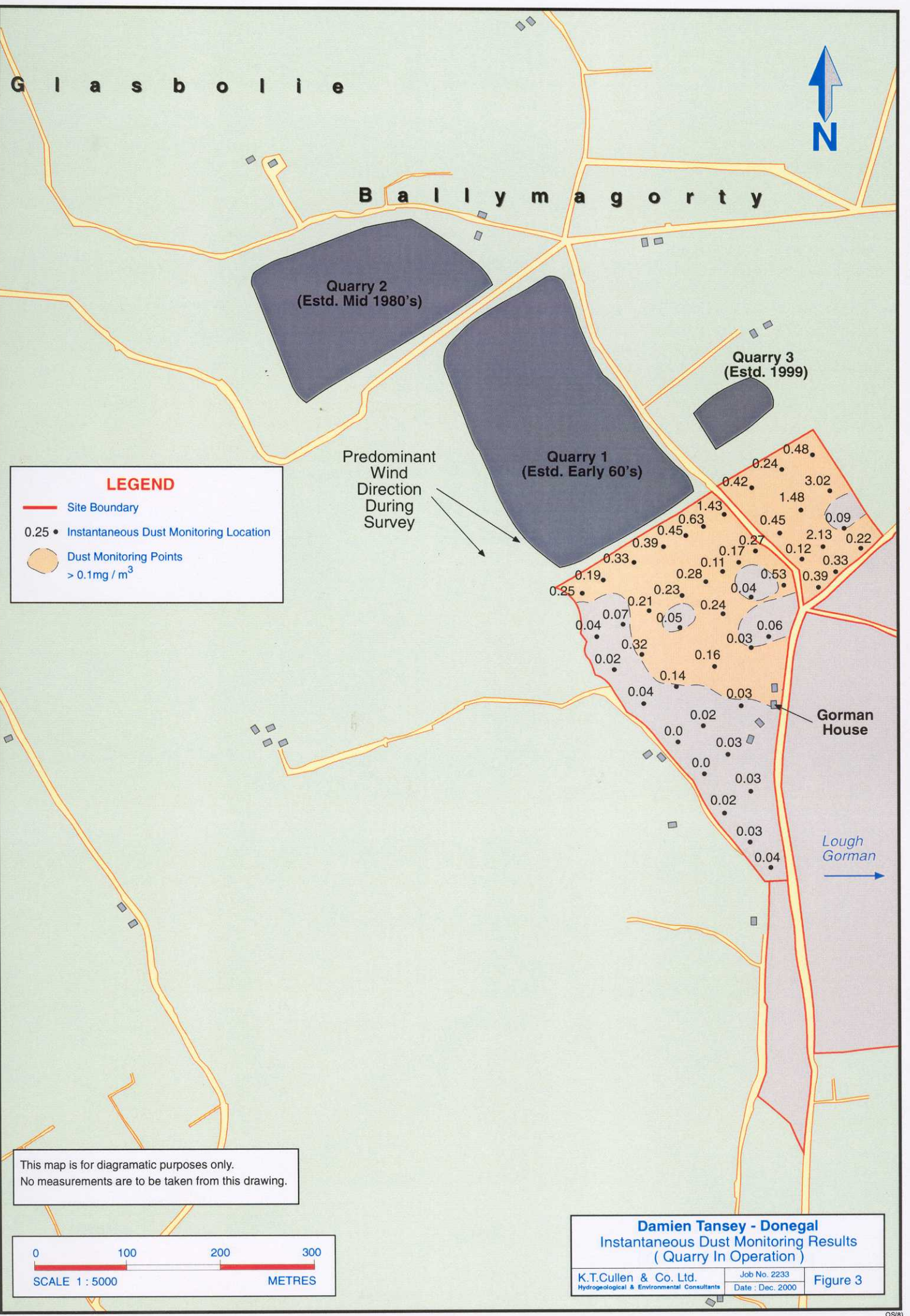
