JERSEY TTSD

GREEN WASTE COMPOSTING

STAGE 2 SITES ASSESSMENT REPORT

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MANAGEMENT SUMMARY

The States of Jersey intends to replace the existing windrow composting facility that is processing green waste with one or more facilities using enclosed composting technology to minimise emissions of odour and bio-aerosols to the environment. It is also necessary to re-locate the existing green waste reception and shredding facility at La Collette since the site is required for development of the EfW (energy from waste) project. The domestic green waste reception needs to be relocated away from La Collette due to the potential risk of a vapour cloud explosion from the fuel storage depot close by. Due to the time scales for the EfW project, it may be necessary to relocate these existing facilities to temporary sites before permanent sites can be found and developed. This evaluation process has been carried out for the location of permanent rather than temporary facilities.

A number of state owned and privately owned sites were put forward as potential sites for composting and/or reception of green waste. A stage 1 screening exercise has already been carried out to eliminate sites that are highly unlikely to be suitable. A total of 11 potential sites were carried forward for further assessment.

Stage 2A assessment involved screening out of unsuitable sites for long-term use on the basis of noise nuisance. Sites P4 (Field 506A, Grouville), P18 (Field 1122, St Helier) and S2 (Field 1491, St Helier) were eliminated at this stage for being too close to sensitive noise receptors.

Following stage 2A screening, it is understood that site P1 (Field 1364, Trinity) has changed ownership and is no longer available.

Stage 2B assessment involved scoring of each site for the purposes of accommodating each type of facility (domestic green waste reception only, commercial green waste reception only and in-vessel composting only). Sites were rated quantatively based on a series of criteria explained within this report. A positive number would mean that the site is a good one, and a high negative number would mean that the site is less suitable. As waste treatment sites are generally considered to be unattractive neighbours, a realistic expectation for a suitable site is likely to be a low negative score.The results of stage 2B scoring are given in the following table.

Site	P10	P11	P12	S1	S4	S5	S6	S11
	Fields 1061A, 1061, 1062, St John	Field 188, St Lawrence	Fields 712, 713, 715, St Peter	Field 298, St Peter	Field 827, Trinity	La Collette Industrial Zone, St Helier	La Collette Leisure Zone, ST Helier	Fields 1277, 1278, 1276, 1274, St Helier
Commercial Reception	-18.0	-29.0	-28.5	-6.5	-13.5	**-1.5**	-12.5	-7.0
Domestic Reception	-18.0	-30.5	-30.5	**-6.5**	**-13.5**	N/A	N/A	**-7.0**
IVC	N/A	-36.0	-41.0	N/A	-24.5	**0.0**	-8.0	N/A

Based on these scores, it is recommended that site S5 should accommodate the commercial reception and in-vessel composting facilities. Further assessment would not reveal a better site than S5.

Further stage 3 assessment is required to determine whether site S1, S4 or S11 should accommodate the domestic green waste reception facility. None of these sites are ideal sites for domestic green waste reception due to their location within the Countryside zone and proximity to residential properties.

It is therefore recommended that Site 12 (a site in Bellozanne currently used for reception and storage of commercial bulky waste) is also assessed in stage 3 as a potential domestic green waste reception site. Site S12 was not on the original list of potential sites assessed in stage 1 as it is not available until completion of the EfW project. If the fact that site S12 is not immediately available is ignored, then it would have scored +1 in stage 2B for domestic reception which is higher than for any other site, and the only positive score in the assessment. A temporary site (based on a modified version of site S2) has been proposed by TTS until a permanent site is available for domestic reception.

Part of this study has been to check whether allowing smaller sites for receiving or processing only part of the Island's green waste would introduce additional superior sites. No single privately owned site scored higher than the best performing single States owned sites. The best States owned sites are large enough to deal with the whole waste flow. The Stage 1 assessment established that the area required for composting and maturation accounts for only a small proportion of the total site area, with much of the space required for vehicle reception and manoeuvring. This indicates that there will be economic disbenefits to multiple sites through the requirement for additional access roads, reception areas and storage areas compared to a single site operation.

None of the private sites considered had existing infrastructure that would have any significant benefit when assessed as a multiple site. Therefore there is no benefit in further consideration of multiple sites as these could not score higher than the best scoring States-owned single sites.

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1 INTRODUCTION

1.1 Background

The States of Jersey intends to replace the existing windrow composting facility that is processing green waste with one or more facilities using enclosed composting technology to minimise emissions of odour and bio-aerosols to the environment. It is also necessary to re-locate the existing green waste reception and shredding facility at La Collette since the site is required for development of the EfW (energy from waste) project. The existing domestic green waste reception needs to be relocated away from La Collette due to the potential risk of a vapour cloud explosion from the fuel storage depot close by. Due to the time scales for the EfW project, it may be necessary to relocate these existing facilities to temporary sites before permanent sites can be found and developed. However, this evaluation process has been carried out for the location of permanent rather than temporary facilities.

A large number of state owned and privately owned sites were put forward as potential sites for composting and/or reception of green waste. A Stage 1 screening exercise has already been carried out to eliminate sites that are highly unlikely to be suitable. A total of 11 potential sites remain.

This report details the work to assess the remaining sites to produce a preferred solution containing one or more sites.

1.2 Objectives

The objectives of stages 2 and 3 of the sites assessment process are:

1) Stage 2A - to screen out sites that are unlikely to be suitable on the basis of nuisance to neighbours,
2) Stage 2B – to assess each remaining site against a basic list of criteria without the need for extensive surveys, in depth searches or detailed modelling. Sites that are unlikely to be suitable will be eliminated,
3) Stage 3 – to assess different solutions which may contain one or more sites using an extended list of criteria to give a preferred solution and the associated sites. This would consider financial and legal implications including the value of the properties involved.

2 STAGE 2A - SCREENING ON BASIS OF NOISE NUISANCE

2.1 Methodology

The nuisance factors normally associated with waste management facilities are noise, odour, dust, light and litter. The degree of nuisance that a sensitive receptor will experience depends on many factors. One key factor is that increased separation distance between the source and receptor will generally reduce the degree of nuisance experienced by the receptor for all types of nuisance.

Noise has been used as a critical indicator for nuisance on which to screen out sites that are unlikely to be suitable. Noise nuisance is relatively simple to estimate numerically, and where noise is considered to be a key problem, it is likely that other issues will also be problematic, such as litter, dust or odour. A specialist noise consultant was commissioned to assess the minimum recommended separation distance between the proposed types of facilities and residential receptors. The assessment was carried out using generic published information and the consultant's experience to determine the minimum separation distance below which noise nuisance is unlikely to be acceptable even with a reasonable degree of mitigation on site and/or off-site. The noise consultant's report is given in Appendix D.

The aim of this screening exercise is to eliminate sites that are unlikely to be suitable rather than demonstrate that sites that remain will definitely be acceptable from a nuisance perspective. For planning purposes, it will still be necessary to confirm that the chosen site(s) are acceptable from a nuisance perspective.

Comments for nuisance factors which have not been explicitly assessed follow:

1) Litter nuisance. Litter can be effectively controlled by good house keeping procedures and should not be an important factor for site selection.
2) Light nuisance. Reception facilities and most of the composting activities will only take place during the day so the requirement for lighting is not high. Light nuisance and pollution can also be minimised through good design. Light nuisance should not be an important factor for site selection.
3) Dust and odour nuisance. Dust and odour can be minimised by good design and effective operational procedures. For example:
    a) Dust emissions can be controlled by damping of dust generating sources.
    b) Dust and odour emissions is minimised by having all composting processing facilities indoors. Process buildings will be kept under a slight negative pressure and ventilation air is either used in the process or cleaned prior to discharge to atmosphere. If necessary the cleaned air can also be discharged from a higher point to aid rapid dispersion in the atmosphere. Odour from reception sites will be minimised by not accepting black bag or food waste and not storing green waste overnight.

    Whilst dust and odour are potentially important factors, the separation distance between the source and receptors will help to minimise the risk of nuisance. Dust and odour (particularly odour) concentrations at sensitive receptors depend on many factors (e.g. terrain, weather, degree of on site abatement and presence of nearby structures) that are site and technology specific. Detailed site specific assessment/modelling on each site is not practical at this stage. If required, then odour/dust assessment/modelling could be carried out to differentiate between two or three sites that have similar overall scores from other assessment criteria. In any event, it will be necessary to confirm that the final chosen site(s) are acceptable from a dust and odour nuisance perspective.

2.2 Results

The following table, an extract from the noise consultant's report, provides the minimum recommended separation distance between a facility and residential receptors. If the minimum separation distance cannot be achieved for a particular site then that site should be rejected. The consultant's noise report was based on UK categories of locations. Fichtner and TTSD have interpreted these location categories in the Jersey context as follows:

- Rural locations are those within the Green Zone
- Semi-rural locations are those within the Countryside Zone
- Industrial locations are those within the Industrial Zone

Site S6 is in a Leisure Zone and therefore does not fit into any of the above categories. However, Site S6 is large and there is sufficient space within the site that is far from residential receptors so categorisation of the site for the purposes of noise is not material to the site selection process.

Type of Site	Green Zone	Countryside Zone	Industrial Zone
IVC	50m	40m	40m
Single reception	50m	40m	30m
Multiple/combined facility	50m	50m	50m

For the purposes of this evaluation, the following assumptions have been made:

1) Single reception means sites that receive only domestic green waste or commercial green waste.
2) Multiple/combined facility means
   a) IVC + reception, or
   b) Domestic and commercial green waste reception, or
   c) Green waste + recyclables reception
3) Screening is carried out using residential receptors only and not commercial and industrial receptors. It is accepted practice to apply tighter noise constraints for facilities adjacent to residential properties than industrial buildings or commercial offices.
4) The following table shows the zoning of the potential sites and whether the sites passed or failed the noise screening exercise.

Site No.	Site Location	Zone	Pass/Reject
P1	Field 1364, Trinity	Countryside	Pass
P4	Field 506A, Grouville	Countryside	Reject
P10	Field 1061A, 1061, 1062, St John	Countryside	Pass
P11	Field 188, St Lawrence	Countryside	Pass
P12	Fields 712, 713, 715, St Peter	Countryside	Pass
P18	Field 1122, St Helier	Countryside	Reject

Site No.	Site Location	Zone	Pass/Reject
S1	Field 298, St Peter	Industrial	Pass
S2	Field 1491, St Helier	Countryside	Reject
S4	Field 827, Trinity	Countryside	Pass
S5	La Collette Industrial Zone, St Helier	Industrial	Pass
S6	La Collette Leisure Zone, St Helier	Leisure	Pass
S11A	Fields 1277, 1278, St Helier	Countryside	Pass
S11B	Fields 1276, 1274, St Helier	Countryside	Pass

For site P18, the adjacent graveyard is not a residential receptor but for the purposes of noise nuisance, it is recommended that it is given the same sensitivity as a residential receptor and that the site should be rejected.

Based on the above recommendations, sites P4, P18 and S2 should be eliminated as potential permanent sites. The effect of the recommended minimum separation distances also has the effect of limiting the area that is available for use for many of the other sites for reception facilities where bio-aerosols exclusion zones do not apply.

Following completion of stage 2 screening, it was discovered that site P1 had changed ownership and was no longer available. Site P1 was therefore also eliminated at this stage.

3 STAGE 2B - BASIC SCORING

3.1 Overview of Scoring Mechanism

The scoring mechanism for stage 2B is given in Appendix A. Some notes on the use of the scoring mechanism follow:

1) Column A lists the different assessment criteria against which the different sites and solutions were assessed;
2) Column B provides suggested weightings for each criterion. The weightings are multipliers for the raw scores and are applied individually to each criterion rather than groups of criteria. This approach avoids the need to take account of which group each criterion belongs in as some criteria can belong in more than one group. Weightings range from 0.5 (not very important) to 3.0 (very important);
3) Column C indicates which type of sites each criterion applies to;
4) Columns D to I describe how scores were applied for each criterion.

Detailed descriptions on the application of scores for each criterion are provided in Appendix A, with outline descriptions as follows:

1) +2 score - The site offers a significant benefit to the project;
2) +1 score - The site offers a some benefit to the project;
3) 0 score - Neutral score;
4) -1 score - The site incurs a disadvantage to the project;
5) -2 score - The site incurs a significant disadvantage to the project;
6) -5 score - The problem posed by this criterion is very significant and warrants a more detailed look. Consideration should be given to eliminating the site on this criterion alone, regardless of how well it scored under other criteria.

3.2 Details of Each Scoring Criterion

3.2.1 Planning Criteria/Risk

3.2.1.1 Compatibility with Island Plan

Sites located within green zones and zones of outstanding character have already been screened out in stage 1. Of the remaining sites, those located within an Industrial Zone would score more favourably compared to those within a Countryside Zone or Leisure Zone. Only site S5 is in an Industrial Zone.

Compatibility with the Island Plan is regarded as being very important so a high weighting factor was given for this criterion.

3.2.1.2 Visual Impact

Potential sites were scored against the degree of visibility to sensitive neighbours, members of the public or tourists. Site S5 scored most favourably compared to the other sites due to its location within an industrial environment.

A low weighting factor has been suggested for this criterion as the height of the facilities is low, and therefore the overall visual impact is not severe.

3.2.1.3 Biodiversity

Any site located within one of the following designated areas would score -5 in stage 2B. A site specific assessment would be required if such a site was carried forward for detailed assessment:

1) A Ramsar (wetlands) site
2) An SPA (special protection area)
3) An SAC (Special Areas of Conservation)
4) A candidate SAC
5) An SSSI (Sites of Special Scientific Interest) site

Any site located within a National or Local Nature Reserve would score -2.

At this stage, a medium weighting factor was given for this criterion. No sites that were carried forward for stage 2B assessment were known or suspected to have heritage/archaeological issues.

3.2.1.4 Archaeology/Heritage

Sites without any known or suspected heritage/archaeological issues would score zero. Any sites with known or suspected heritage/archaeological issues would score -2 in stage 2B. Such sites would require a site specific assessment if carried forward for further detailed assessment.

At this stage, a medium weighting factor was given for this criterion. No sites that were carried forward for stage 2B assessment were known or suspected to have heritage/archaeological issues.

3.2.2 Design & Operational Criteria

3.2.2.1 Site Area

Since the section on footprint estimation in the Stage 1 assessment report was written, further green waste surveys have been conducted which show that domestic green waste delivery vehicle numbers could be higher than indicated by previous surveys. The Stage 1 assessment and report have not been updated to reflect these later surveys but are accounted for in the Stage 2B assessment. Appendix B considers the implications of the increased vehicle numbers on the estimated footprints in the Stage 1 report.

Note that the footprint estimates for Stage 1 were based on outline non site specific layouts. Footprint estimates remain non site specific for stage 2B assessment. Site specific layouts would be required to confirm that the chosen site(s) can accommodate the necessary facilities.

Having sufficient site area allows the site to accommodate all of the necessary facilities and cope with the likely volumes of waste arisings without compromising performance. A high weighting factor was therefore given to this criterion.

3.2.2.2 Drainage Connection

For stage 2B, potential sites were scored according to the distance between a mains sewer and the boundary of the proposed facilities. Routing of the mains sewer was based on historical records provided by TTSD.

Drainage was scored for potential composting sites only. For reception sites, the Jersey Environmental Department has confirmed that water run off need only be intercepted for hydrocarbon and particulates removal prior to discharge to a water course or soak-away.

Only a relatively small volume of effluent/sewage is expected to be discharged. If necessary, effluent/sewage could be disposed of without a mains sewer connection. These alternatives include on site treatment and/or transport off-site by means of road tanker. Therefore, a very low weighting factor was given for this criterion.

3.2.2.3 Level Site for Construction & Operation

Potential sites were scored in stage 2B by visual inspection only. Modest gradients could be readily levelled albeit at a cost. It would also be possible to have split level sites.

A low weighting was given for this criterion.

3.2.3 Pollution, Health & Safety Risks

3.2.3.1 Nuisance to Neighbours

Screening on the basis of noise nuisance, using separation distances recommended by a specialist noise consultant, was already carried out in stage 2A.

Further scoring was carried out on noise and odour nuisance in stage 2B. Scoring was based on nominal separation distances and the number of residential and commercial receptors affected. There was no consideration of site specific factors such as terrain, screening and weather at this stage. Detailed modelling of such factors was not considered practical for the large number of sites at this stage.

Nuisance to neighbours was considered to be an important factor for site selection. Due to this, separate scores were given for noise and odour. A separate score was also given for visual impact which would be another form of nuisance. To avoid exaggerating the importance of nuisance, medium (rather than high) weighting factors were given to noise nuisance and to odour nuisance.

3.2.3.2 Bio-aerosols Risk to Neighbours

In stage 2B, potential sites were scored based on separation distances between composting/shredding facilities and sensitive receptors in accordance with recommendations from a bio-aerosols specialist. The recommended distances were based on the experience of the bio-aerosols consultant without consideration of other site specific factors such as weather, terrain and buildings close by.

The bio-aerosols consultant will be asked to undertake a site specific assessment on the final chosen site(s) to confirm that the proposed combination of technical solution and sites would be acceptable from a bio-aerosols perspective.

Reception only sites were not considered to be significant sources of bio-aerosols so bio-aerosols risk was not considered for reception only facilities.

Health and safety is very important so a high weighting factor was given for this criterion.

3.2.3.3 Location within Fuel Storage Hazard Zone

Due to the vapour cloud explosion incident at the Buncefield fuel storage depot in the UK, the States of Jersey commissioned a report[1] to assess the risks associated with the location of the new EfW facility at La Collette close to the fuel storage depot. Based on the results of this report we understand that that a new domestic waste reception at La Collette would not be considered acceptable but that commercial green waste reception and composting operations would be acceptable, although not preferred, at La Collette.

Health and safety is very important but since the likelihood of a vapour cloud explosion is remote this criterion was given a medium weighting factor only.

3.2.3.4 Location within Airport Public Safety Zone

The airport authority and the Health and Safety Inspectorate (HSI) should be consulted on proposed developments within an airport public safety zone. The proposed scoring mechanism assumes that airport public safety zones would be treated in a similar manner to fuel storage hazard zones.

Health and safety is very important but since the likelihood of a plane crash is remote this criterion was given a medium weighting factor only.

3.2.4 Access/Transportation Issues

3.2.4.1 Proximity to Domestic and Commercial Green Waste Origins

The approximate centre of origin of domestic and commercial green waste was determined as follows:

1) Domestic green waste deliveries to the existing reception facility were surveyed on 4 separate days in 2007 to determine the number of vehicles taking waste from each Parish.
2) The raw vehicle numbers for the two week day surveys were multiplied by 5/2 to give the vehicle numbers for a normal week day and then added to the vehicle numbers for the Saturday and Sunday surveys to give a weighted simulation of the results for a full week.
3) It was assumed that waste arisings were uniformly spread from within individual Parishes.
4) The centroid (centre) of waste arisings for domestic and commercial green waste was estimated by calculating the weighted average x and y co-ordinates for all of the Parishes. These centroids are shown in Appendix C. The centroids for commercial and domestic waste arisings are both in the Parish of St Helier which occupies a reasonably central location within the Island and also has the highest population. The un-weighted centroid for land area alone is in the neighbouring Parish of St Lawrence.
5) Scores were allocated to each site according to the distance between the relevant centroid and the site.

The use of limited survey data and the assumptions introduce a degree of uncertainty in the derived results but considering the size of the Island, the impact of inaccuracies on transport distances is relatively small. In view of the short distances involved, a relatively low weighting factor was given to this criterion.