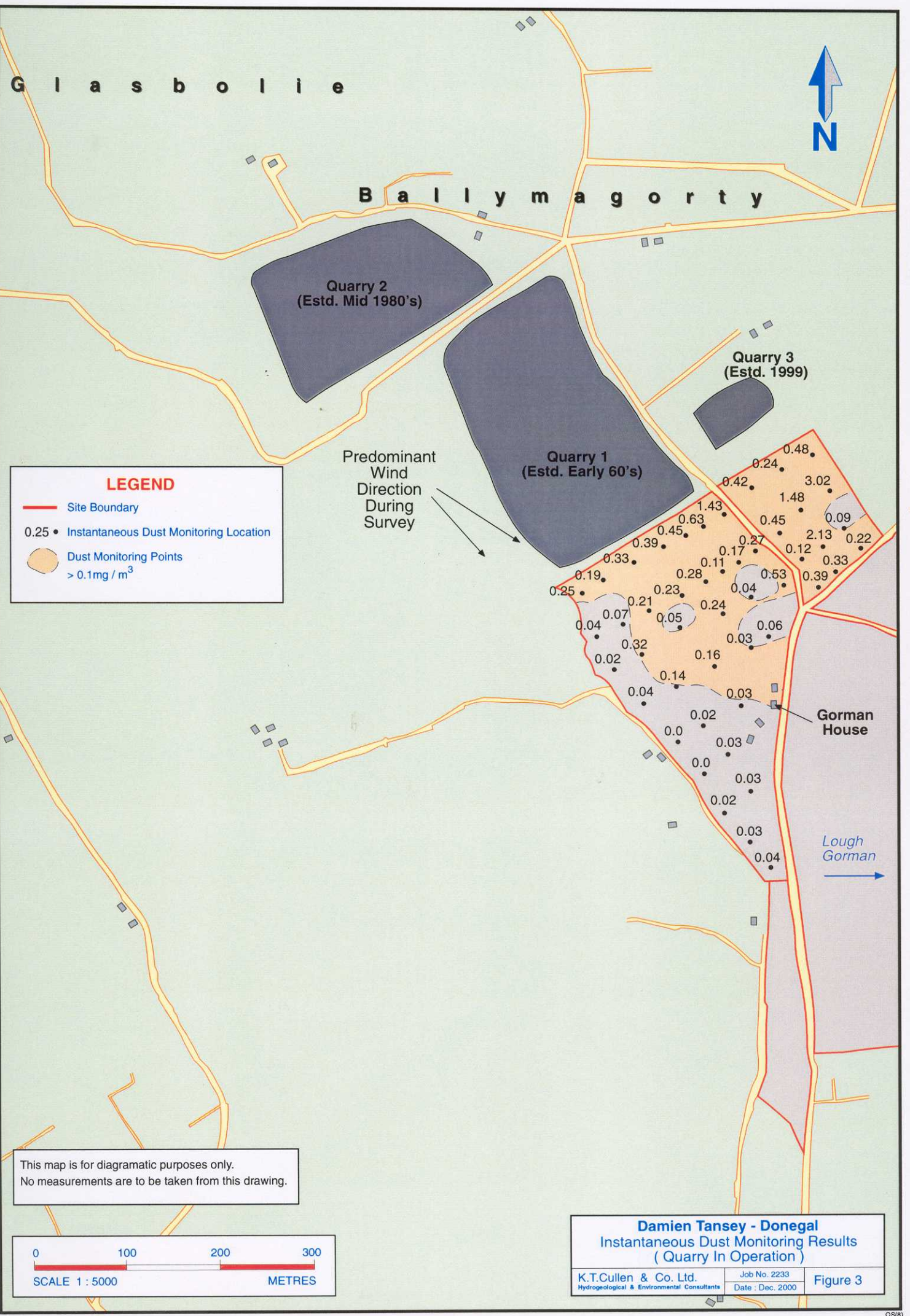
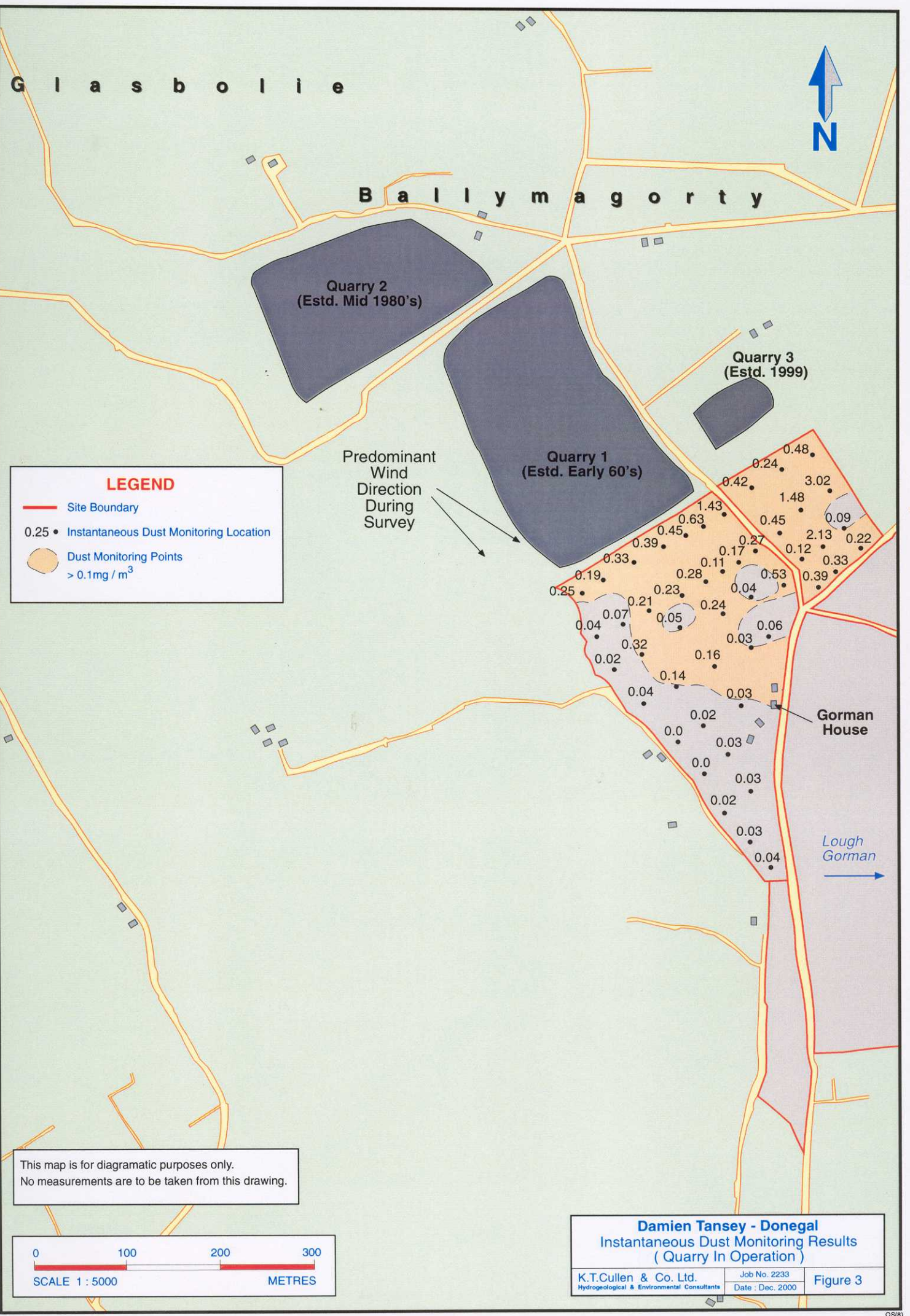