[1] "Initial Assessment of Vapour Cloud Explosion Risks Associated with the La Collette Fuel Depot", Atkins Ltd, 2007

3.2.4.2 Vehicular Access and Link Roads

For stage 2B, potential sites were scored based on the likely need for new/improved roads and junctions.

Poor vehicular access would have implications on safety, costs and disruption to neighbours and normal traffic flows whilst roads and junctions were upgraded. A high weighting factor was given to this criterion.

3.2.5 Impact on Project Programme

For stage 2B, it was assumed that privately owned sites could potentially cause a delay in the programme whilst the land was being acquired. If there is a covenant restriction on a site, then it would also be likely to incur a programme delay. In extreme cases, such factors could mean that the site was not available if agreement could not be reached.

Deliverability and project programme are very important so a high weighting factor was given to this criterion. These factors are considered to be important as the knock-on effect of delays in relocating green waste reception facilities would lead to consequential delays in the energy from waste project, leading to potentially large cost increases. In addition, delays to the composting process location would delay the replacement of the current open-windrow operation which is causing occasional odour nuisance.

3.2.6 Vacant Possession

For stage 2B, sites that are currently occupied by residents or ongoing operations that TTSD has no automatic right to relocate were given a lower score than the remaining sites. Having to relocate existing operations could incur programme delays and in extreme cases mean that the site was not available if agreement could not be reached on suitable sites to relocate existing operations to.

A high weighting factor was given to this criterion.

3.2.7 Criteria Considered But Not Used in Stage 2B

A number of assessment criteria (mostly from the previous sites assessment exercise carried out in 2006) were considered but not used for scoring in stage 2B as follows:

1) Loss of potential alternative uses of the site. For consistency of comparison between state owned and private sites, the value of the land would need to be converted into a cost figure. This exercise would only be performed in stage 3 (if required);
2) Potential development sensitive receptor. It is difficult to assess and allow for potential future development of sensitive receptors around the site. Certain elements of this criterion is already covered under criteria such as compatibility with the Island Plan zones, and land value (covered in stage 3 if required);
3) Compatible neighbours. This overall criterion is already covered by other criteria such as nuisance, visual impact and safety zoning;
4) Adverse public reaction risk. This is not a criterion that can be readily quantified and scored and is at least partially covered under nuisance, compatibility with Island Plan zones and visual impact;

5) Power connection. Budget estimates were obtained from JEC (Jersey Electric Company) for power connections to each site based on assuming a 750 kVA capacity connection and other preliminary assumptions. The 750 kVA capacity should be comfortable even for a complete integrated site incorporating reception and composting of all green waste arisings. Smaller sites accommodating only reception facilities or part of the Island's green waste arisings are likely to require smaller capacity connections. The budget estimates varied by no more than £80,000 between the different sites which is relatively small in the overall context of the project. Power connection costs were therefore not scored in stage 2B assessment but would be included as part of the cost assessment in stage 3 (if required);

6) Ground conditions for construction. Intrusive ground surveys are costly and should only be undertaken during stage 3 (if required) when there are fewer sites to assess;

7) Opportunity to co-locate complementary operations. Rather than attempt to score every conceivable combination in stage 2B, each site was assessed on its own merits for location of a single type of facility. On completion of stage 2B scoring, opportunities to locate more than one type of facility on the same site would be considered if any site scores well for more than one type of facility (composting, domestic reception, and commercial reception). The possibility of co-locating domestic green waste reception with recyclables reception facilities may also be explored in stage 3 due to potential synergies between these types of reception facilities;

8) Disruption during construction. Such disruptions, if any, would be short term and unlikely to be very significant. Therefore, this criterion was not be used to assess the long term suitability of a site;

9) Contaminated ground risk. Ground surveys are time consuming and expensive and would only be carried out in stage 3 (if required) when fewer sites remain to be assessed;

10) Impact on air quality. Air quality would need to be assessed by reference to traffic flows, pollution control equipment and dispersion modelling which would not be practical for the large number of sites in stage 2B. This criterion would be assessed in stage 3 (if required);

11) Risk of water or ground pollution. It would be possible to design the facilities to mitigate against pollution risks. This criterion is therefore one of cost to be considered during stage 3;

12) Proximity to farms for spreading of compost. TTSD advised that compost was spread on farms throughout the Island and that due to the small size of the Island, transport distances for compost product should not be a criterion for site selection;

13) Perception of potential for traffic congestion. The site selection process should be based on real rather than perceived issues even if it means having to disprove misconceptions;

14) Roads and traffic congestion issues. These issues would need to be considered for the planning application but are not practical for the large number of sites in stage 2B;

15) Property blight. This is not a criterion that can be readily quantified and scored and is at least covered by other criteria such as nuisance, visual impact and compatibility with the Island Plan zones.

3.3 Results

Where appropriate, each site was scored separately as a potential host for each of the following types of facilities:

1) A complete IVC (in-vessel composting) facility designed to process all of the Island's green waste arisings. It was assumed that domestic and commercial green waste would be collected on a different site (s) and bulked up for transport to the IVC;
2) A reception facility designed to accept all of the Island's domestic green waste for bulking up and transporting to the IVC site;
3) A reception facility designed to accept all of the Island's commercial green waste for bulking up and transporting to the IVC site.

The following table summarises the weighted scores for the potential sites for each type of facility. A positive score would indicate a very suitable site. However, as waste treatment is generally considered an unattractive neighbour, realistically a low negative score would indicate an acceptable site. Higher negative scores indicate unsuitable sites.

Site	P10	P11	P12	S1	S4	S5	S6	S11
	Fields 1061A, 1061, 1062, St John	Field 188, St Lawrence	Fields 712, 713, 715, St Peter	Field 298, St Peter	Field 827, Trinity	La Collette Industrial Zone, St Helier	La Collette Leisure Zone, ST Helier	Fields 1277, 1278, 1276, 1274, St Helier
Commercial Reception	-18.0	-29.0	-28.5	-6.5	-13.5	**-1.5**	-12.5	-7.0
Domestic Reception	-18.0	-30.5	-30.5	**-6.5**	**-13.5**	N/A	N/A	**-7.0**
IVC	N/A	-36.0	-41.0	N/A	-24.5	**0.0**	-8.0	N/A

Comments on individual sites follow:

1) Site P10. This site is large enough to house either domestic reception or commercial reception only and did not score particularly well for either. The low scores were mainly due to nuisance criteria and the fact that it is currently occupied by residential accommodation. It is recommended that this site is rejected without further assessment;
2) Site P11. This site did not score well for any category of site. The low scores were mainly due to nuisance, poor vehicular access and the fact that it is currently occupied by privately owned ongoing operations that would need to be relocated. It is recommended that this site is rejected without further assessment;
3) Site P12. This site did not score well for any category of site. The low scores were mainly due to nuisance and poor vehicular access. It is recommended that this site is rejected without further assessment;
4) Site S1. This site could potentially act as a domestic reception only site. The site could accommodate a commercial reception facility instead of the domestic reception facility but not domestic and commercial reception of all green waste arisings for the Island. The site did not score as well as site S5 for commercial reception. It is recommended that this site is put forward for stage 3 assessment as a potential domestic reception site;

5) Site S4. This site did not score well as a potential IVC site due to the proximity of sensitive receptors and the potential impact of the restrictive covenant on the project programme. The site also scored reasonably well as a commercial reception site but not as well as site S5. It is recommended that this site is put forward for stage 3 assessment as a potential domestic reception site;
6) Site S5. This site received the top scores for the IVC and commercial reception and is large enough to house both types of facilities. This site scored well mainly due to its industrial location and large area. However, this site was excluded for consideration as a new domestic reception site due to the hazard assessment and the potential impact of a vapour cloud explosion from the adjacent fuel farm ;
7) Site S6. This site scored well for IVC and commercial reception facilities but not as well as for site S5. The site was excluded for consideration as a new domestic reception site due to the hazard assessment. It is also highly unlikely that more detailed assessment would make site S6 score better than site S5. It is recommended that this site is rejected without further assessment;
8) Site S11. There are a number of residential properties on or close to the boundary of this site. For an IVC facility it is necessary to apply a 50 m exclusion zone for bio-aerosol safety. The remaining un-zoned area is insufficient to accommodate an IVC large enough to process all of the Island's green waste arisings. This site could potentially be a commercial and/or domestic reception site but scored significantly lower than site S5 for commercial reception. It is recommended that this site is put forward for stage 3 assessment as a potential domestic reception site;

Based on the above scores, the following is recommended:

1) Site S5 should be the preferred site for commercial reception and in-vessel composting without any further detailed assessment of the other sites. The co-location of the commercial green waste reception and composting facility on the same site will result in further benefits that will give Site S5 an even bigger advantage compared to the other sites where co-location is not possible;
2) Further stage 3 assessment is required to determine whether site S1, S4 or S11 should accommodate the domestic reception facility.

4 SPECIAL CASE – SITE 12

As indicated in the stage 1 assessment report, the current Refuse Handling Plant (RHP) and Resource Recovery Centre (RRC) at Bellozanne were not included in the list of potential sites considered in Stage 1 assessment as these sites would not be available until the EfW project is completed.

As concluded above, the La Collette industrial site is considered to be most suitable for in-vessel composting and commercial waste reception. The choice of a site for domestic green waste reception is less clear cut. All three of the remaining potential sites for domestic green waste reception are close to residential receptors and in the Countryside zone.

In view of the fact that none of the remaining potential sites for domestic green waste reception is particularly good, it was decided to review the possibility of using the RHP/RRC site. The part of the RHP/RRC site identified for potential domestic green waste reception is now referred to as Site S12. A map showing the boundary of the site is given in Appendix E. Site S12 is currently used for reception and storage of commercial bulky waste. On completion of the EfW project, reception and storage of commercial bulky waste will be relocated to a new site alongside the new EfW plant.

Comments on Site 12 are as follows:

1) If the fact that only part of the site is currently available and only for part of the time then the score for Site S12 in stage 2B would have been +1, which is higher than for any of the other remaining potential sites (S1, S4 and S11) for domestic reception. Site S12 scores well because it is located within an industrial zone. Furthermore, since the site is currently used as a waste reception facility there are unlikely to be any planning issues;
2) Due to the short-term unavailability of S12, until completion of the EfW project, there would be a need for a temporary site to receive domestic green waste. The site identified for this purpose was a modified version of Site S2. Comments on this site are as follows:
    a) This site was chosen because it is close to other waste reception facilities. The site already has a prepared surface and can be implemented in minimal time and at minimal cost which is especially important for a temporary facility;
    b) This site was eliminated during stage 2 screening (for noise nuisance) due to the presence of three residential properties close to the Western boundary of the site.
    c) To reduce potential nuisance to neighbours it would be possible to move the original Northern and Southern site boundaries for site S2 further to the South;
    d) To improve traffic flows within the site, commercial trailers would not be allowed on site. It would be necessary to review the size of vehicles to be accepted at the site together with traffic flows as part of a more detailed assessment during Stage 3.

It is recommended that site S12 (with a modified Site S2 as a temporary site) is considered along side Sites S1, S4 and S11 during stage 3 detailed assessment.

5 MULTIPLE SITES

Part of this study has been to check whether allowing smaller sites for receiving or processing only part of the Island's green waste would introduce additional superior sites. No single privately owned site scored higher than the best performing single States owned sites. The best States owned sites are large enough to deal with the whole waste flow. The Stage 1 assessment established that the area required for composting and maturation accounts for only a small proportion of the total site area, with much of the space required for vehicle reception and manoeuvring. This indicates that there will be economic disbenefits to multiple sites through the requirement for additional access roads, reception areas and storage areas compared to a single site operation.

None of the private sites considered had existing infrastructure that would have any significant benefit when assessed as a multiple site. Therefore there is no benefit in further consideration of multiple sites as these could not score higher than the best scoring States-owned single sites.

6 CONCLUSIONS & RECOMMENDATIONS

6.1 Stage 2A Screening

Stage 2A screening using a noise nuisance criterion eliminated sites P4, P18 and S2 for being too close to sensitive receptors.

6.2 Loss of Site P1

Following stage 2A screening, it was understood that site P1 had changed ownership and is no longer available. No further assessment is carried out on this site.

6.3 Stage 2B Scoring

The sites being considered have been rated quantatively over a range of criteria. The scores have then been summed to provide an overall ranking. A positive score would indicate that the site would be very suitable. Realistically, as waste treatment facilities are generally considered to be unattractive neighbours, a low negative score would be considered acceptable. High negative scores are considered less suitable. The scores from the 2B assessment are given in the following table:

Site	P10	P11	P12	S1	S4	S5	S6	S11
	Fields 1061A, 1061, 1062, St John	Field 188, St Lawrence	Fields 712, 713, 715, St Peter	Field 298, St Peter	Field 827, Trinity	La Collette Industrial Zone, St Helier	La Collette Leisure Zone, ST Helier	Fields 1277, 1278, 1276, 1274, St Helier
Commercial Reception	-18.0	-29.0	-28.5	-6.5	-13.5	**-1.5**	-12.5	-7.0
Domestic Reception	-18.0	-30.5	-30.5	**-6.5**	**-13.5**	N/A	N/A	**-7.0**
IVC	N/A	-36.0	-41.0	N/A	-24.5	**0.0**	-8.0	N/A

Based on these scores it is recommended that site S5 should be used for commercial reception and composting facilities without further assessment of the other sites. Further analysis would not reveal a more suitable site than S5.

Further stage 3 assessment of sites S1, S4 and S11 is required to determine the best site to accommodate the domestic green waste reception facility.

6.4 Special Site S12 & Need for Temporary Domestic Reception Site

Sites S1, S4 and S11 are not ideal sites for domestic green waste reception due to their location within the Countryside zone and proximity to residential properties. It is therefore recommended that Site 12 (a site in Bellozanne currently used for reception and storage of commercial bulky waste) is also assessed in stage 3 as a potential domestic green waste reception site. Site S12 was excluded from the original list of potential sites assessed in stage 1 as it is not available until completion of the EfW project. If the fact that site S12 is not immediately available is ignored, then it would have scored +1 in stage 2B for domestic reception. A temporary reception site based on a modified version of site S2 has been proposed by TTS until a permanent site is available.

6.5 Multiple Sites

Part of this study has been to check whether allowing smaller sites for receiving or processing only part of the Island's green waste would introduce additional superior sites. No single privately owned site scored higher than the best performing single States owned sites, whilst the best States owned sites are large enough to deal with the whole waste flow. There are economic disbenefits to multiple sites through the requirement for additional access roads, reception areas and storage areas compared to a single site operation.

None of the private sites considered had existing infrastructure that would have any significant benefit when assessed as a multiple site. Therefore there is no benefit in further consideration of multiple sites as these could not score higher than the best scoring States-owned single sites.

Appendix A Stage 2B Scoring Criteria

	Scoring Mechanism							
	Weighting	**Applicability**	**+2**	**+1**	**0**	**-1**	**-2**	**-5**
1 Planning criteria/risk								
Compatibility with Island Plan	3	All	N/A	N/A	Site is in industrial zone	Site is not in an industrial zone	N/A	N/A
Visual impact	1	All	N/A	N/A	Remote location, no signficant visibility to sensitive neighbours, public or tourists. Or blends in with neighbouring facilities e.g. in industrial area	Facilities and operations partially visible to sensitive neighbours, public or tourists	Facilities and operations will be clearly visible to sensitive neighbours, public or tourists	N/A
Biodiversity	2	All	N/A	N/A	Site is not located in a designated site	N/A	Site is in a National Nature Reserve or Local Nature Reserve	Site is located in a Ramsar, SPA, SAC, Candidate SAC or SSSI site.
Heritage/archaeology	2	All	N/A	N/A	No heritage/archealogical issues expected	N/A	Some heritage/archealogical issues suspected	N/A
2 Design & operational criteria								
Area	3	All	See separate sheet for footprint scoring					
Drainage connection	0.5	Compost	N/A	Mains sewer connection no more than 20m from boundary of un-zoned area	Mains sewer connection available 20m to 60m from boundary of un-zoned area	Mains sewer connection available 60m to 100m from boundary of un-zoned area	Mains sewer connection available over 100m from boundary of un-zoned area	N/A
Level site for construction and operation	1	All	N/A	Level site	Essentially level site with only minor gradients so that minimal levelling work is required	Moderately level site with minor levelling work required	Site with significant gradients that will require significant levelling	Site with steep gradients unsuitable for installation of facilities without subtsantial levelling work
3 Pollution & safety risks								
Nuisance to neighbours – noise	2	All	N/A	Site is in an industrial zone or no commercial or residential receptors within 200m of used area.	Site is in an already noisy area or nearest commercial or residential receptor is within 100 m to 200 m of used area	N/A	Commercial or residential receptors within 100m of used area and site is not in an industrial or already noisy area	N/A
Nuisance to neighbours - odour	2	Compost	N/A	No residential receptors within 200m of used area	Commercial receptors between 100m and 200m from used area and no other receptors within 200m of used area.	Commercial receptors between 50m and 100m of used area and/or residential receptors between 100m and 200m of used area.	Residential receptors within 100m of used area.	N/A
Bioaerosols risk to neighbours	3	Composting and shredding only	N/A	No sensitive receptors within 200m of used area	Commercial receptors, open parkland and public footpaths between 100m and 200m from used area and no other receptors within 200m of used area.	Commercial receptors, public footpaths and open parklands between 50m and 100m of used area and/or residential receptors between 100m and 200m of used area.	Residential receptors between 50m and 100m of used area.	Highly sensitive receptors such as schools, hospitals, restaurants, hotels within 100m of used area.
Location within fuel storage hazard zone	2	All	N/A	N/A	Site is not in such a zone or does not accept direct deliveries of domestic or commercial green waste	Site is on the boundary of such a zone and accepts direct commercial deliveries but not direct domestic deliveries	Site is in such a zone and accepts direct commercial deliveries but not direct domestic deliveries	Domestic reception sites cannot be located within such a zone
Location within airport public safety zone	2	All	N/A	N/A	Site is not in such a zone or does not accept direct deliveries of domestic or commercial green waste	Site is on the boundary of such a zone and accepts direct commercial deliveries but not direct domestic deliveries	Site is in such a zone and accepts direct commercial deliveries but not direct domestic deliveries	Domestic reception sites cannot be located within such a zone
4 Access/transportation issues								
Proximity to domestic waste origins	1.5	Domestic reception	N/A	N/A	No more than 2 mile from estimated centre of waste origins	No more than 4miles from estimated centre of waste origins	No more than 6 miles from estimated centre of waste origins	N/A
Proximity to commercial waste origins	1.5	Commercial reception	N/A	N/A	No more than 2 mile from estimated centre of waste origins	No more than 4miles from estimated centre of waste origins	No more than 6 miles from estimated centre of waste origins	N/A
Vehicular access and link roads	3	All	N/A	N/A	Good access and link roads to site so that no road improvements outside the site boundary is required	New access or road upgrades required but length of road involved is less than 50m and no complex junction modifications required.	New access or road upgrades required but length of road involved is between 50m to 100m and no complex junction modifications required.	New access or road upgrades required with road length involved longer than 100m or complex junction modifications required.
5 Programme								
Impact on completion of project programme	3	All	N/A	N/A	Site is a State Owned site	Site is a Private Site	There is a known convenant restriction that could impact on programme	N/A
6 Vacant Possession								
Vacant possession	3	All	N/A	N/A	Site is currently vacant or only contains operations that TTSD can readily relocate	N/A	Site is currently occupied by residents or ongoing operations that TTSD has no automatic rights to relocate	Site is currently occupied by residents or ongoing operations that TTSD has no automatic rights to relocate and it is likely that the current occupiers would be unwilling or unable to relocate. This score will only be applied in stage 3.