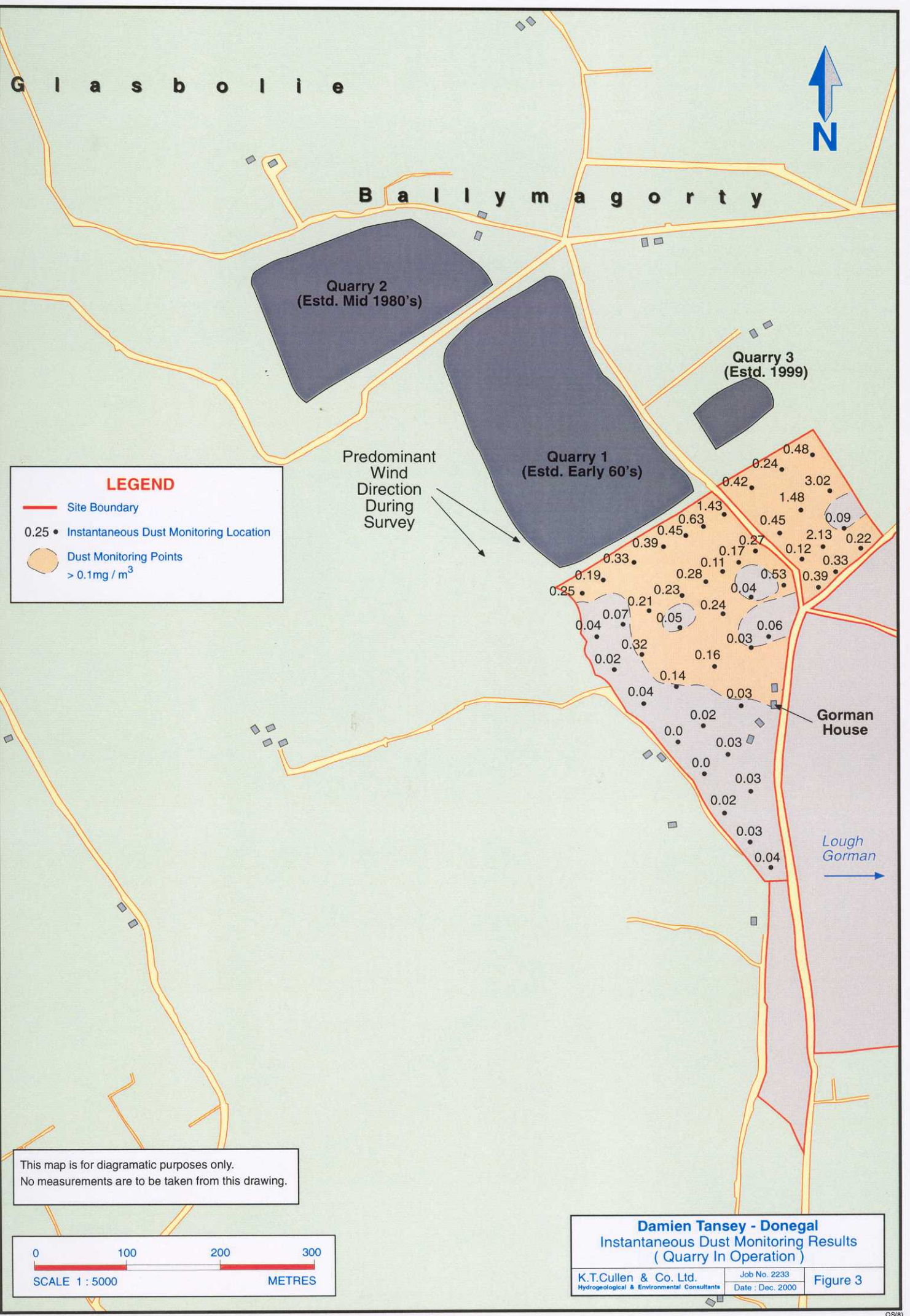
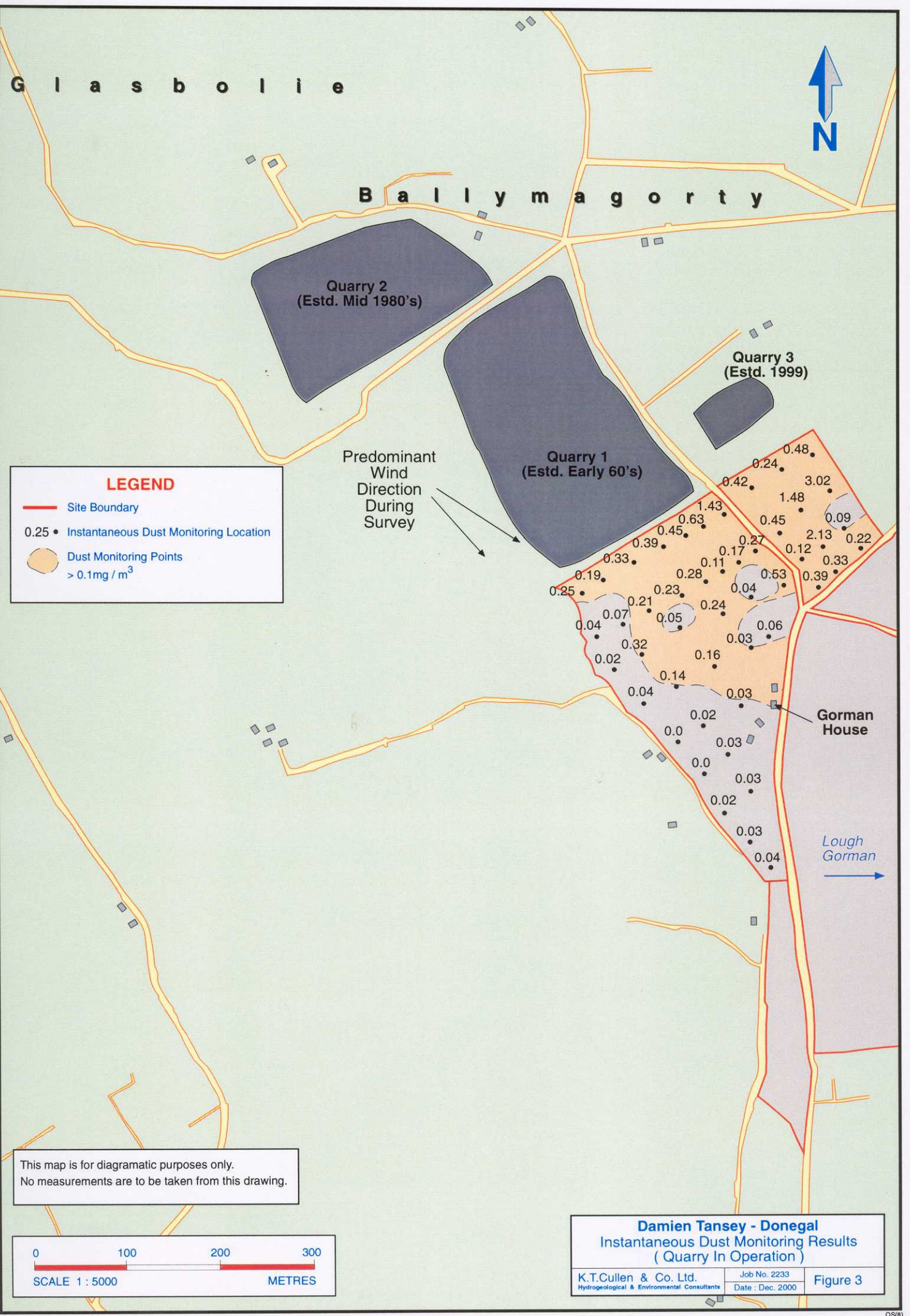
Damien Tansey - Donegal