Footprint Scoring Criteria							
Score	**+2**	**+1**	**0**	**-1**	**-2**	**-5**	**Notes**
Processing							
Full capacity processing and all reception	>14,500	13,00 to 14,500	11,000 to 13,000	N/A	10,000 to 11,000	<10,000	
Full capacity processing, no reception	>13,000	11,000 to 13,000	9,000 to 11,000	N/A	7,500 to 9,000	<7,500	
Full capacity processing and commercial reception	>14,500	13,00 to 14,500	11,000 to 13,000	N/A	10,000 to 11,000	<10,000	
Full capacity processing and domestic reception	>13,600	11,700 to 13,600	10,200 to 11,700	N/A	9,000 to 10,200	<9,000	
One third capacity processing and all reception	>8,500	7,500 to 8,500	6,500 to 7,500	N/A	6,000 to 6,500	<6,000	
One third capacity processing, no reception	>8,000	7,000 to 8,000	6,000 to 7,000	N/A	5,500 to 6,000	<5,500	
Waste Reception Sites							
Single site, domestic	>3,000	2,600 to 3,000	2,200 to 2,600	N/A	1,800 to 2,200	<1,800	
Multiple sites, domestic	>1,200	900 to 1,200	700 to 900	N/A	500 to 700	<5,00	
Single site, commercial	>3,200	2,800 to 3,200	2,400 to 2,800	N/A	2,000 to 2,400	<2,000	
Single site, combined	>3,700	3,300 to 3,700	2,900 to 3,300	N/A	2,500 to 2,900	<2,500	
Single site, combined, shred	>4,500	4,000 to 4,500	3,500 to 4,000	N/A	3,000 to 3,500	<3,000	

Appendix B Site Footprint Estimation

Since the section on footprint estimation in the stage 1 assessment report was written, further green waste surveys have been conducted which show that domestic green waste delivery vehicle numbers could be significantly higher than indicated by previous surveys. The footprint estimates have therefore been updated in this section.

Note that the footprint estimates for stage 1 were based on outline non site specific layouts. Footprint estimates remain non site specific for stage 2 assessment. Site specific layouts will be required for the chosen preferred site(s) to confirm that practical layouts are possible given the site specific conditions, site shape and locations of the site access.

B.1 Factors Affecting Site Footprint Requirements

The footprint requirements for a complete working site depend on a number of key factors including:

1) Composting technology. For the purposes of estimating footprint requirements the composting technologies offered for the project have been put into the following categories:
   a) Tunnel composting such as those offered by WTT, Linde, Christiaens, SRS and CRS. Clamp systems should also have similar footprint requirements.
   b) Hall composting such as those offered by Earth Tech and New Earth Solutions.
   c) Vessel composting such as those offered by Andar/Rotocom and Bioganix.
   d) Container composting such as those offered by Alpheco (through Edmund Nuttall) and Vital Earth
   e) Vertical systems such as those offered by VCU.
2) Site specific conditions such as the shape of the available plot and the access arrangements. The percentage of space that cannot be usefully employed for equipment or buildings will depend on a combination of the plot shape, access arrangements and to some extent also the technology employed.

B.2 Single Site for All Processing

B.2.1 Including All Reception and Shredding

B.2.1.1 Tunnel Composting Technology

1) A preliminary site layout was developed (see drawing S0870-023 A2) based on the following key assumptions.
   a) That annual average processing capacity is 15,800 tonnes/year.
   b) That the “in-vessel” composting technology will be tunnels.
   c) That the seasonal peaking factor (ratio of tonnage in peak month to average month) is 1.5.
   d) That all input waste will be composted in tunnels for a total of 4 weeks in 2 stages.
   e) That 80% of the compost product exiting the tunnels can be immediately dispatched for agricultural use.

f) That the remaining 20% of compost product exiting the tunnels will be further matured for another 4 weeks in aerated bays within the post treatment building.

g) The site will include all processing and reception facilities.

h) There must be at least 30m separation between main process building doors and the covered waste reception area.

i) The layout was based on a non site specific rectangular plot and excludes landscaping and any irregular shaped areas outside of this box that may be useable or otherwise.

j) The estimated area excludes the space required for the offices and staff/visitor parking. These facilities do not generate dust, odour or bio-aerosols and very little noise so can be located in areas of a site that are close to sensitive receptors if necessary.

2) The full site area was split into the following categories:

a) Area for the "in-vessel" composting technology

b) Area for compost maturation as required by the solution proposed

c) Remaining area that would be required regardless of technology employed including:

i) Weighbridge

ii) Waste reception, storage and pre-treatment.

iii) Product storage, post-treatment and dispatch.

iv) Ancillaries and bio-filters.

v) Roads and vehicle turning space.

vi) Unused areas within the rectangular site due to imperfect packing of plant and equipment.

Some of these areas are not completely independent of technology employed but the differences should be relatively minor compared to the overall site area.

B.2.1.1 Other Composting Technologies

Indicative layouts and footprint requirements were provided by some technology suppliers with their expressions of interest in the project but each supplier based their estimates on a different set of assumptions, some of which are not stated. It is therefore not appropriate to simply use these estimates directly to compare the different technologies. There is also publicly available information on footprint requirements for different technologies but the value of this information is also limited due to the use of widely differing assumptions and project specific factors.

The following methodology was therefore used by Fichtner to generate rough estimates of the likely footprint requirements of the different types of technologies.

1) Area for the "in-vessel" composting technology. This area is based on information supplied by the technology suppliers by measuring approximate scaled layouts where necessary. Where appropriate, the measured/given area was adjusted to a processing capacity of 15,800 tonnes/year and peaking factor of 1.5 by assuming that area is proportional to processing capacity. Proportional scaling may not be strictly correct due to edge effects but the error introduced should be relatively small.

2) Area for compost maturation.

a) Hall composting systems already include for maturation within the hall so no additional maturation area is required.

b) Container and vertical composting technology suppliers proposed to carry out maturation using the "in-vessel" technology so that no additional maturation area is required.

c) For the vessel systems, the maturation residence time indicated by the technology supplier was used by Fichtner to estimate the area by assuming that area required is proportional to residence time.

d) The cage system technology supplier indicated a maturation period of 4 weeks which should require approximately the same area as that for the tunnel composting system.

The following table summarises the results of the footprint estimates for different types of technologies.

Main Site Areas – Processing On A Single Site							
Technology		**Tunnels**	**Hall**	**Vessels**	**Containers**	**Cage**	**Vertical**
Capacity		15,800	15,800	15,800	15,800	15,800	15,800
Peak factor		1.5	1.5	1.5	1.5	1.5	1.5
IVC Technology area	m^2	1,964	3,300	660	3,279	882	1,250
Maturation area	m^2	304	inc	1,444	inc	304	inc
Other areas	m^2	7,902	7,902	7,902	7,902	7,902	7,902
Site area	**m^2**	**10,170**	**11,202**	**10,006**	**11,181**	**9,088**	**9,152**
		100%	110%	98%	110%	89%	90%
Remove domestic + commercial reception	m^2	-2,732	-2,732	-2,732	-2,732	-2,732	-2,732
Site no public + commercial reception + shred	**m^2**	**7,438**	**8,470**	**7,274**	**8,449**	**6,356**	**6,420**
Remove domestic reception	m^2	0	0	0	0	0	0
Site no domestic reception	**m^2**	**10,170**	**11,202**	**10,006**	**11,181**	**9,088**	**9,152**
Remove commercial reception	m^2	-900	-900	-900	-900	-900	-900
Site no commercial reception	**m^2**	**9,270**	**10,302**	**9,106**	**10,281**	**8,188**	**8,252**

The following comments can be made:

1) The choice of technology has a relatively small impact on the overall site footprint requirements.

2) The actual area required for composting and maturation account for only a small proportion of the total site area.

3) The requirement for at least 30m separation between main process building doors and the covered reception area significantly increases the length of site roads, wasted space and overall site area.

B.2.2 Excluding Domestic Reception, Commercial Reception and Shredding

If the domestic and commercial waste reception facilities are located on a separate site(s) then a significant reduction in area can be achieved. Some of the area reduction is due to removal of some of the space required for waste reception but it is mainly due to removal of roads and wasted space required for 30m separation of the covered reception from process building doors.

B.2.3 Excluding Domestic Reception

Excluding only domestic waste reception means that commercial waste reception is still required. Whilst there is a slight reduction in the number of unloading positions required the turning areas remain the same. The actual reduction in site area is not significant.

B.2.4 Excluding Commercial Reception

Exclude commercial waste reception should allow the depth of the reception area to be reduced and the right hand site boundary to be moved approximately 10m to the left.

B.3 Multiple Sites for Processing

B.3.1 Including All Reception & Shredding

The site area for processing one third of the total annual arising of 15,800 tonnes/year has been estimated using the following methodology:

1) It is assumed that the composting and maturation areas will be proportional to processing capacity.

2) The covered reception area is reduced to an area of 35m x 28m.

3) One third of the reception/pre-treatment building and post-treatment building is assumed to be proportional to processing capacity for areas related to storage of wastes or products. The remaining 2/3rd of these two buildings is assumed to be vehicle manoeuvring and equipment space which should be relatively independent of processing capacity.

4) The area of the bio-filter is assumed to be proportional to processing capacity (not strictly correct but impact should be small).

5) The area for plant, equipment and buildings (including canopied reception area) was estimated for the large single site. The above assumptions were used to estimate the area for plant, equipment and buildings (including canopied reception area) for the smaller (1/3rd capacity site).

6) It is assumed that the full site area is proportional to the area for plant, equipment and buildings and reception area.

The results of the estimates are presented in the following table.

Main Site Areas - One Third Capacity							
Technology		**Tunnels**	**Hall**	**Vessels**	**Containers**	**Cage**	**Vertical**
Capacity	**tpa**	**5,267**	**5,267**	**5,267**	**5,267**	**5,267**	**5,267**
Peak factor		1.5	1.5	1.5	1.5	1.5	1.5
Technology area	m^2	655	1,100	220	1,093	294	417
Maturation area	m^2	185	inc	481	inc	101	inc
Other areas	m^2	5,353	5,353	5,353	5,353	5,353	5,353
Site area	**m^2**	**6,192**	**6,453**	**6,054**	**6,445**	**5,748**	**5,769**
		100%	104%	98%	104%	93%	93%
Remove domestic and commercial reception	m^2	-548	-548	-548	-548	-548	-548
Site, no reception	**m^2**	**5,644**	**5,905**	**5,506**	**5,897**	**5,200**	**5,221**

B.3.2 Excluding Domestic Reception, Commercial Reception and Shredding

Due to the need to having minimum turning areas for delivery vehicles, there would be little reduction in site area if either domestic or commercial reception of waste is excluded.

If both domestic and commercial reception is excluded, then the percentage reduction in site area is assumed to be the same as for the full capacity plant.

B.4 Separate Waste Reception

The following steps were involved in estimating the area requirements for waste reception.

1) Waste delivery vehicle numbers was provided by TTSD for 4 separate days (Tuesday, Wednesday, Saturday and Sunday) in 2007. Survey data was also provided for 3 half days in 2005.
2) Historical data shows that green waste quantities have been increasing over the years. TTSD indicated that the vehicles numbers surveyed in 2007 were unlikely to increase even further.
    a) The 2005 vehicle numbers were multiplied by the ratio of design green waste processing capacity (15,800 tonnes/year) to quantity of green waste in 2005 (11,363 tonnes/year).
    b) The 2007 vehicle numbers were not inflated any further.
3) The adjusted quarterly hourly data was used to calculate the rolling hourly vehicle numbers and hence the peak hourly vehicle numbers for each day.
4) The hourly vehicle numbers were multiplied by the average unloading times (4.9 minutes for domestic vehicles and 8.2 minutes for commercial vehicles) provided by TTSD to give equivalent unloading times for each rolling hour for domestic vehicles, and commercial vehicles. These equivalent unloading times are then divided by 60 minutes/hour to give the number of vehicles that need to be able to unload simultaneously (see table below).
5) From the results of calculations, the following sizing criteria is recommended:

a) For a single site to take all domestic and commercial deliveries, the facility should be designed to be able to unload up:
   i) 11 domestic + zero commercial vehicles simultaneously during peak domestic periods,
   ii) 3 domestic + 5 commercial vehicles during peak commercial periods.

b) For a single site to take all domestic deliveries only, the facility should be designed to be able to unload 11 vehicles simultaneously.

c) For a single site to take all commercial deliveries only, the facility should be designed to be able to unload 5 vehicles simultaneously.

These results are very approximate due to the limited survey data available and the assumptions that have been necessary. It is still necessary to allow for some vehicle queuing in case the facilities cannot cope. In the event that excessive vehicle numbers are regularly encountered at particular times or particular days, at least some of the users will learn to avoid known peak periods thereby helping to reduce long term problems. The opening hours are short compared to other civic amenity sites in the UK. There is scope to reduce peak vehicle numbers by increasing opening hours, particularly on Sundays during which the existing reception facility only opens for half a day.

The results of the estimates are presented in the following table.

Main Site Areas – Reception Sites				
Separate Waste Reception Facilities	**Length**	**Width**	**Area**	**No of Sites**
	m	m	m^2	
Single site - domestic	51	35	1,800	1
Multiple sites - domestic			500	4 or 5
Single site - commercial	49	40	2,000	1
Single site - combined domestic and commercial	49	50	2,500	1
Single site - combined domestic, commercial, shred	83	45	3,000[2]	1

Note that these areas do not include site offices, staff/visitor parking, and queuing of delivery vehicles (although some queuing space is inherent in some of the layouts). It is assumed that no weighbridges will be required at any of the reception sites.

B.4.1 Single Site for Domestic Reception

An example layout for a single site to accept all domestic green waste is provided in drawing 0871-042 A2.

[2] Excludes unused area 17.5m x 40m

B.4.2 Multiple Sites for Domestic Reception

As indicated in the stage 1 assessment report, the advertisement for expressions of interest by private land owners to propose sites for green waste reception specified a minimum area of 500 m^2. This minimum area was estimated based on green waste vehicle data available at the time of the advertisement.

An outline layout (drawing 871-017 A1) assuming a typical civic amenity site traffic flow system shows that two vehicles could unload simultaneously. More recent green waste survey data indicates at peak periods up to 11 vehicles would need to be able to unload simultaneously. On this basis, 6 sites would be required to enable simultaneous unloading of up to 11 vehicles. In practice, space has been allocated for use by the skip wagons which will not be on site for most of the time. When the skip wagon is not on site, unloading vehicles could use the area normally reserved for the skip wagon thereby reducing the number of sites required to 4 or 5 depending on how much comfort is required and how uniformly we can expect vehicles to distribute themselves between the different sites.

B.4.3 Single Site for Commercial Reception

An example layout for a single site to accept and shred all commercial green waste is provided in drawing 0871-020 A2.

It is assumed that shredding will not take place on site. If shredding is required, the need to keep a minimum distance of 30m between the shredder and the reception facility will significantly increase the site footprint.

B.4.4 Combined Domestic + Commercial Reception

An example layout for a single site to accept and shred all domestic and commercial green waste is provided in drawing 0871-019 A2.

The inclusion of shredding will increase the site footprint but will increase bulk density (and hence reduce the number of bulk loads) prior to transporting to the processing facility.

Drawing 0871-49 A1 shows the layout without any on-site shredding.

B.5 Expansion Area for Kitchen Waste

The Jersey Waste Strategy envisages the possibility of future kerbside collection of kitchen waste for composting. There is likely to be significant cost savings if the kitchen waste is also composted in the same facility as the proposed green waste composting facility. The following assumptions have been made regarding the composting of kitchen waste.

1) The Waste Strategy envisages approximately 17,000 tonnes/year of kitchen waste arisings. For the purposes of this exercise we have assumed that up to 50% of the arisings will be collected for composting. UK experience suggests that significantly less than 50% will be collected so the 50% assumption is conservative for the purposes of estimating area requirements.
2) Unlike green waste there should be very little seasonal variation for kitchen waste.
3) Kitchen waste is generally very wet making it very difficult to compost without the addition of bulking material such as cardboard or green waste. The green waste could be collected with the kitchen waste at the kerbside or mixed together at the composting facility.

4) In the UK, it is normal for at least some of the separately collected green waste to be composted separately from the kitchen waste in less expensive windrow composting sites. Windrow composting is not an option in Jersey so there would be very little cost benefit in separate composting of green waste and kitchen waste.

5) The area requirements will depend on the ratio of mature PAS100 grade compost compared to less mature agricultural grade compost which in turn depends on market demands. For the purposes of this exercise, TTSD would like to assume that all of the additional tonnage will be composted to PAS100 grade product. The area required for compost maturation will be significantly increased.

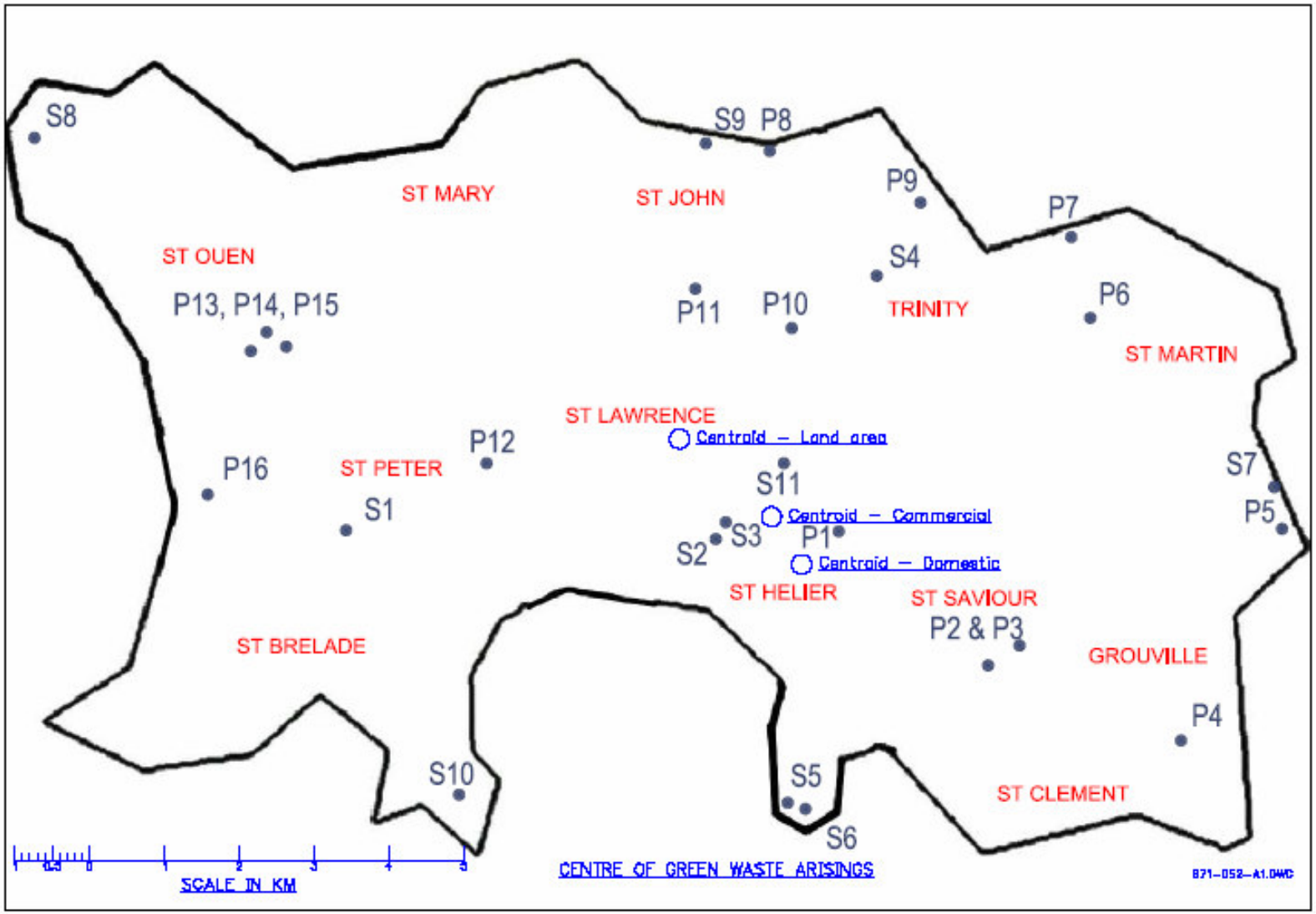
Layout drawing 0871-024 A1 shows an approximate layout for complete reception and processing of 15,800 tonnes/year of green waste and 8,500 tonnes/year of kitchen waste on a single site based on the use of tunnel composting technology. The overall site area requirement is 12,700 m^2.

B.6 Outline Layout Drawings

871-017.A1	Partial Domestic Reception - Vehicle Drive by
871-019.A2	Domestic Reception + Commercial Reception + Shredding
871-020.A1	Commercial Reception
871-023.A2	Single Site Composting – Green Waste Only
871-024.A2	Single Site Composting – Green + Kitchen Waste
871-042.A2	Domestic Reception – Large Skips
871-049.A1	Domestic + Commercial Reception

The above drawings are provided at the end of the report.

Appendix C Centre of Green Waste Arisings Map



Appendix D Noise Consultant's Report

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ENVIRONMENTAL NOISE ASSESSMENT CRITERIA

FOR

JERSEY COMPOSTING

Instructed by:

Fichtner Consulting Engineers Ltd

Report No. R07.1494/DRK

Engineer: D.R. Kettlewell MSc MAE MIOA I.Eng
Date of Report: 10th July 2007

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CONTENTS

1.0 INTRODUCTION

1.1 At the request of Fichtner Consulting Engineers, Noise & Vibration Consultants Ltd ("NVC") was commissioned to provide an initial assessment of noise criteria relevant to proposed facilities for in-vessel composting, domestic green waste reception (with or without reception of recyclables) and commercial green waste reception (with or without reception of recyclables) at various potential sites in Jersey.

1.2 The aim of this study is to consider and develop a simple screening mechanism to determine which of the potential sites should be screened out at an early stage so that effort can be focussed on assessing sites that are likely to be suitable.

1.3 Noise is generally been defined as sound that is unwanted by the recipient. The effects of noise on the neighbourhood are varied and complicated, including such things as interference with speech communication, disturbance of work, leisure or sleep. A further complicating factor is that in any one neighbourhood some individuals will be more sensitive to noise than others.

1.4 Although noise may be difficult at times to quantify, in respect of its effect, there are a number of factors that require consideration in terms of whether a particular site being considered for this type of development may be more suitable than others. These may include, for example, one or more of the following:

(i) Distance from the receptor to the noise source/s.
(ii) Background noise levels at the nearest receptor position.
(iii) Existing background noise source/s.
(iv) Number of receptors in the vicinity.
(v) Character of noise/s.
(vi) Times of operation of noise source/s
(vii) Prevailing wind direction relative to noise source and receptor.
(viii) Topography affecting local screening of noise source.
(ix) Type of receptor (e.g. residential, commercial or industrial)
(x) Ground cover on intervening ground between receptor and noise source.
(xi) Location of noise source relative to receptor.
(xii) Temperature and relative humidity.

1.5 The above factors can vary considerably from one site to another. However, amongst the array of variables, one common factor is the physical distance from the receptor to the site boundary or noise source. The effect of distance attenuation is calculated based on hemispherical radiation from the source to the receptor (due to the fact that most noise sources are radiating from a surface rather than being suspended in free space).

1.6 We know from our experience in dealing with this type of site, that separation distance plays an important role in reducing the impact on nearest receptors. This study therefore considers initially the effect of operating this type of site at different separation distances and determines the distance at which the potential impacts could be significant enough to be unacceptable in consideration of the limitation of typical noise mitigation measures that could be introduced.

1.7 At close distances to a noise source, the noise is less affected by some of the variables mentioned above (i.e. wind, ground cover, temperature, topography and relative humidity). The noise therefore radiates out from the surface and its effect, at close distance, is relatively consistent. It can therefore be applied to help give an indication of the potential impact it may have in a given environment and to assist in formulating the minimum distance at which this type of site may be considered. At greater distance, the effects of the existing ambient and background noise, topography, receptor location, wind direction, ground cover and local character of the area are additional factors which need to be taken into account. The additional factors would be used as part of a more detailed screening process to assess each site on its strengths and weaknesses in respect of potential noise impact.

1.8 For the purpose of this study we are considering residential receptors only. Assessment of commercial/industrial receptors to a potential site would require more detailed local knowledge of any associated office facilities to determine its sensitivity.

Sources of Information

1.9 Information used in this assessment has been obtained from the following sources:

- Background noise studies undertaken by NVC Ltd consultants in rural, semi-rural and urban areas of the UK over the last 10 years.
- Noise impact assessments of associated waste, recycling and composting site studies undertaken by NVC Ltd consultants.
- National noise incidence studies of noise levels within communities (e.g. The National Noise Incidence Study 2000': DEFRA Feb 2002).
- Minerals Policy Statement 2 (MPS2): `Controlling and Mitigating the Environmental Effects of Minerals Extraction in England.
- BS4142: 1997 `Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas
- World Health Organisation (WHO) Guidelines for Community Noise: April 1999
- BS8233: 1999 `Sound insulation and Noise Reduction for Buildings – Code of Practice'.

- Planning Policy Statement 10 (PPS10): Planning for Sustainable Waste Management: July 2005
- Companion Guide to Planning Policy Statement 10: June 2006
- BS5228: Part 1`Noise and vibration control on construction and open sites': 1997

2.0 NOISE POLICY, GUIDANCE AND STANDARDS

2.1 Introduction

2.1.1 In 1990, the National Noise Incidence Survey (BRE, 1990) was undertaken to establish the noise climate outside homes in England and Wales. The study found that 56% of the sample population were exposed to a greater daytime noise level than 55dB(A) L_{Aeq} and 89% exposed to a greater daytime noise level than 50dB(A) L_{Aeq}. This study informed policy development in determining acceptable internal and external noise levels.

2.1.2 In 2000, BRE conducted a national study of environmental noise levels for the Department of the Environment (`The National Noise Incidence Study 2000': DEFRA Feb 2002). The study found that 55 (+/- 3%) of the population of England and Wales live in dwellings exposed to day-time noise levels above the WHO level of 55dB $L_{Aeq,day}$. It also found that 63 (+/- 3%) of the population were exposed above the level of 45dB $L_{Aeq,night}$.

2.1.3 Within the introduction of Planning Policy Guidance 24 ("PPG24"), `*Planning and Noise*': 1994, it states:

> `*The aim of this guidance is to provide advice on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business.*´

2.1.4 The Planning Policy Guidance (PPG) provides the following information:

- indicates how noise issues should be handled in development plans and development control;
- outlines ways of mitigating the adverse impact of noise;
- provides specific guidance on noisy and noise-sensitive development;
- introduces the use of noise exposure categories;
- gives guidance on the use of planning conditions relating to noise.

2.1.5 The guidance introduces the concept of Noise Exposure Categories (NEC), which has been derived to assist local planning authorities in their consideration of planning applications for residential development near transport related noise sources. The NEC procedure is only applicable for the introduction of a new residential development into an area with an existing noise source. Within Annex 1, guidance is given for various types of noise sources, which includes road traffic, aircraft and railways.

2.1.6 For reference, the recommended noise exposure categories for new dwellings near existing sources are shown below in Table 2.1. Note that these noise categories are based on measurements taken in an open site (i.e. without any proposed noise attenuating features in place).

2.1.7 The level at the boundary of NEC A and NEC B is based on guidance provided by the World Health Organisation health criteria from 1980 that "*general daytime outdoor noise levels of less than 55dB(A) Leq are desirable to prevent any significant community annoyance".*

2.1.8 The night-time noise level at the boundary of NEC A and NEC B is also based on the World Health Organisation health criteria, which states that "*based on limited data available, a level of less than 35dB(A) is recommended to preserve the restorative process of sleep".*

Table 2.1: Noise Exposure Categories (NECs) according to PPG24

Noise Levels corresponding to the Noise Exposure Categories for New Dwellings L_{AeqT} dB				
Noise Source	***Recommended Exposure Categories for Dwellings - $L_{Aeq,\ T}$ dB***			
	A	***B***	***C***	***D***
Road Traffic				
(07:00-23:00)	< 55	55 - 63	63 – 72	> 72
(23:00-07:00)	< 45	45 - 57	57 – 66	> 66
Rail Traffic				
(07:00-23:00)	< 55	55 - 66	66 – 74	> 74
(23:00-07:00)	< 45	45 - 59	59 – 66	> 66
Air Traffic				
(07:00-23:00)	< 57	57 - 66	66 – 72	> 72
(23:00-07:00)	< 48	48 - 57	57 – 66	> 66
Mixed Sources				
(07:00-23:00)	< 55	55 - 63	63 – 72	> 72
(23:00-07:00)	< 45	45 - 57	57 – 66	> 66

2.1.9 Within the general guidance it states "*where there is a clear need for new residential development in an already noisy area some or all NECs might be increased by up to 3dB(A) above the recommended levels. In other cases, a reduction of up to 3dB(A) may be justified."*

2.1.10 The following table gives an interpretation of the NEC categories in terms of granting planning permission.

Table 2.2: NEC Category description in terms of planning issues.

NEC Category	**Description**
A	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level.
B	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise.
C	Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.
D	Planning permission should normally be refused.

Other Guidance

BS 8233:1999

2.1.11 The British Standard BS8233: 1999, `Sound insulation and noise reduction for buildings – Code of Practice' provides additional guidance on noise levels within buildings. These are based on the WHO recommendations and the criteria given in the standard for unoccupied spaces within residential properties include the following:

Table 2.3: BS8233: 1999 Internal noise level guidance for dwellings

Criterion	*Typical Situation*	*Design Range , LAeq, dB*	
		Good	*Reasonable*
Reasonable conditions for sleeping and resting	*Living Rooms*	*30*	*40*
Reasonable conditions for sleeping and resting	*ooms*	*30*	*35*
For a reasonable standard in bedrooms at night, individual noise events (measured with the F time-weighting) should not normally exceed 45dB L_{Amax}			

2.1.12 For noisy industrial developments the guidance refers to BS4142 `Method for rating industrial noise affecting mixed residential and industrial areas'.

BS4142: 1997 `Method for rating industrial noise affecting mixed residential and industrial areas'

2.1.13 BS4142: 1997 `Method for Rating industrial noise affecting mixed residential and industrial areas' is based on the measurement of background noise using L_{A90} noise measurements compared to source noise levels measured in L_{Aeq} measurements. The differential between the two measurements; once any corrections have been applied for source noise tonality, distinct impulses etc.; determines the likelihood of complaints. If a differential of +5dB(A) is resultant, then the standard says that the noise is of marginal significance; if the differential is +10dB(A) then complaints are likely. Any assessment of source noise has to be considered in context with the existing ambient noise level in terms of L_{Aeq} and therefore must be corrected for its influence before applying any further tonal corrections and comparing with background noise data.

World Health Organisation (WHO) Guidelines for Community Noise: April 1999

2.1.14 This document provides further updated information on noise and its affects on the community. Within the document for noise `In Dwellings', it states that "The effects of noise in dwellings, typically, are sleep disturbance, annoyance and speech interference". For bedrooms the

critical effect is sleep disturbance. Indoor guideline values for bedrooms are 30dB L_{Aeq} for continuous noise and 45dB L_{Amax} for single sound events. Lower noise levels may be disturbing depending upon the nature of the noise source. At night-time, outside sound levels about 1 metre from facades of living spaces should not exceed 45dB L_{Aeq}, so that people may sleep with bedroom windows open. This value was obtained by assuming that the noise reduction from outside to inside with the window open is 15dB. To enable casual conversation indoors during daytime, the sound level of interfering noise should not exceed 35dB L_{Aeq}. To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55dB L_{Aeq} on balconies, terraces and in outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50dB L_{Aeq}. Where it is practical and feasible, the lower outdoor sound level should be considered the maximum desirable sound level for new development."

Mineral Policy Statement (MPS 2) – Controlling and Mitigating the Environmental Effects of Minerals Extraction in England: 2005 – Annex 2: Noise

2.1.15 MPS 2 is the latest Government advice applicable to the control of noise from surface mineral workings and associated operations in England.

2.1.16 The purpose and scope of the document "*states the planning considerations the Government expects to be applied to noise emissions from surface mineral operations. It covers both surface mineral extraction and surface operations associated with underground mineral extraction, including waste disposal and recycling operations that for an integral part of a mineral working operation. It is not framed with direct reference to other waste disposal and recycling operations. Since these share many operational features with surface mineral operations, waste management operators and waste planning authorities should take account of this Annex alongside Planning Policy Guidance Note 10 (PPG10) Planning and Waste Management.* [Reference: MPS2 Annex 2, paragraph 2.4, page 10]

2.1.17 Under `Planning Conditions' it states "*Planning conditions should be used to apply absolute controls on noise emissions with limits normally being set at particular noise-sensitive properties (the terms used are defined in Appendix 2A). This enables the effect of noise to be related most directly to its impact on local people. In some circumstances, however, it might be more appropriate to set the limits at the site boundary or some other point. Subject to a maximum of 55dB(A) $L_{Aeq,}$1h (free field), MPAs should aim to establish a noise limit at the noise sensitive property that does not exceed the background level by more than 10dB(A). It is recognised, however, that this will in many circumstances, be difficult to achieve without imposing unreasonable burdens on the mineral operator. In such cases, the limit set should be as near that level as practicable during*

normal working hours (0700-1900) and should not exceed 55dB(A) $L_{Aeq,}$1h (free field). Evening (1900-2200) limits should not exceed background level by more than 10dB(A) and night-time limits should not exceed 42dB(A) $L_{Aeq,}$1h (free field) at noise–sensitive dwellings."
[Reference: MPS2 Annex 2, paragraph 2.19, page 15-16]

Planning Policy Statement 10 (PPS10): Planning for Sustainable Waste Management

2.18 A package was announced by Government on 21 July 2005 to help councils deliver the waste management facilities urgently needed to manage waste more effectively. PPS10 sets out the Government's policy to be taken into account by waste planning authorities and forms part of the national waste management plan for the UK. In terms of noise there is no specific guidance, within Annex E under the heading of `noise and vibration' it states "*Considerations will include the proximity of sensitive receptors. The operation of large waste management facilities in particular can produce noise both inside and outside buildings. Intermittent and sustained operating noise may be a problem if not kept to acceptable levels and particularly if night-time working is involved."*

2.2 Construction Noise

2.2.1 For construction noise PPG24 draws attention to British Standard BS 5228, Part 1. This is an approved code of practice under the Control of Pollution Act and consequently there is a legal requirement for construction noise to be controlled according to the recommendations given in BS5228. The Standard does not give noise limits for construction sites, but emphasis is placed on ensuring that best practical means are adopted to control noise on site.

2.3 Road Traffic Noise

2.3.1 No guidance is given in planning guidance in relation to the assessment of increased traffic noise from existing roads as a result of traffic generated by new developments. Furthermore, noise generated by traffic on the public highway as a result of a particular development is not considered to be the responsibility of the promoter of that development. However, any change in noise levels along affected roads is relevant to planning.

2.4 Discussion over Relevant Noise Criteria

2.4.1 In respect of noise criteria appropriate to this type of site, consideration of planning guidance found within PPG24, PPS10 and MPS2 Annex 2 should be taken into account. Additional consideration of BS4142: 1997 is necessary when considering industrial noise where it is mixed with residential areas.

2.4.2 The general principles of the above guidance relates to either achieving a fixed absolute noise level in outdoor living areas, which is deemed to provide a reasonable environment for people to enjoy their surroundings during the daytime [i.e. 50-55dB(A) Leq] or in very quiet areas or times of the day/night to relate it to an increase above the existing background noise [i.e. 5dB(A) to 10dB(A) above background noise, measured in terms of LA90].

3.0 BASELINE NOISE LEVELS

3.1 The relevant noise criteria for any particular site are therefore likely to be subject to consideration of the existing background noise level at a specific residential location or community.

3.2 The background noise is measured in terms of LA90. This noise index gives an indication of the lower limit or levels of the fluctuating noise. It is the "A weighted" noise level exceeded for 90 per cent of the specified measurement period (T). e.g. If the measurement period was over 10 hours and the L_{A90} reading was say 50dB, then this means that for 9 hours out of 10 the level went above 50dB.

3.3 For any given location and environment, the level of background noise will depend on many factors, which could include one or more of the following:

(i) Distance to local road network
(ii) Distance to other transportation networks (e.g. airport, ferry ports, marinas etc)
(iii) Distance from the sea
(iv) Location of any existing industrial areas
(v) Distance to trees and vegetation
(vi) Local farming activities
(vii) Local topography
(viii) Number of properties local to the monitoring position

3.4 The surrounding area for any given residential location will define its environment, which we can divide into 3 categories:

(a) Rural
(b) Semi-rural
(c) Industrial

3.5 Rural areas are normally relatively remote from any significant transportation networks, within the countryside and away from any significant industrial development. Industrial areas are, as it suggests, normally found within industrial zones where they are relatively close to transport networks. Semi-rural areas are those areas having perhaps being remote from town centres but still having some local industry or transport networks within their locality.

3.6 In terms of background noise levels for different types of receptor areas, we have examined library data from noise surveys undertaken by NVC over the last 5 years or so to determine a typical range that would be expected for the three categories. The results of this analysis is summarised in table 3.1 below.

Table 3.1: Typical background noise levels in rural, semi-rural and urban

Type of Residential Receptor Area	Time Period	Typical Background Noise Level Range LA90 (dB)
Rural	Daytime	30-39
Rural	Night-time	26-36
Semi-rural	Daytime	31-59
Semi-rural	Night-time	32-45
Urban	Daytime	46-62
Urban	Night-time	41-48

3.7 As expected, the above table shows a general increase in background noise level from rural to industrial areas due to the influence of local noise sources in close proximity to receptor positions.

4.0 SOURCE NOISE LEVELS

4.1 As part of this study we have reviewed empirical and library test data obtained from surveys and assessments undertaken over the last few years at green waste reception, composting and recycling sites which contain the type of noises being considered.

4.2 Some of the key noise sources that require consideration would include for example:

In-vessel Composting Facility (IVC)

(i) Receiving hall- daytime only
(ii) HGVs loading and unloading – indoors, daytime only
(iii) Green waste/compost shredding and screening – indoors, daytime only
(iv) Fans for building ventilation, process aeration, bio-filters – at least some fans will be operating continuously 24 hours per day, 7 days per week.
(v) Liquid pumps – likely to be intermittent operation day or night
(vi) Mobile plant (e.g. loading shovels) – day time only
(vii) Conveyors – daytime only
(viii) Occasional maintenance noise – mostly day time

Domestic Green Waste Reception (Daytime only)

(i) Vehicle movements – skip wagons, cars, vans, trailers
(ii) Lifting and putting down of skips – occasional
(iii) Human noise – from a few operatives/users

Commercial Green Waste Reception (Daytime only)

(i) Vehicle movements – HGVs, commercial trucks, vans
(ii) Mobile plant (loading shovel)
(iii) Human noise – from a few operatives/users

Recyclables Reception (Civic Amenity Site – Daytime Only)

(i) As per green waste reception, plus
(ii) Material movement impacts – outdoors, daytime only

4.3 It is possible that there could be a combination of the above facilities at a particular site and therefore the cumulative effect in terms of noise should be taken into account.