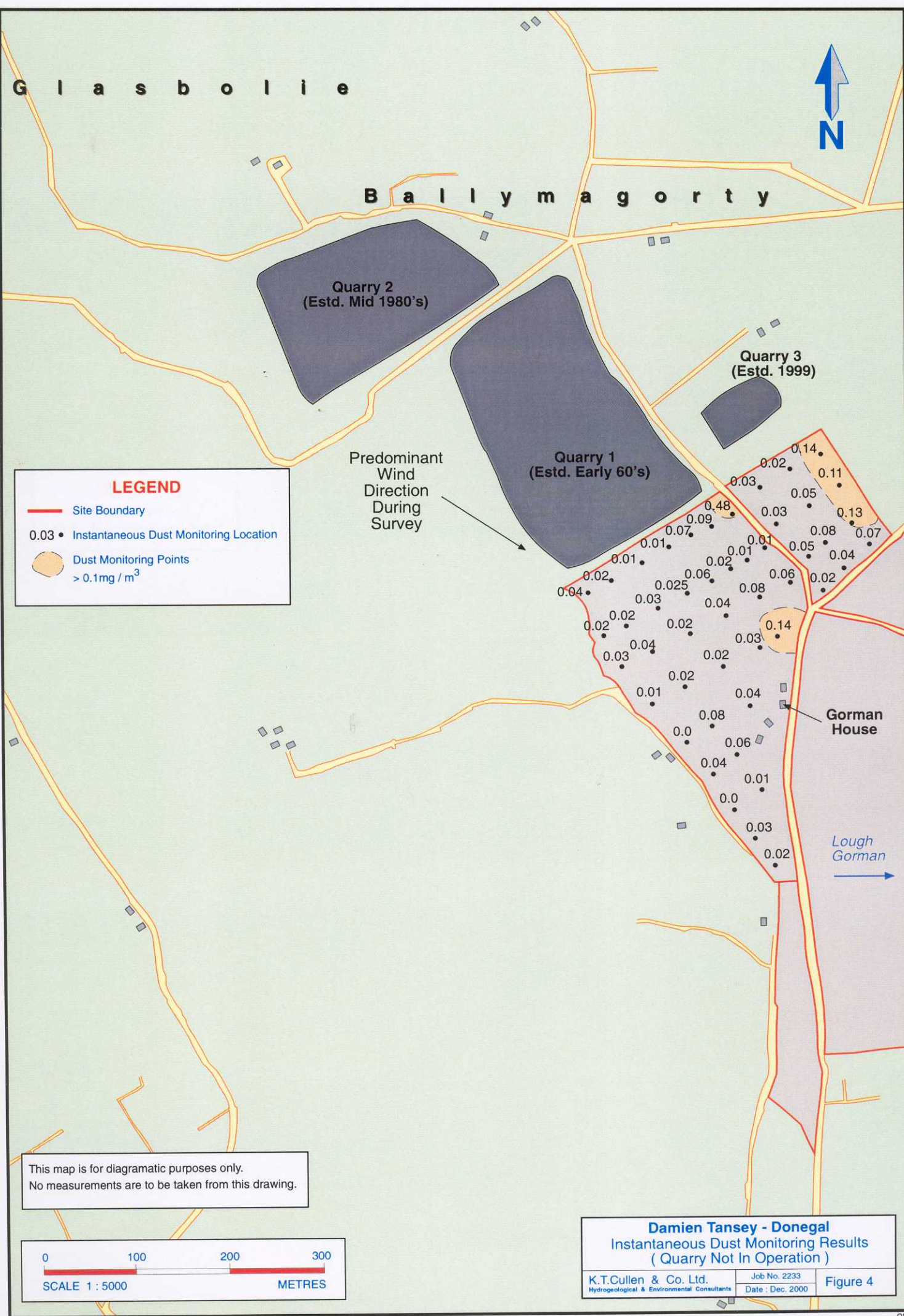
Site Map and Dust/Soil Monitoring Locations