4.4 The empirical data has been analysed from the above type of development and corrected for varying distance from site boundary positions to establish typical source noise levels at receptor positions.

4.5 For the purpose of the prediction of typical site noise levels, we have assumed that the site/s have either minimal noise amelioration measures to control noise (to represent the highest likely noise level) or they incorporate noise control features typical to this type of development (e.g. boundary screening, building insulation, ventilation system silencers). We have assumed that the site boundary is approximately 10 metres from the facility.

4.6 The following tables show the results of the noise predictions for the above facilities at distances of 25 metres, 50 metres, 100 metres, 150 metres and 200 metres from typical site boundary positions. For night-time periods, the only plant likely to be operating will be the ventilation system, pumps and the bio-filter system at the IVC facility.

Table 4.1: Results of Noise Predictions at Varying Distance for In-vessel Composting (Daytime)

Type of Facility	Distance (m)	Predicted Noise Level $L_{Aeq\ 16hr}$ (dB)	Noise control features
In-vessel Composting	25	74	None
In-vessel Composting	50	69	None
In-vessel Composting	100	64	None
In-vessel Composting	150	60	None
In-vessel Composting	200	58	None
In-vessel Composting	25	56	Included
In-vessel Composting	50	51	Included
In-vessel Composting	100	46	Included
In-vessel Composting	150	42	Included
In-vessel Composting	200	40	Included

Table 4.2: Results of Noise Predictions at Varying Distance for Reception Facility (Daytime)

Type of Facility	Distance (m)	Predicted Noise Level $L_{Aeq\ 16hr}$ (dB)	With or without noise control features
Reception	25	62	None
Reception	50	56	None
Reception	100	50	None
Reception	150	46	None
Reception	200	44	None
Reception	25	52	Included
Reception	50	46	Included
Reception	100	40	Included
Reception	150	36	Included
Reception	200	34	Included

Table 4.3: Results of Noise Predictions at Varying Distance for In-vessel Composting (Night-time)

Type of Facility	Distance (m)	Predicted Noise Level $L_{Aeq\ 8hr}$ (dB)	Noise control features
In-vessel Composting	25	71	None
In-vessel Composting	50	66	None
In-vessel Composting	100	61	None
In-vessel Composting	150	57	None
In-vessel Composting	200	55	None
In-vessel Composting	25	44	Included
In-vessel Composting	50	39	Included
In-vessel Composting	100	34	Included
In-vessel Composting	150	30	Included
In-vessel Composting	200	28	Included

4.7 The above noise levels are calculated without any allowance for directivity effects, local screening, IVC building orientation and prevailing wind direction, which could provide further attenuation depending on the design and site location.

4.8 If a particular IVC site is combined with a green waste reception facility (with or without recyclables reception) then potentially there would be a cumulative effect on noise levels. The actual level at a particular receptor would depend on the site layout and design as it may be the case that one of the facilities provides a natural barrier to the other. If we assume that they are both contributing equally to a particular receptor the resultant noise level would be as follows:

Table 4.4: Results of Noise Predictions at Varying Distance for combination of In-vessel Composting & Green Waste Facility (Day-time)

Type of Facility	Distance (m)	Predicted Noise Level $L_{Aeq\ 8hr}$ (dB)	Noise control features
IVC & Reception	25	74	None
IVC & Reception	50	69	None
IVC & Reception	100	64	None
IVC & Reception	150	60	None
IVC & Reception	200	58	None
IVC & Reception	25	57.5	Included
IVC & Reception	50	52	Included
IVC & Reception	100	47	Included
IVC & Reception	150	43	Included
IVC & Reception	200	41	Included

4.9 If there is a combination of two types of reception facilities then as an approximate maximum increase, we would allow for +3dB(A) assuming the noise contribution at the receptor is equal.

5.0 CONCLUSIONS

5.1 Noise Criteria

5.1.1 Section 2.0 of this report provides details of relevant noise guidance and criteria that is likely to be considered. Using an absolute level for determining a design level for daytime is likely to relate to World Health Organisation (WHO) guidance and Planning Policy Guidance (PPG24), which advises that external levels should be aimed at a level of 50dB-55dB $L_{Aeq\ 16hr}$. For night-time periods, the guidance would relate to an external noise level of 40-45dB(A) $L_{Aeq\ 8hr}$.

5.1.2 Applying a criteria based on achieving an allowance above the existing background noise (as in the case of BS4142 and MPS2) would require achieving a design level of background noise (in terms of L_{A90}) +5dB to +10dB.

5.1.3 Section 3.0 of this report provides indicative background noise levels for different types of environment from residential rural areas to areas near industry. The following table considers the above criteria and compares the expected range of background noise levels for each type of residential area.

Table 5.1: Design Noise Criteria & Typical Background Noise

Type of Residential Area	Time Period	Range Background Noise Levels LA90 dB	Daytime Criteria LAeq dB_{16hr} WHO/PPG24 or BS4142/MPS2	Night-time Criteria LAeq dB_{8hr} WHO/PPG24 or BS4142/MPS2
Rural	Daytime	30-39	50-55 or 35-49	-
Rural	Night-time	26-36	-	40-45 or 31-46
Semi-rural	Daytime	31-59	50-55 or 36-69	-
Semi-rural	Night-time	32-45	-	40-45 or 37-55
Industrial	Daytime	46-62	50-55 or 51-72	-
Industrial	Night-time	41-48	-	40-45 or 46-58

5.1.4 Section 4.0 of this report details the predicted noise levels from the type of site proposed based on empirical data with a basic building construction (i.e. single skin cladding for the IVC building) and an indication of the likely improvement with insulated cladding, boundary screening and ventilation system silencers.

5.1.5 We have considered the `worst case' scenario of a rural environment away from any significant transport network (i.e. main roads, airport, ports and marinas), which is typical of the Jersey noise climate. This is considered on the basis of the site with and without noise amelioration measures. Tables 5.2 and 5.3 shows the results of the comparison for

an IVC and Green Waste facility:

Table 5.2: Comparison showing expected background noise, design criteria and predicted site noise level (IVC) including noise control measures

Type of Area	Time Period	Distance (m)	Range Background Noise Levels LA90 dB	Design Criteria LAeq dB_{16hr} WHO/PPG24 or BS4142/MPS2	Predicted Noise Level
Rural	Daytime	25	30-39	50-55 or 35-49	56
Rural	Night-time	25	26-36	40-45 or 31-46	44
Rural	Daytime	50	30-39	50-55 or 35-49	51
Rural	Night-time	50	26-36	40-45 or 31-46	39
Rural	Daytime	100	30-39	50-55 or 35-49	46
Rural	Night-time	100	26-36	40-45 or 31-46	34
Rural	Daytime	150	30-39	50-55 or 35-49	42
Rural	Night-time	150	26-36	40-45 or 31-46	30
Rural	Daytime	200	30-39	50-55 or 35-49	40
Rural	Night-time	200	26-36	40-45 or 31-46	28

Table 5.3: Comparison showing expected background noise, design criteria and predicted site noise level (Green Waste) with and without noise control measures

Type of Area	Time Period	Distance (m)	Range Background Noise Levels LA90 dB	Design Criteria LAeq dB_{16hr} WHO/PPG24 or BS4142/MPS2	Predicted Noise Level
Rural	Daytime	25	30-39	50-55 or 35-49	52-62
Rural	Daytime	50	30-39	50-55 or 35-49	46-56
Rural	Daytime	100	30-39	50-55 or 35-49	40-50
Rural	Daytime	150	30-39	50-55 or 35-49	36-46
Rural	Daytime	200	30-39	50-55 or 35-49	34-44

5.1.6 Table 5.2 would indicate that at a distance of 50 metres the predicted noise level for the IVC facility during the daytime is within the design limit range based on an absolute noise limit, but is just above the design range based on an allowance above background noise (i.e. BS4142 or MPS2). For night-time, the predicted noise level is within the design range but could still exceed the lowest possible criteria based on an allowance above background noise. Depending on the site location, topography and site design it may be possible to reduce the predicted noise levels further, however at a distance closer than 50 metres the required reduction to meet the lower design criteria range is likely, on a balance of probability, to be impracticable for any given location.

5.1.7 For Green Waste facilities, the results would indicate that at a distance of 50 metres (with noise control measures), the resultant levels are likely to be within the absolute design range and within or above the more stringent criteria (i.e. using BS4142). At distances closer than 50 metres the predicted levels would exceed both design criteria ranges to an extent that it would be difficult to reduce noise to an acceptable level.

5.1.8 If we consider the possibility that there could be a combination of IVC and reception facilities at a particular rural site, then this has been shown to increase the overall noise level by about 1dB(A). This is therefore unlikely to change the conclusion regarding separation distance.

5.1.9 If we consider the possibility that there could be a combination of more than one type of reception site together then the `worst case' scenario would be that this could increase noise levels at the receptor by 3dB(A). In this situation the 50 metre separation distance may or may not be adequate as it will depend on the existing background noise specific to the site.

5.1.10 If we consider other types of areas (i.e. semi-rural and industrial) at 50 metres distance it shows the following:

Table 5.4: Comparison showing expected background noise, design criteria and predicted site noise level (IVC or reception) with and without noise control measures in Semi-rural and Industrial areas

Type of Area	Type of Site	Time Period	Distance (m)	Range Background Noise Levels LA90 dB	Design Criteria LAeq dB_{16hr} WHO/PPG24 or BS4142/MPS2	Predicted Noise Level
Semi-rural	IVC	Daytime	50	31-59	50-55 or 36-69	51
Industrial	IVC	Daytime	50	46-62	50-55 or 51-72	51
Semi-rural	Reception	Daytime	50	31-59	50-55 or 36-69	46-56
Industrial	Reception	Daytime	50	46-62	50-55 or 51-72	46-56

5.1.11 In conclusion, the results of the analysis of rural areas would indicate, that IVC or reception site boundaries within 50 metres of the nearest residential receptor is likely to generate noise levels above a reasonable noise criteria. At distances below 50 metres, the resultant additional noise reduction necessary would be too great for any practicable noise control to provide adequate attenuation.

5.1.12 In semi-rural areas the results would still indicate that a separation distance within 40 meters of an IVC or reception site is likely to exceed noise criteria (based on a reasonable exceedance above background) but it would depend on the prevailing background noise level at the specific receptor.

5.1.13 In industrial areas the results show that for an IVC site within 40 metres distance of sensitive receptors it should be rejected. Reception sites within 30m should be rejected. Sites containing more than one type of reception or in combination with IVC should be rejected if within 50m of a sensitive receptor.

5.1.14 It must be noted that the above analysis takes into account noise associated with that occurring on site but does not take into account any impact associated with HGV and vehicular noise along the route to site, which may be an additional factor depending on the route passed residential receptor positions.

5.1.15 The following table summarises the minimum recommended separation distance between facility boundaries and residential sensitive receptors. If the separation distance between the facility boundaries and sensitive receptors are less than the minimum recommended in the following table then the site should be rejected.

Table 5.5: Minimum Recommended Separation Distance to Residential Receptor

Type of Site	Rural Location	Semi-Rural Location	Industrial Location
IVC	50m	40m	40m
Single reception	50m	40m	30m
Multiple/combined facility	50m	50m	50m

REFERENCES

World Health Organisation (WHO) Guidelines for Community Noise: April 1999

BS4142: 1997 Method for rating industrial noise affecting mixed residential and industrial areas.

BS7445: 1991 - Description and measurement of environmental noise.

Minerals Policy Statement 2 (MPS2): `Controlling and Mitigating the Environmental Effects of Minerals Extraction in England.

BS8233: 1999 `Sound insulation and Noise Reduction for Buildings – Code of Practice'.

Planning Policy Statement 10 (PPS10): Planning for Sustainable Waste Management: July 2005

Companion Guide to Planning Policy Statement 10: June 2006

BS5228: Part 1`Noise and vibration control on construction and open sites': 1997

APPENDIX 1

BASIC ACOUSTIC TERMINOLOGY

Sound is produced by mechanical vibration of a surface, which sets up rapid pressure fluctuations in the surrounding air.

Sound Pressure Level is a measurement of the size of these pressure fluctuations. It is expressed in decibels (dB) on a logarithmic scale. Each 3 dB increase in sound pressure level represents a doubling of the sound energy. The threshold of hearing is approximately 0 dB.

The rate at which the pressure fluctuations occur determines the pitch or frequency of the sound. The frequency is expressed in Hertz (Hz), that is, cycles per second. The human ear is sensitive to sounds from about 20 Hz to 20,000 Hz. Although sound can be of one discrete frequency - a 'pure tone' - most noises are made up of many different frequencies.

The human ear is more sensitive to some frequencies than others, and modern instruments can measure sound in the same 'subjective' way. This is the basis of the A-weighted sound level dB(A), normally used to assess the effect of noise on people. The dB(A) weighting emphasises or reduces the importance of certain frequencies within the audible range.

Noise Measurement

The measurement of sound pressure level is only really meaningful where the level of noise is constant. In the typical industrial environment noise levels can vary widely and sometimes short duration high levels of noise are interspersed with periods of relative quiet. The most widely used means of 'averaging' the noise over a period of time is the Equivalent Continuous Sound Level. Normally written as L_{Aeq} this value takes into account both the level of noise and the length of time over which it occurs. There are many meters available which are capable of measuring L_{Aeq} by electronic integration over the measurement period.

The L_{Aeq} or A-weighted equivalent continuous noise level is a measure of the total noise energy over a stated time period and includes all the varying noise levels and re-expresses as an 'average', allowing for the length of time for which each noise level was presented.

The L_{An} parameters are defined as the noise levels which are exceeded for n% of the monitoring period, thus, for example, the L_{A90} parameter is the noise level exceeded for 90% of the 15 minute period, i.e. 13.5 minutes. The L_{A50} parameter is the noise level exceeded for 50% of the hourly period, i.e. 30 minutes, etc. The L_{max} parameter is the maximum rms A-weighted noise level occurring during the measurement period.

The definition in layman's terms is given below for terminology used in the measurement and results obtained during the survey work.

A-weighting: Normal hearing covers the frequency (pitch) range from about 20Hz to 20,000 Hz but sensitivity of the ear is greatest between about 500Hz and 5000Hz. The "A-weighting" is an electrical circuit built into noise meters to mimic this characteristic of the human ear.

Ambient noise: The totally encompassing sound in a given situation at a given time usually composed of sound from many sources near and far.

Attenuation: Noise reduction

Background noise: The general quiet periods of ambient noise when the noise source under investigation is not there.

Decibel (dB): The unit of measurement for sound based on a logarithmic scale. 0dB is the threshold of normal hearing; 140dB is the threshold of pain. A change of 1dB is only detectable under controlled laboratory conditions.

dB(A) [decibel A weighted]: Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) serves to distinguish sounds of different frequency (or pitch) in a similar way to how the human ear responds. Measurements in dB(A) broadly agrees with an individual's assessment of loudness. A change of 3dB(A) is the minimum perceptible under normal everyday conditions, and a change of 10dB(A) corresponds roughly to doubling or halving the loudness of sound.

dB(C): [decibel C weighted]: Frequency weighting which does not alter low frequency octave band levels by very much compared to `A' weighting. Similar to linear reading (i.e. linear does not alter frequency spectra at all)

Frequency (Hz): The number of sound waves to pass a point in one second.

L_{Aeq}: This is a noise index used to describe the "average" level of a noise that varies with time (T). It allows for the different sensitivities of the human ear to different frequencies (pitch), and averages fluctuating noise levels in a manner, which correlates well with human perceptions of loudness.

$L_{A10,T}$: This noise index gives an indication of the upper limit or peak levels of the fluctuating noise. It is the "A weighted" noise level exceeded for 10 per cent of the specified measurement period (T). e.g. If the measurement period was over 10 hours and the L_{A10} reading was say 60dB, then this means that for 1 hour out of 10 the level went above 60dB.

$L_{A90,T}$: This noise index gives an indication of the lower limit or levels of the fluctuating noise. It is the "A weighted" noise level exceeded for 90 per cent of the specified measurement period (T). e.g. If the measurement period was over 10 hours and the L_{A90} reading was say 50dB, then this means that for 9 hours out of 10 the level went above 50dB.

L_{Amax}: This is the highest `A' weighted noise level recorded during a noise measurement period.

Residual noise: The ambient noise remaining at a given position in a given situation when the noise source under investigation is not there.

Specific noise: The noise source under investigation for assessing the likelihood of complaints

Noise Terminology

Sound is produced by mechanical vibration of a surface, which sets up rapid pressure fluctuations in the surrounding air.

Between the quietest audible sound and the loudest tolerable sound there is a million to one ratio in sound pressure level. It is because of this wide range that a noise level scale based on logarithms is used in noise measurement. This is the decibel or dB scale.

Audibility of sound covers a range of about 0 to 140 decibels (dB) corresponding to the intensity of the sound pressure level. The ability to recognise a particular sound is dependent on the pitch or frequencies present in the source. Sound pressure measurements taken with a microphone cannot differentiate in the same way as the ear, consequently a correction is applied by the noise measuring instrument in order to correspond more closely to the frequency response of the ear which responds to sounds from 20 Hz to 20000 Hz. This is known as 'A weighting' and written as dB(A).

The use of this unit is internationally accepted and correlates well with subjective annoyance to noise.

The logarithmic basis of noise measurements means that when considering more than one noise source their addition must be undertaken in terms of logarithmic arithmetic. Thus, two noise sources each of 40 dB(A) acting together would not give rise to 40 + 40 = 80 dB(A) but rather 40 + 40 = 43 dB(A). This 3dB(A) increase represents a doubling in sound energy but would be only just perceptible to a human ear.

The following table gives typical noise levels in terms of dB(A) for common situations.

Approximate Noise Level dB(A)	***Example***
0	Threshold of hearing
30	Rural area at night, still air
40	Public library
50	Quiet office, no machinery
60	Normal conversation
70	Inside a saloon car
80	Vacuum cleaner
100	Pneumatic drill
140	Threshold of pain

Noise levels can vary with time according to source activity and indices have been developed in order to be able to assign a value to represent a period of noise level variations and to correspond with subjective response.

The L_{Aeq} or A weighted equivalent continuous noise level index is used to average the noise energy over a period of intermittent noise levels. It is the level of steady sound of equivalent energy and is usually referred to as the ambient noise level.

The background noise level, defined as the L_{A90} parameter, represents the noise level exceeded for 90% of a measurement period, or the ninety percentile level. It generally reflects the quieter noise level between noise events and generally ignores the effects of short-term higher noise level events. (For example if the LA90 level measured was 50dB over 10 hours then for 9 hours the level exceeded 50dB).

APPENDIX 2

Engineer's Experience & Qualifications

Dean Robert Kettlewell - MSc MIOA MAE I.Eng
(Director & Principle Acoustic Consultant)

Précis

As Director and Principle Acoustic Consultant with Noise & Vibration Consultants Ltd, Dean has 25 years background experience in a wide range of issues relating to environmental, industrial and commercial noise and vibration assessment. He currently manages corporate and unit specific contracts for:

- Environmental Noise Impact Assessments
- Integrated Pollution Prevention and Control (IPPC) Applications
- Industrial Noise Assessment and Control
- Assessment of Environmental & Industrial Noise Nuisance
- Building Acoustics and Sound Insulation Tests
- Planning Issues for Residential and Commercial Development
- Noise at Work Regulations Assessments
- Entertainment Noise Assessment and Control
- Expert Witness representation for Deafness and `Vibration White Finger' Claims
- Architectural Acoustics
- Specialist knowledge in the Design of Noise Control Systems
- Ground borne vibration measurement and assessment
- Project Management of Noise Control Systems
- Hand-arm Vibration Assessments

With an MSc in Applied Acoustics, Dean's strengths lie not only in his extensive knowledge but also his significant experience in practical implementation of noise control systems. This enables him to relate and converse with people in all fields, levels of management and community groups.

As well as providing consultancy advice, Dean is registered as an expert witness with the Law Society Register of Expert Witnesses and has provided his expert opinion in court cases over many years.

Dean has broadened his knowledge over the years within a wide range of specialised areas of acoustics, which complement his earlier `hands-on' design and practical experience within the field of industrial and environmental acoustics.

Before forming NVC Ltd, Dean has worked with other consultancies as Senior and Principle Acoustic Consultant, managing small and large-scale projects within the public and private sectors.

Coupled with this, Dean has led a number of projects examining the issue of low frequency noise and has completed an MSc thesis based on this subject matter.

<u>Specialised Subject</u>

- Environmental Noise Impact Assessments
- Noise and Planning (PPG24, PAN 56, TAN11)
- Waste Recycling Noise Assessments
- Integrated Pollution Prevention and Control
- Noise at Work Regulation Assessment
- Low Frequency Noise Assessment
- Expert Witness Representation for Deafness and VWF Claims
- Noise Nuisance
- Hand-Arm Vibration Assessments
- Building Acoustics
- Entertainment Noise
- Industrial Noise Assessment and Control
- Wind Farm Assessment

Noise & Vibration Consultants Ltd, 56a Leabrooks Road, Somercotes, Derbyshire DE55 4HB
Tel: 01773 607483 Mobile: 07802 853 500
Fax: 01773 603331
Email Address: drk.nvc@btopenworld.com

Industrial Sector Expertise (with examples)

- Waste Management (Biffa Waste, Onyx, WRG, Easco, SELCHP, MES, John Lawrie Group, Lincolnshire County Council, Wrexham CBC)
- Mining (British Coal, Lafarge, RMC, Hanson)
- Paper and Board (Kruger, Charapak)
- Power Generation (Powergen, Cummins, Berry Bros)
- Local Authorities (Wrexham CBC, Amber Valley BC)
- Glass and Glass Fibre (Lambert GT and Owens Corning)
- *Water Management (Ondeo Degremont, South Staffs Water)*
- *Engineering (Welbeck,Hunt & Rogers Automotive)*
- Transport (Hanson, Maurice Hill)
- Foundries (Herbert Cotterill, GKN, Bulldog Tools)
- Construction and Demolition (Wilson Bowden, North Midlands Construction)
- Oil and Gas (British Gas, BP)

Examples of Environmental & Commercial Experience

- Environmental Impact Assessment (RAF Bracknell, ADAS,WRG)
- IPPC Assessments (WRG, SELCHP, Onyx, MES Environmental, Welbeck, Saint Gobain, MES Environmental, SELCHP, WRE)
- Noise Nuisance (Numerous residential/industrial sites in UK)
- Building Acoustics (Center Parcs,Columbia Design and Build)
- Entertainment Noise (Young & Pearce, KMS, Bulldog Pub Co)
- Planning and Noise (David Wilson Homes, Redrow, Persimmon Homes, Miller Homes)
- Deafness and VWF Claims (Whittles Solicitors, Rowley Ashworth, Tinsdills)
- Hand-Arm Assessments (Marshalls, Tarmac,)

International Experience (with examples)

- Tunisia (British Gas)
- Switzerland (CERN)
- Italy (Glass Tempering Factory)
- Germany/Denmark (Wind Farm Assessment)

Professional Accreditation

- Registered as an Expert Witness with Law Society Register of Expert Witnesses
- Certificate of Competence in Noise at Workplace Assessment

Relevant Work Experience

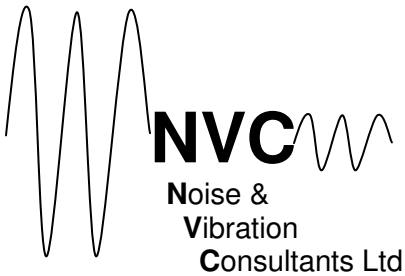
Director & Principle Consultant - Noise & Vibration Consultants Ltd 2001 - present
Senior Acoustic Consultant - *Vibrock Limited 1998 - 2001*
Associate & Principle Acoustic Consultant - John Savidge & Associates 1994 - 1998
Technical Manager – LBJ (Noise Control Division) 1990 - 1994
Technical Engineer/ Technical Manager (1988) - Vibac (Noise Control) Ltd 1982 - 1990

Qualifications and Education

M.Sc. Applied Acoustics (Distinction - Derby University)
HNC Electrical & Electronic Engineering
IOA Diploma in Acoustics & Noise Control (Merit)
IOA Certificate in Law and Administration
Certificate of Competence in Workplace Noise Assessment
Certificate of Competence in Ground Vibration Monitoring
Post Graduate Certificate in Applied Acoustics

Single Joint Expert Training received to meet new civil procedure rules for expert witnesses (July 1999) with Bond Solon Training.
Advanced Courtroom Skills (November 1994) with Bond Solon Training

Affiliations: Member of Institute of Acoustics (MIOA)
Member of Academy of Experts (MAE)
Member of Association of Noise Consultants (ANC)
Incorporated Engineer (I.Eng)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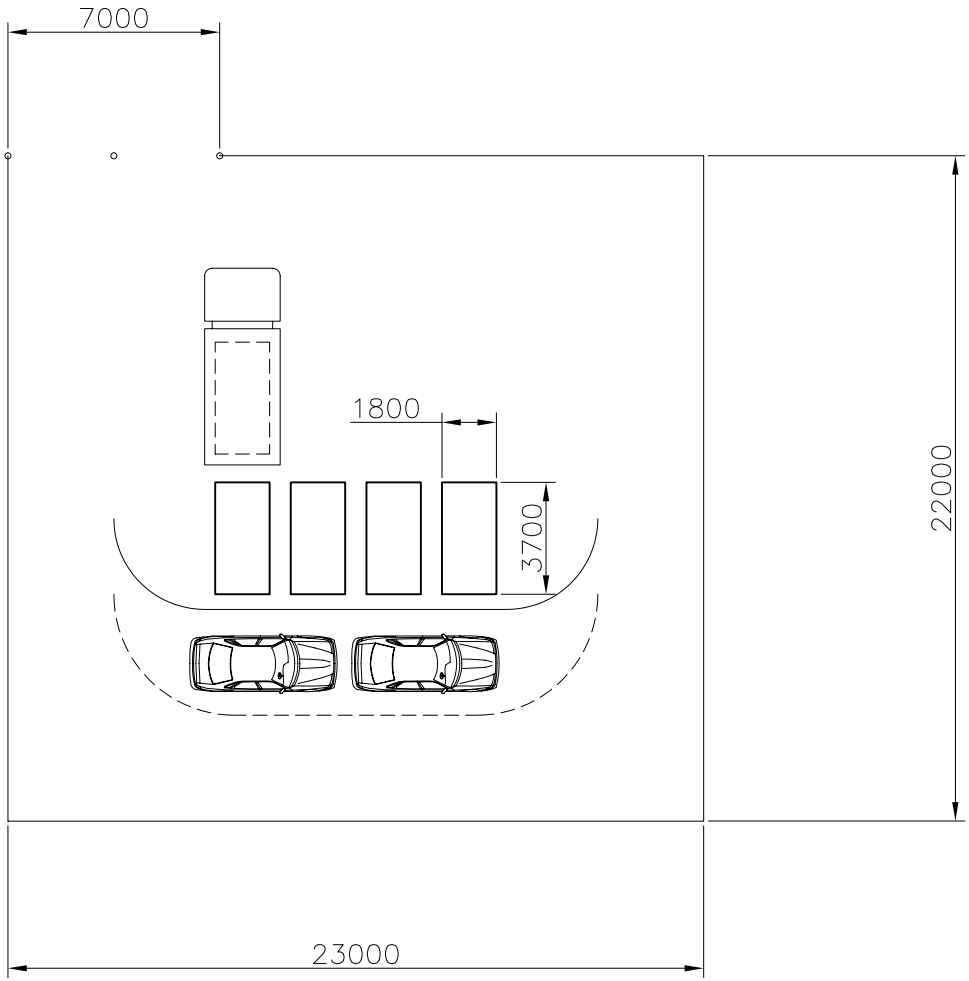
Appendix E Drawings & Maps



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Checked By: ASV	22.5.07					
CAD Ref.: 871-017-A1						

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Site	
Project	Green Waste Composting
Title	Partial Domestic Reception Vehicle Drive By
Office of Issue	STOCKPORT
Telephone No.	0161-476 0032

FICHTNER
CONSULTING ENGINEERS LIMITED
8 Acorn Business Park, Heaton Lane
Stockport, Cheshire SK4 1AS
Tel: 0161-476 0032 Fax: 0161-474 0618

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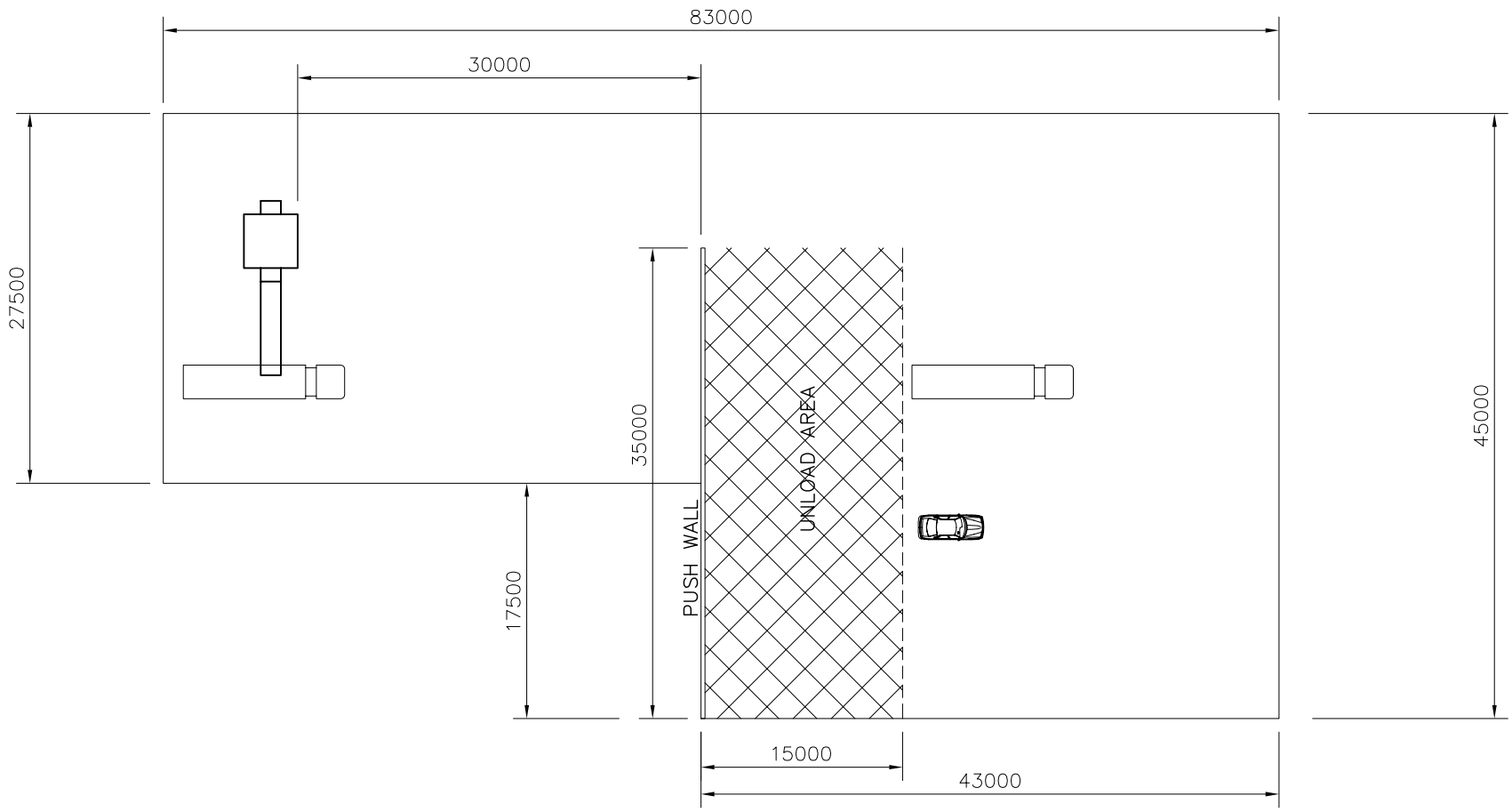

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Rev.	Amendment	By	Chkd	Date
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A2	PRELIMINARY	RK		19.7.07

Client	Jersey TTSD
Site	
Project	Green Waste Composting
Title	Domestic Reception+ Commercial Reception + Shredding Outline Layout
Office of Issue	STOCKPORT
Telephone No.	0161–476 0032

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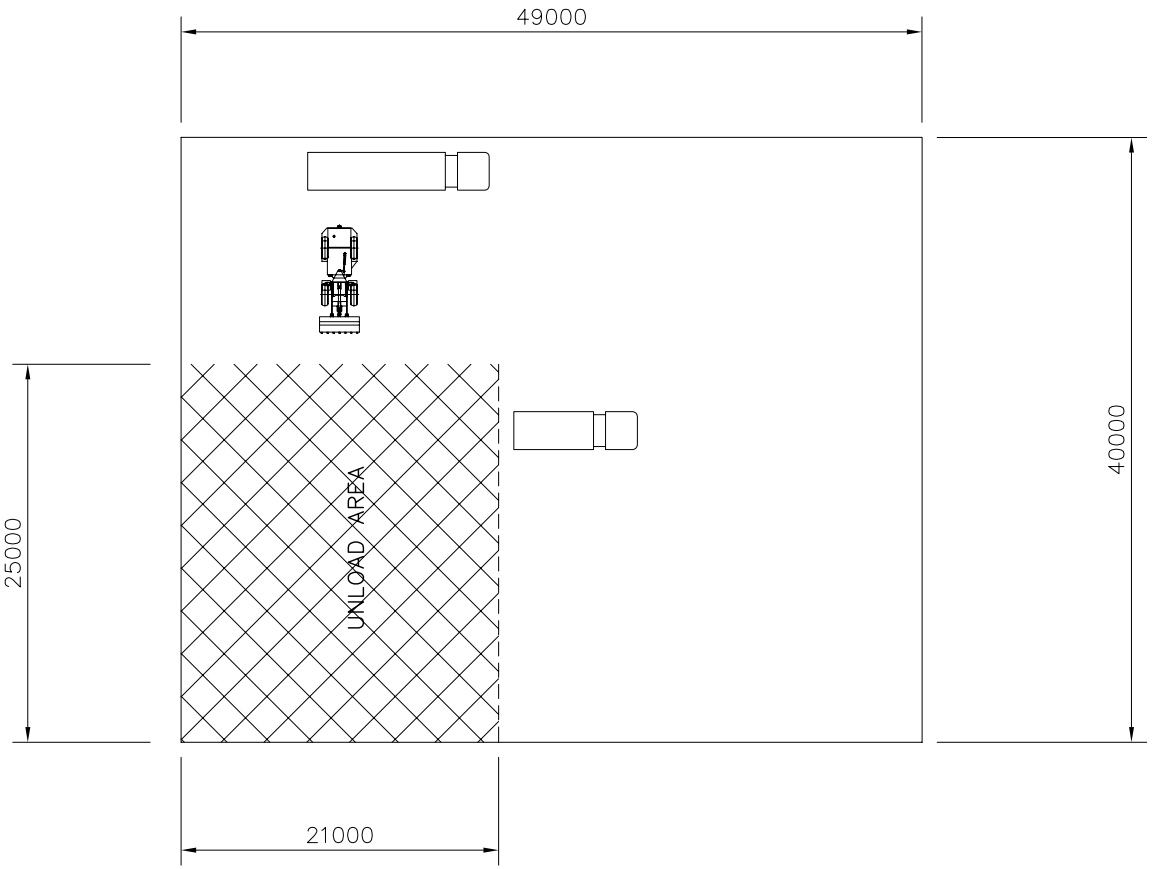

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Site			
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Title	Commercial Reception Outline Layout		
Office of Issue	STOCKPORT	Telephone No.	0161-476 0032

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Stockport, Cheshire SK4 1AS
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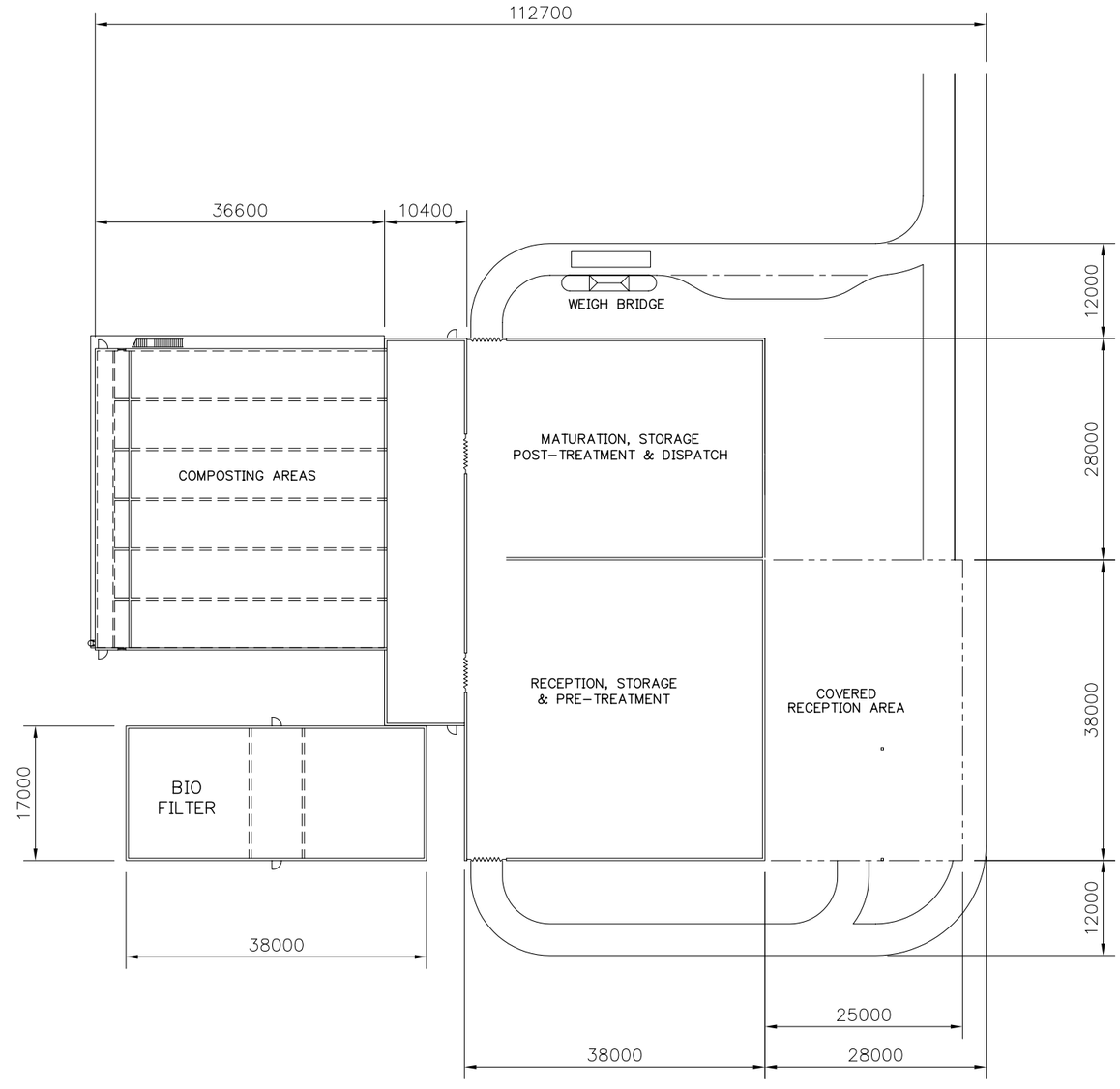