K.T.Cullen & Co. Ltd.
Hydrogeological & Environmental Consultants

Job No. 2233
Date : August 2000

Figure 2





LEGEND

- Site Boundary
- 0.03 • Instantaneous Dust Monitoring Location
- Dust Monitoring Points
> 0.1mg / m³

This map is for diagrammatic purposes only.
No measurements are to be taken from this drawing.

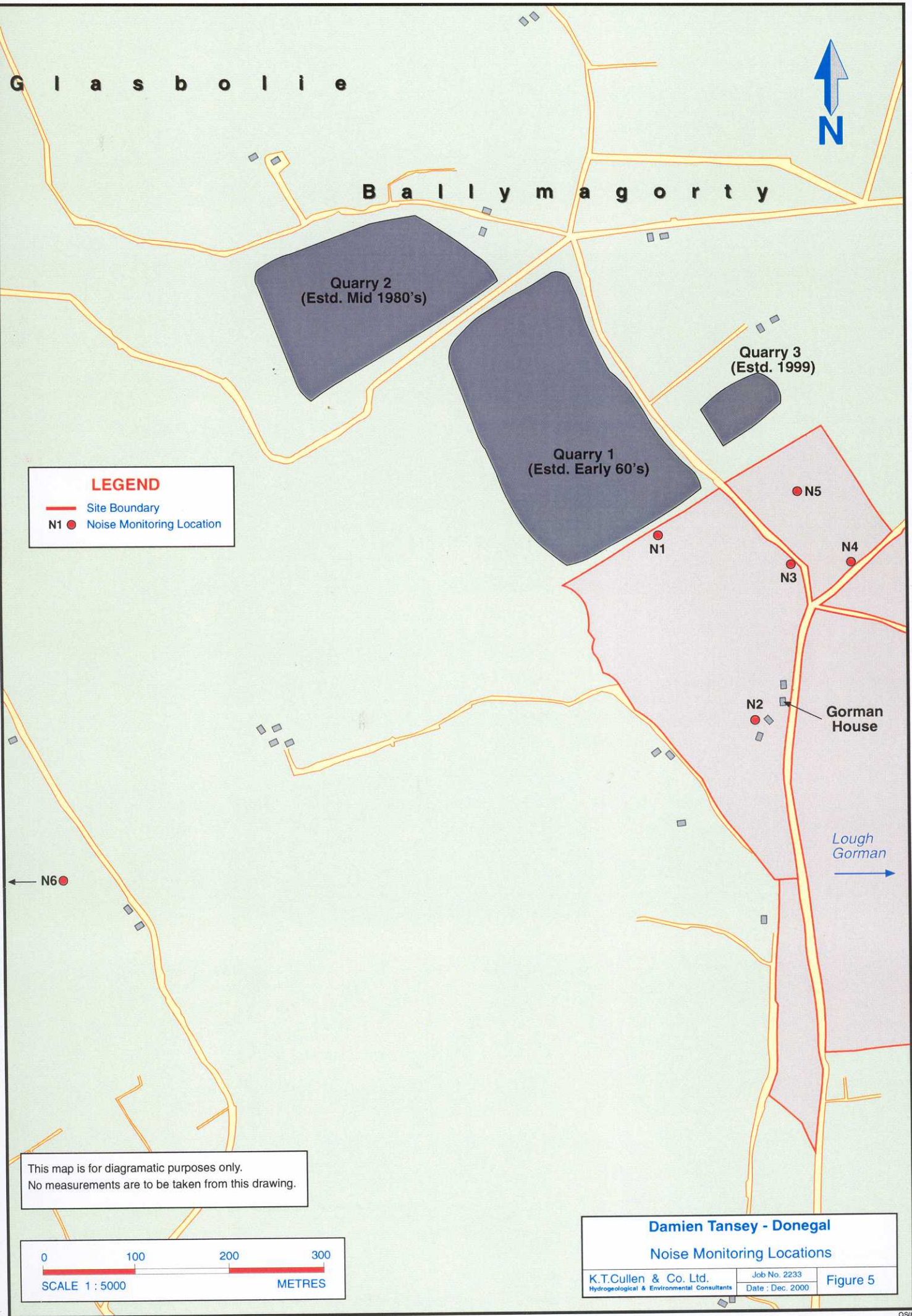
0 100 200 300
SCALE 1 : 5000 METRES

Damien Tansey - Donegal
Instantaneous Dust Monitoring Results
(Quarry Not In Operation)

K.T.Cullen & Co. Ltd.
Hydrogeological & Environmental Consultants

Job No. 2233
Date : Dec. 2000

Figure 4



LEGEND

- Site Boundary
- N1 ● Noise Monitoring Location

This map is for diagrammatic purposes only.
No measurements are to be taken from this drawing.

0 100 200 300
SCALE 1 : 5000 METRES

Damien Tansey - Donegal
Noise Monitoring Locations

K.T.Cullen & Co. Ltd.
Hydrogeological & Environmental Consultants

Job No. 2233
Date : Dec. 2000

Figure 5

TABLES

Table 1: Dust Concentrations Measured at Ballymagroarty, Ballintra over the period 28/4/2000 to 1/9/2000

	D1	D2	D3	D4	D5	D6	D7	D8
	mg/m ² /day	mg/m ² /day	mg/m ² /day	mg/m ² /day	mg/m ² /day	mg/m ² /day	mg/m ² /day	mg/m ² /day
28/4/00 - 18/7/00	137	150	1262	2190	282	1759	340	706
19/7/00 - 1/9/00	161	189	753	2221	235	1194	248	771

Legend

D1 - Dust Monitoring Location No. 1

mg/m²/day - milligrams per meter squared per day

Table 2 : Noise Measurements from Ballymagroarty, Ballintra, Co. Donegal on the 18th and 19th of July 2000.