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Project	Green Waste Composting
Title	Single Site Composting – Green Waste Only Outline Layout
Office of Issue	STOCKPORT
Telephone No.	0161-476 0032

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8 Acorn Business Park, Heaton Lane
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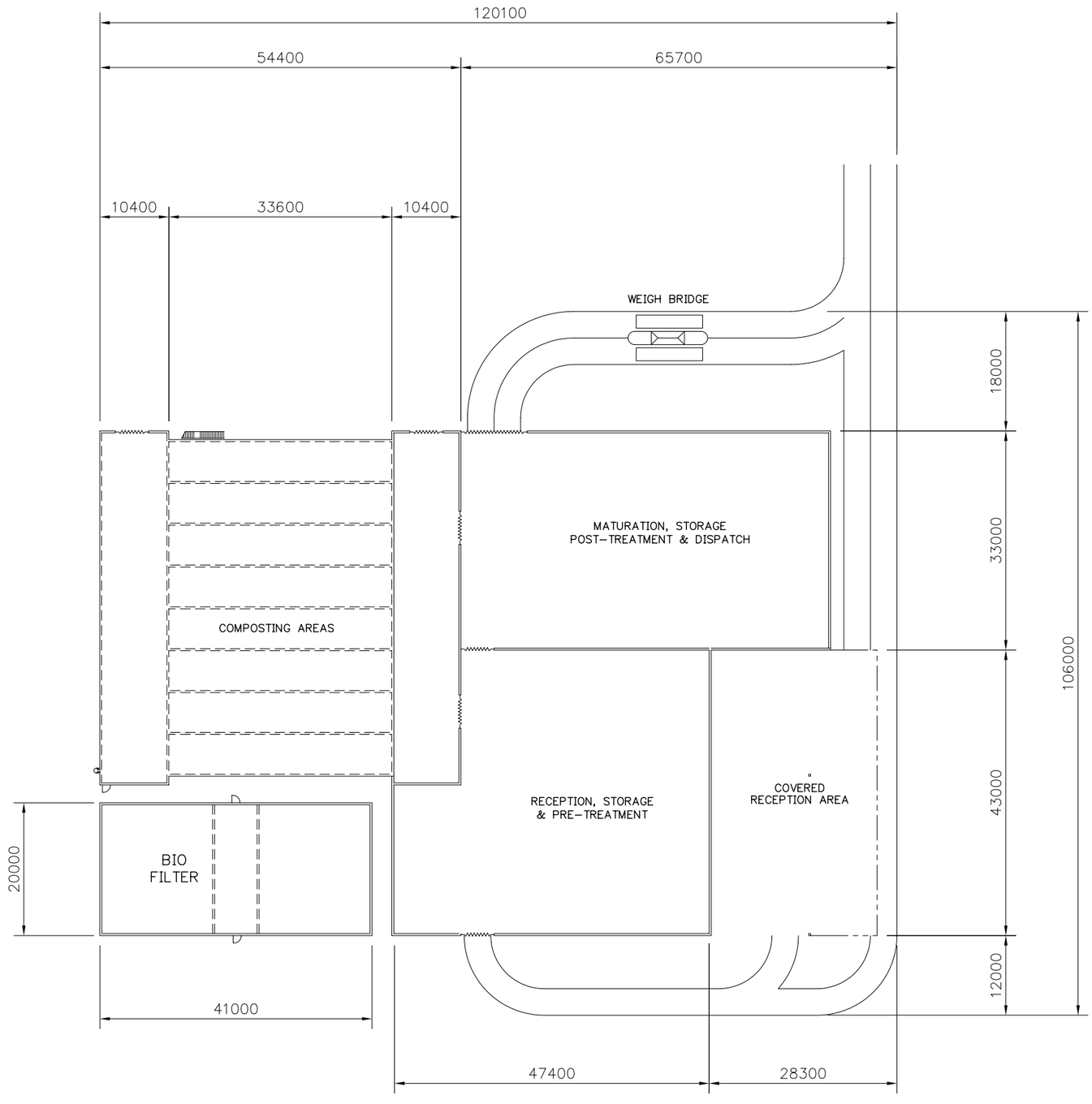

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Client	Jersey TTSD
Site	
Project	Green Waste Composting
Title	Single Site Composting Green + Kitchen Waste
Office of Issue	STOCKPORT
Telephone No.	0161–476 0032

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Tel: 0161–476 0032 Fax: 0161–474 0618

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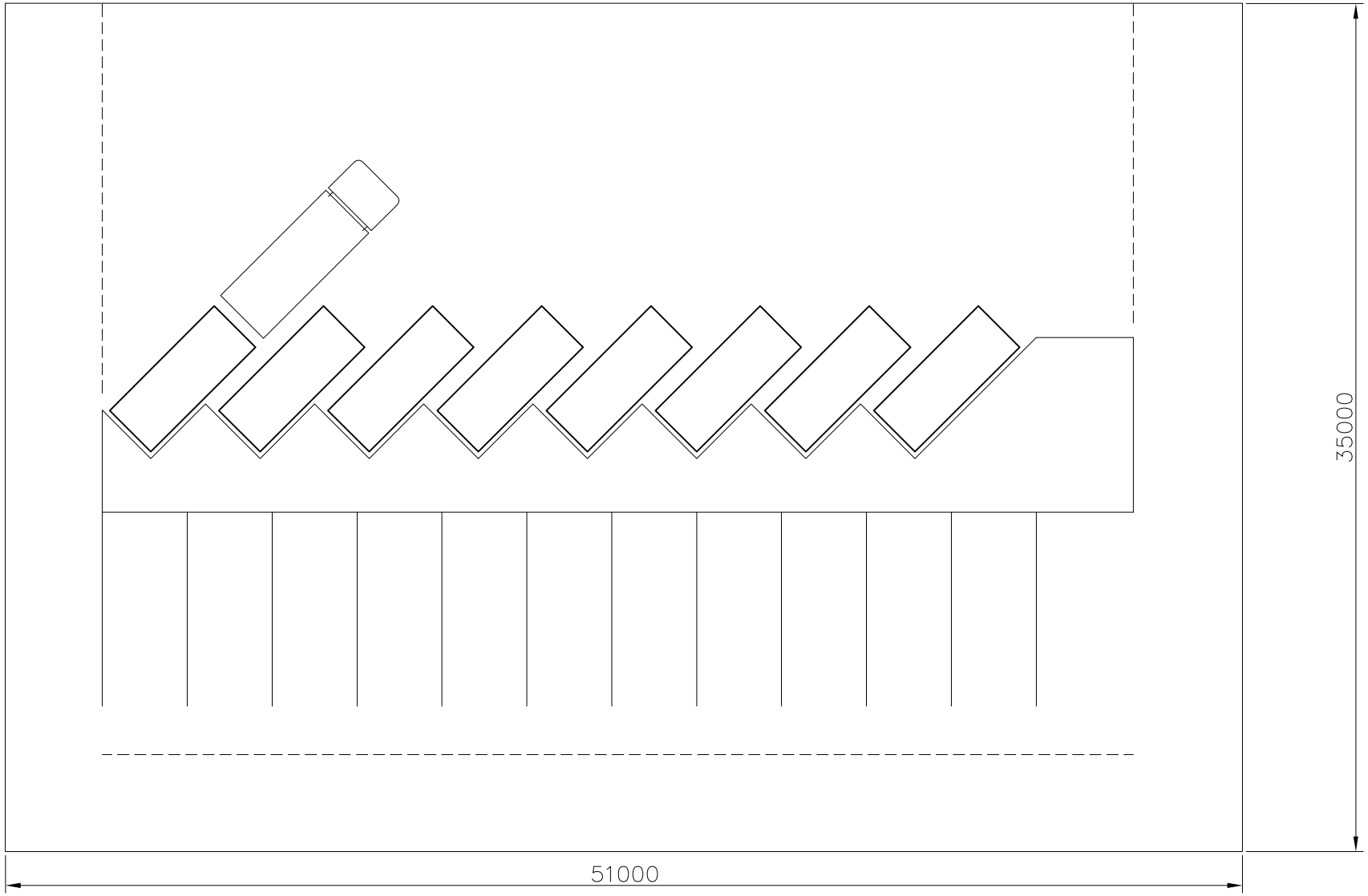

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Site			
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Title	Domestic Reception Large Skips		
Office of Issue	STOCKPORT	Telephone No.	0161-476 0032

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Stockport, Cheshire SK4 1AS
Tel: 0161-476 0032 Fax: 0161-474 0618

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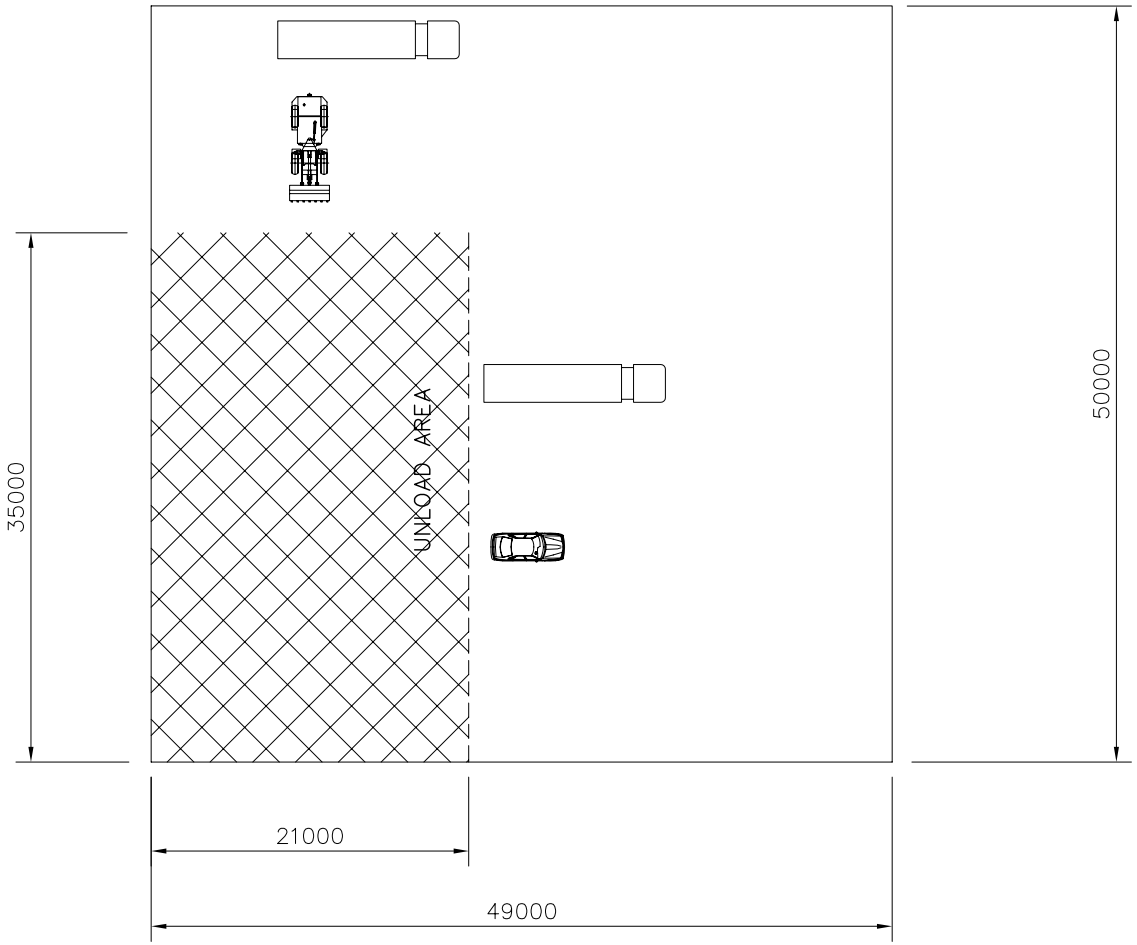

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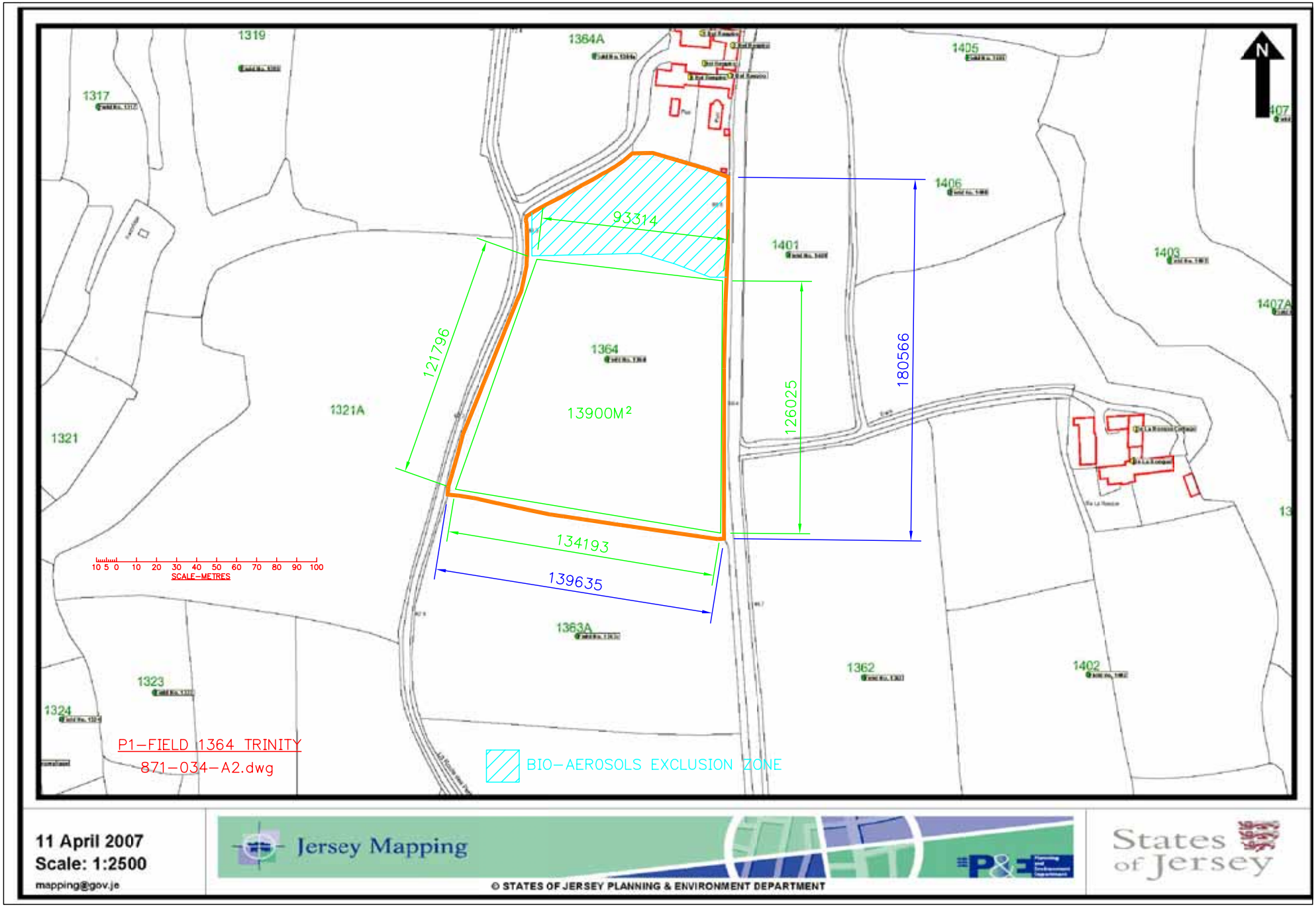

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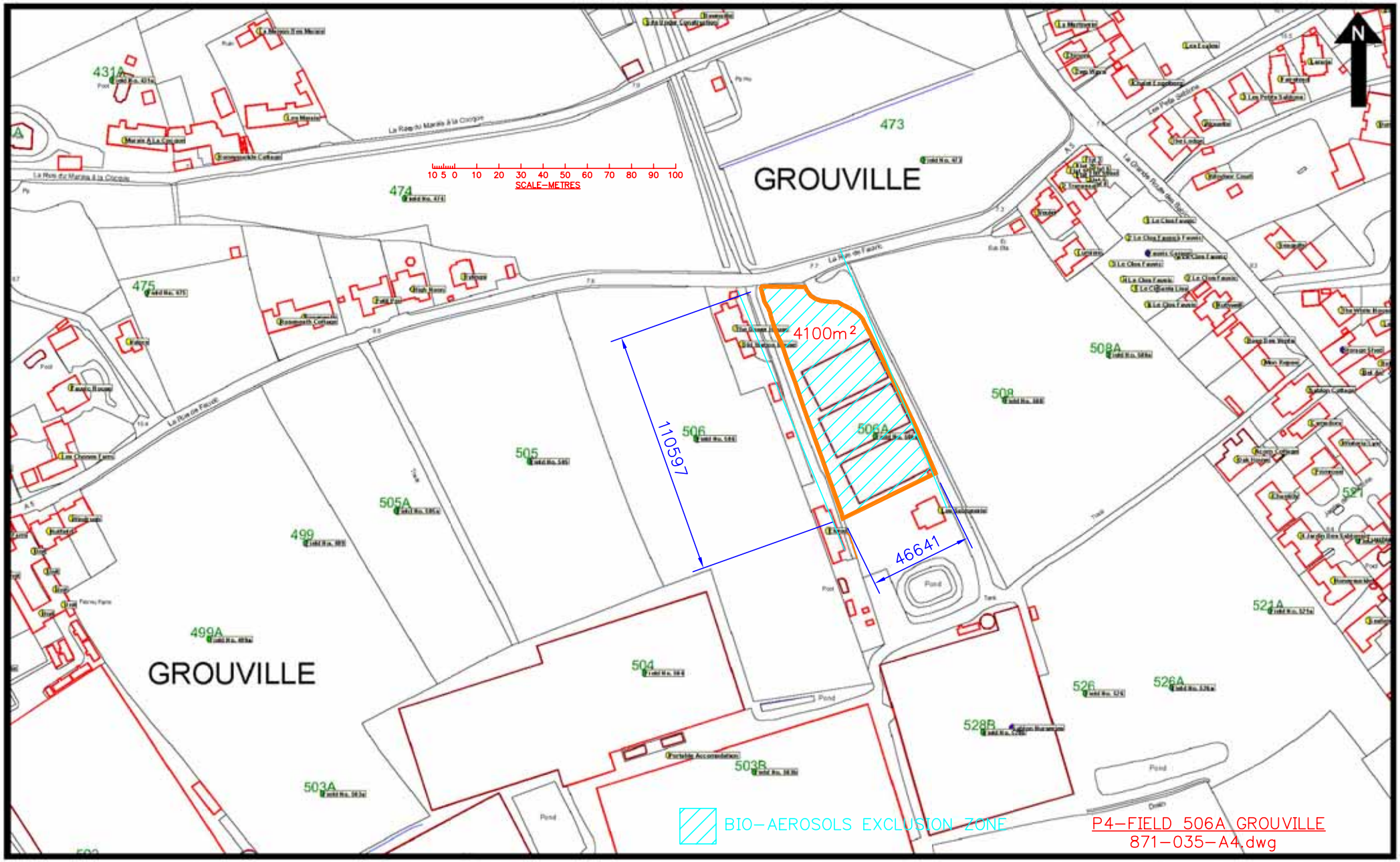