Noise Measurement Location Ref. No	Location Description	Event Duration	Event L(A)eq (dB)	L(A) ₁₀	L(A) ₉₀	Comments/ Description
N 1 - Day	Site Boundary - Northern Field	15 min	56.8	67.3	65.1	Hopper/Conveyor audible from Quarry.
N 1 - Day	Site Boundary - Northern Field	5 min	75.1	76.6	68.1	Noise from Large hynos/trucks delivering and collecting stone.
N 1 - Evening	Site Boundary - Northern Field	30 min	38.7	40.5	32	Rock Crusher in Operation - Hopper/Conveyor audible from Quarry.
N 2 - Day	Beside Shed at House	5 min	54.3	56.4	48.9	Noise from Large hynos/trucks delivering and collecting stone.
N 2 - Day	Beside Shed at House	5 min	53.8	54.8	48.6	Slight Breeze. Traffic audible from N 15 and local loads
N 2 - Night	Beside Shed at House	5 min	49.3	52.9	30.6	Rock crusher in operation in background. Traffic Noise from road also audible.
N 3 - Day	Site Boundary - beside quarry access road	30 min	52.9	63.7	55.2	Rock crusher not in operation. Traffic Noise from road audible
N 4 - Day	Eastern Site Boundary	30 min	57.7	59.5	53.6	Quarry not in operation. Slight breeze. Traffic audible from N 15 road.
N 5 - Day	North eastern Site Boundary	30 min	59.4	72.7	53.5	Slight North westerly breeze. Quarry noise audible.
N 6 - Day	Background reading - 1 km away from site	30 min	49.6	51.1	44.7	Quarry noise audible. Traffic noise from N 15 audible.
						Quarry audible in background. Traffic noise from N 15 audible.
						Quarry not audible in background. Traffic noise from N 15 audible. Cattle in nearby field / wildlife.

Legend

dB = Decibel

L(A)eq = Equivalent Continuous A-Weighted Sound Pressure Level

L(A)₁₀ = Sound Pressure Level exceeded 10% of the time

L(A)₉₀ = Sound Pressure Level Exceeded 90 % of the time

* L(A)eq level is underlined where it exceeds the EPA daytime guideline value of 55 dB(A)

sec = Seconds

min = Minutes

Date of Sampling = 18th of July 2000

Day = 0730 - 1930

Night = 1930 - 0730

K. T. Cullen & Co. Ltd

Environmental and Hydrogeological Consultants

Job # 2233

Jul-00

Table 3 - Mineral Oil, DRO and GRO Soil Analytical Results - Gormans, Ballymagroarty, Ballintra, Co. Donegal

Date of Sample Collection Sample Depth	31/5/00 0-0.1m mg/kg	25/7/00 0-0.1m mg/kg
Mineral Oil	5'593	15'128
Diesel Range Organics	6'580	21'612
Gasoline Range Organics	-	227

S-Value mg/kg	I-Value mg/kg
50	5000
-	-
-	-

Legend:

mg/kg - micrograms per kilogram

Dutch MACs - Dutch Maximum Admissible Concentration guidelines

S-Value= Target Value

I-Value= Intervention Value

K.T. Cullen & Co. Ltd

Job No. 2233

Table 4 PAH Soil Analytical Results - Gormans, Ballymagroarty, Ballintra, Co. Donegal

Date of Sample Collection		31/5/00	25/7/00
Sample Depth		0-0.1m mg/kg	0-0.1m mg/kg
Acenaphthene		<0.001	<0.001
Acenaphthylene		0.141	0.121
*Anthracene		<0.001	0.561
*Benz(a)anthracene		<0.001	<0.001
*Benzo(a)pyrene		<0.001	<0.001
Benzo(b)fluoranthene		<0.001	<0.001
*Benzo(g,h,i)perylene		<0.001	<0.001
*Benzo(k)fluoranthene		<0.001	<0.001
*Chrysene		<0.001	<0.001
Dibenz(a,h)Anthracene		<0.001	<0.001
*Fluoranthene		<0.001	<0.001
Fluorene		<0.001	<0.001
*Indeno(123cd)Pyrene		<0.001	<0.001
*Naphthalene		0.177	0.504
*Phenanthrene		<0.001	0.8
Pyrene		1.51	0.929
Sum of 16 PAHs		1.828	2.915
Sum of 10 PAHs		0.177	1.865

Dutch MACs	
S-Value mg/kg	I-Value mg/kg
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
1	4.0

Legend:
mg/kg - milligrams per kilogram (parts per million),
Dutch MACs - Dutch Maximum Admissible Concentration guidelines
S-Value= Target Value
I-Value= Intervention Value

PHOTOGRAPHS



Quarry No. 1.



Quarry No. 2.

Damien Tansey
Photos 1 & 2

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Hydrogeological & Environmental Consultants

Job No. 2233
Date :Dec. 2000

Figure



Quarry No. 3.



Quarry No. 3. (Partly backfilled with scrap metal/drums).

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Photos 3 & 4

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Hydrogeological & Environmental Consultants

Job No. 2233
Date :Dec. 2000

Figure



Dust emissions from quarry operations.



Dust emissions from quarry access road.

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Photos 5 & 6

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Date :Dec. 2000

Figure



Dust deposition on Gorman car.



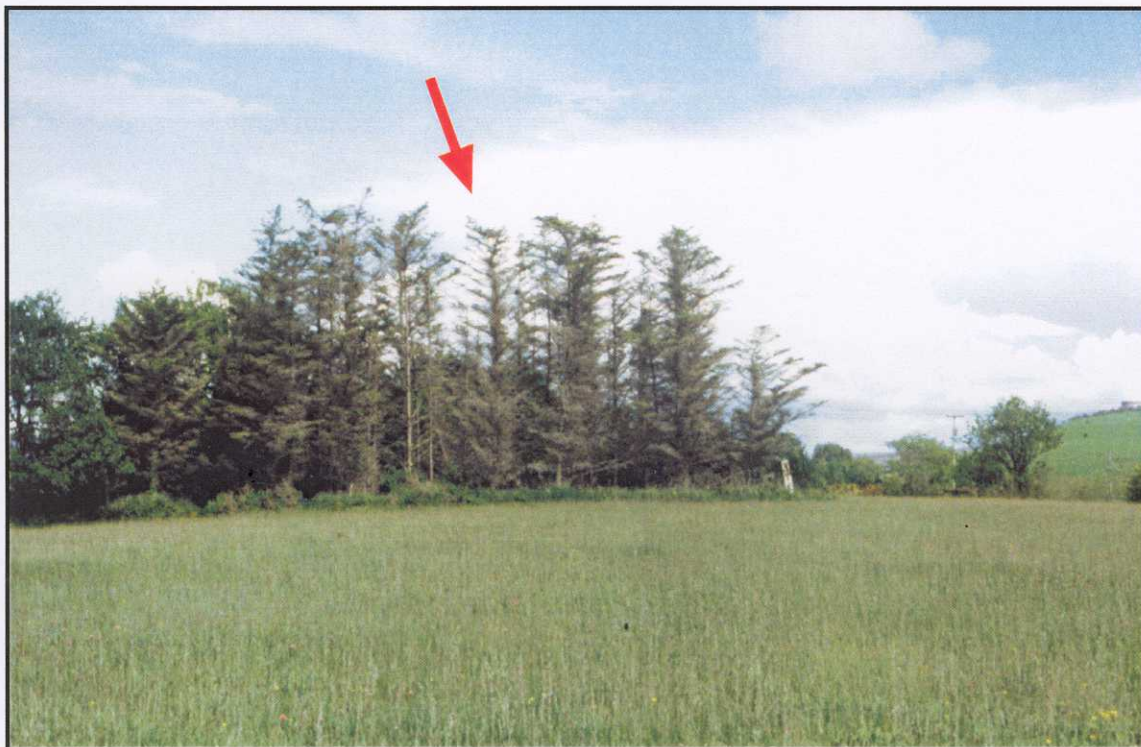
Dust deposition on vegetation.

Damien Tansey
Photos 7 & 8

K.T.Cullen & Co. Ltd.
Hydrogeological & Environmental Consultants

Job No. 2233
Date :Dec. 2000

Figure



Dust deposition on vegetation.



No mitigation measures for visual impact / dust emissions.

Damien Tansey Photos 9 & 10		
K.T.Cullen & Co. Ltd. Hydrogeological & Environmental Consultants	Job No. 2233 Date Dec. 2000	Figure



No mitigation measures for visual impact / dust emissions.



Air discharges from asphalt plants.

Damien Tansey Photos 11 & 12		
K.T.Cullen & Co. Ltd. Hydrogeological & Environmental Consultants	Job No. 2233 Date :Dec. 2000	Figure



Air discharges from asphalt plants.



Air discharges from asphalt plants.



On site waste disposal.



Waste disposal area adjoining the Gorman land.

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Photos 15 & 16

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Figure



Waste disposal area adjoining the Gorman land.



View from the N15 road showing visual impact and waste disposal area

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Photos 17 & 18

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Date: Dec. 2000

Figure



Bitumen residues that have flowed into the Gorman land.



Bitumen residues that have flowed into the Gorman land.



Stained soakway area from Mc Caffreys surface run-off.



Surface run-off from Mc Caffreys.

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Photos 21 & 22

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Figure



Lough Gorman located downgradient from quarry.



Public road running between unprotected cliff faces to quarries No. 1 and No. 2.

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Photos 23 & 24

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Figure



Unprotected cliff face to quarry No. 1 including tailings pond.



Damaged boundary wall between quarry and Gormans land.

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Photos 25 & 26

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Date :Dec. 2000

Figure



Boundary wall with quarry, removed without permission.



Level of access road almost equal with height of Gorman stone wall.

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Photos 27 & 28

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Figure



Unbunded storage tanks.

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Photo 29

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Figure