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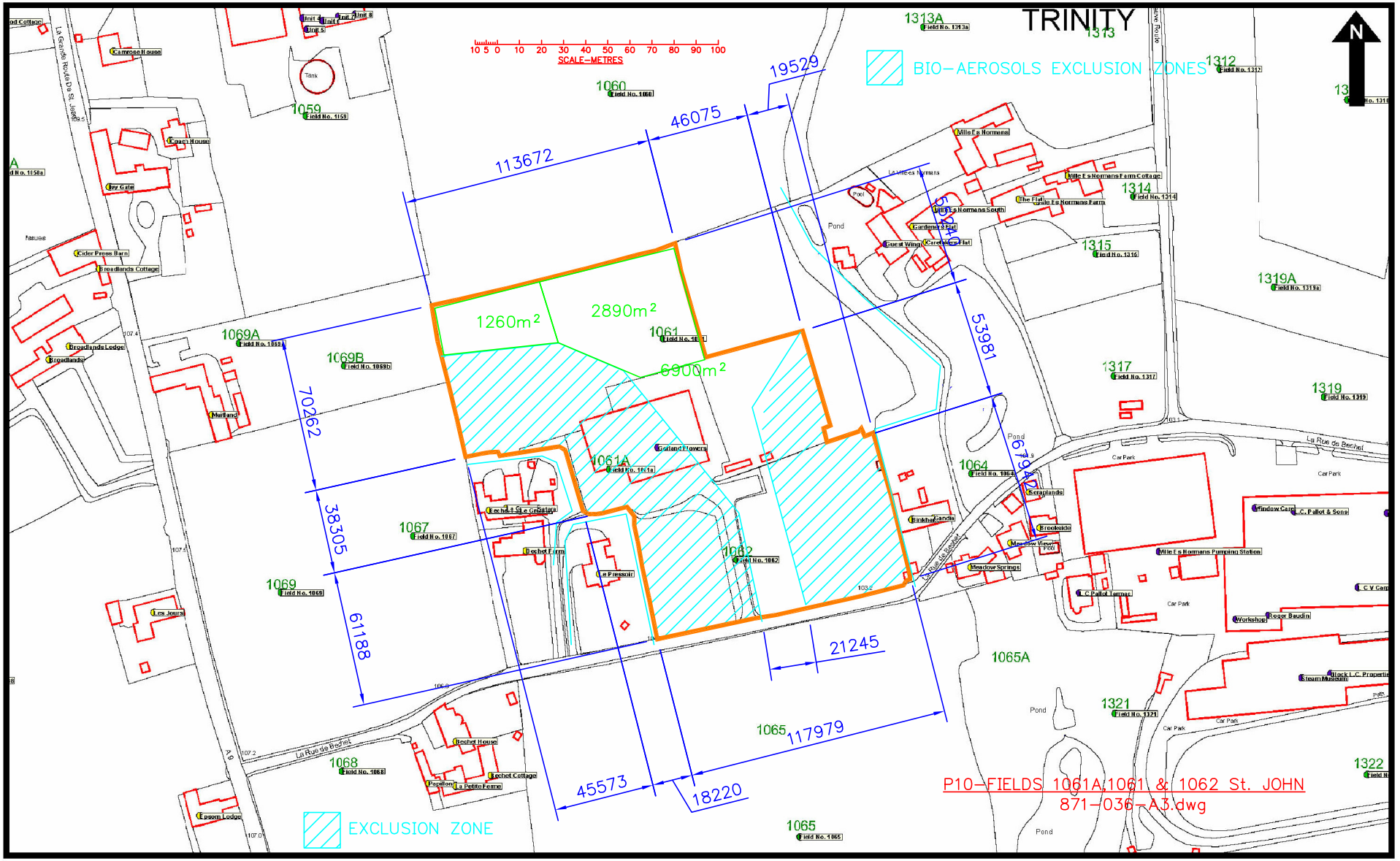

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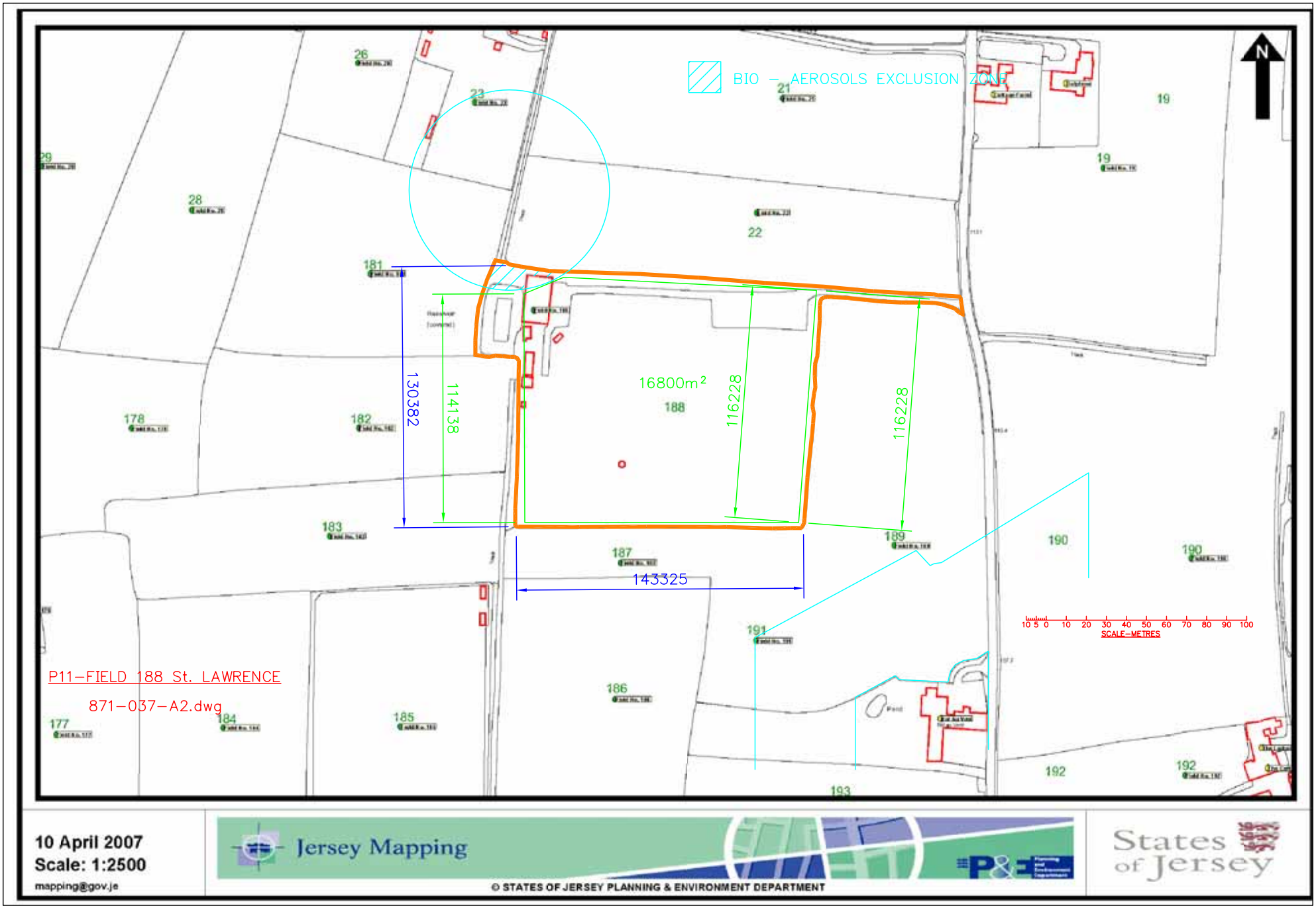
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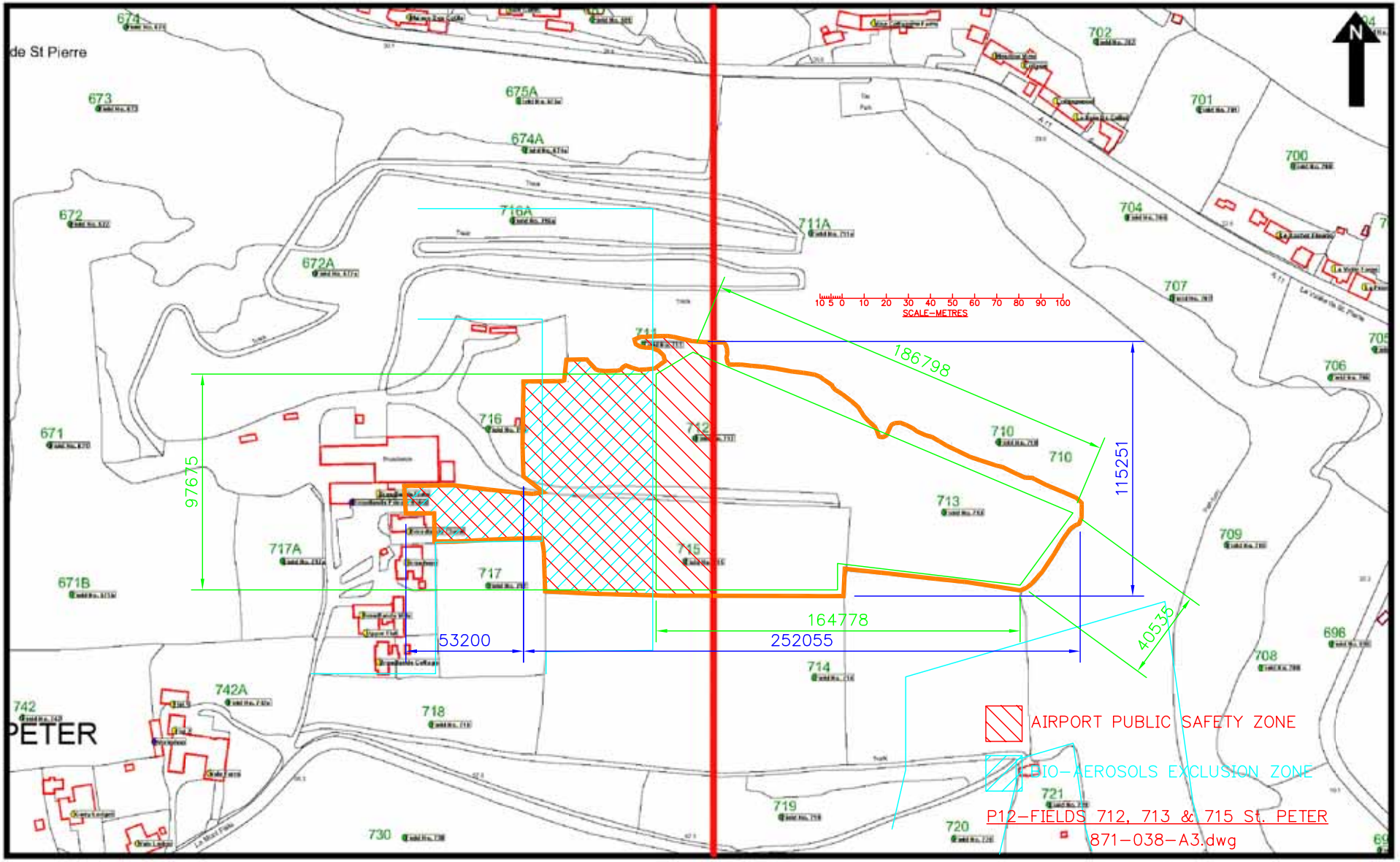

10 April 2007
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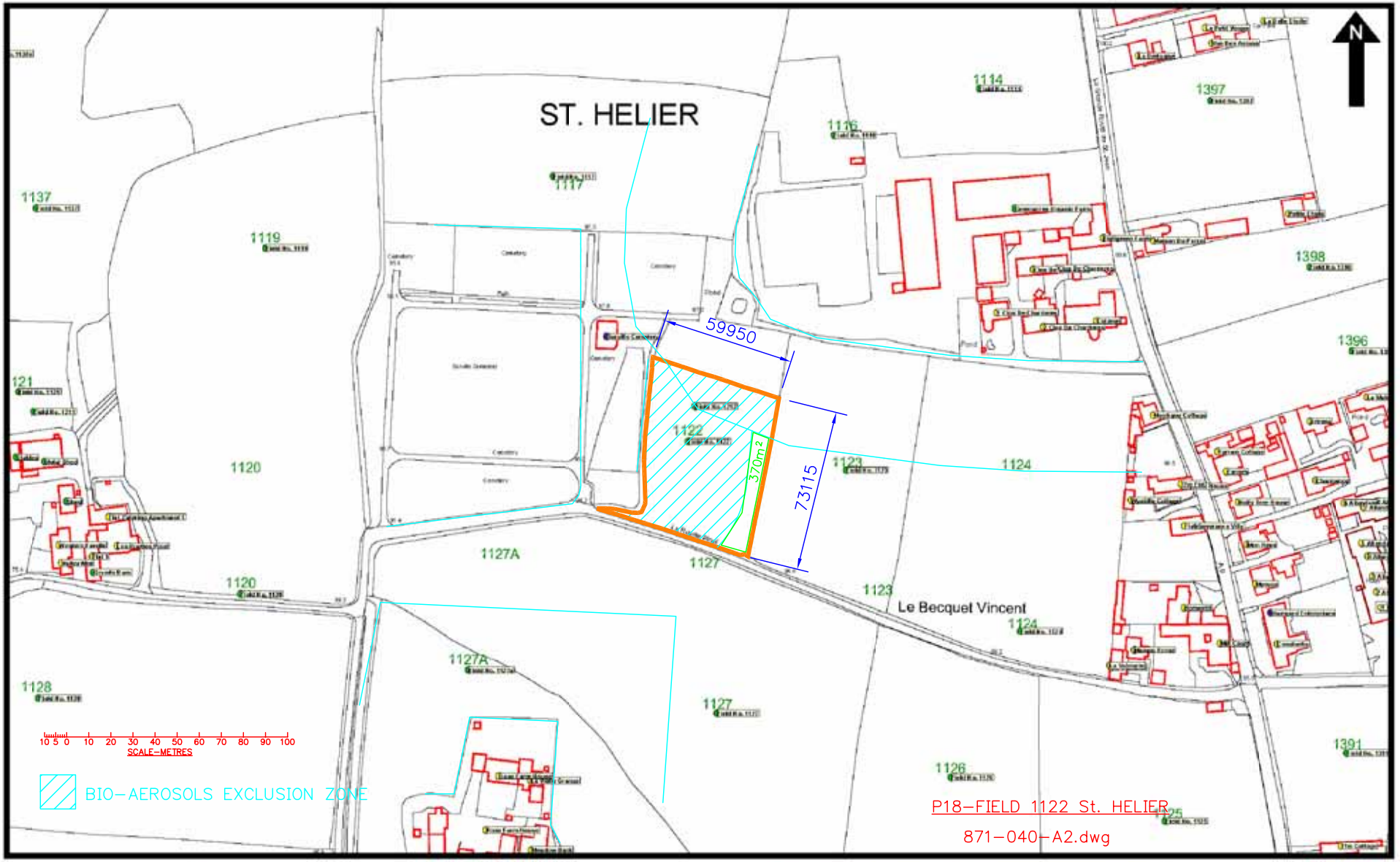
mapping@gov.je

Jersey Mapping

States of Jersey



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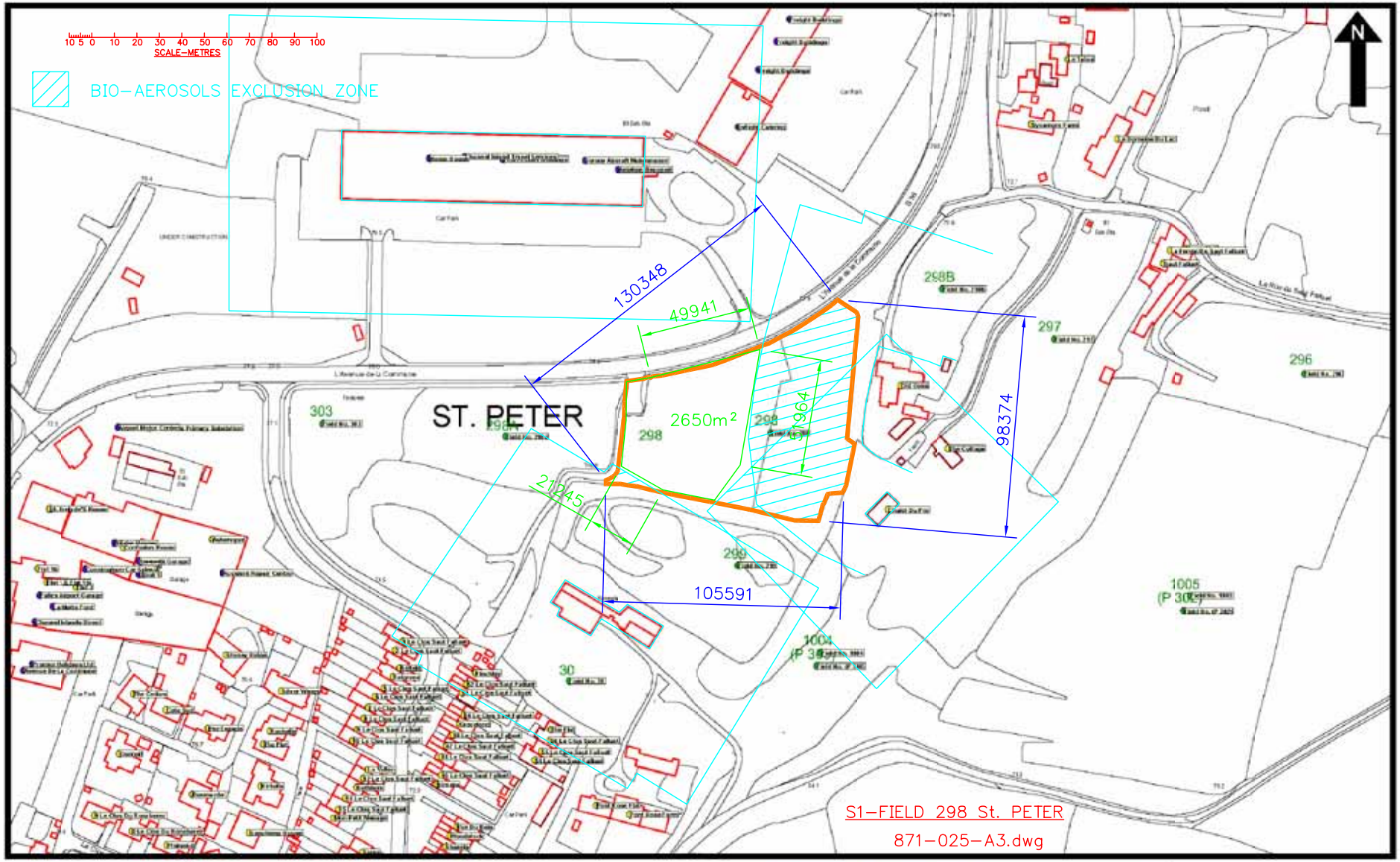
Jersey Mapping

States of Jersey



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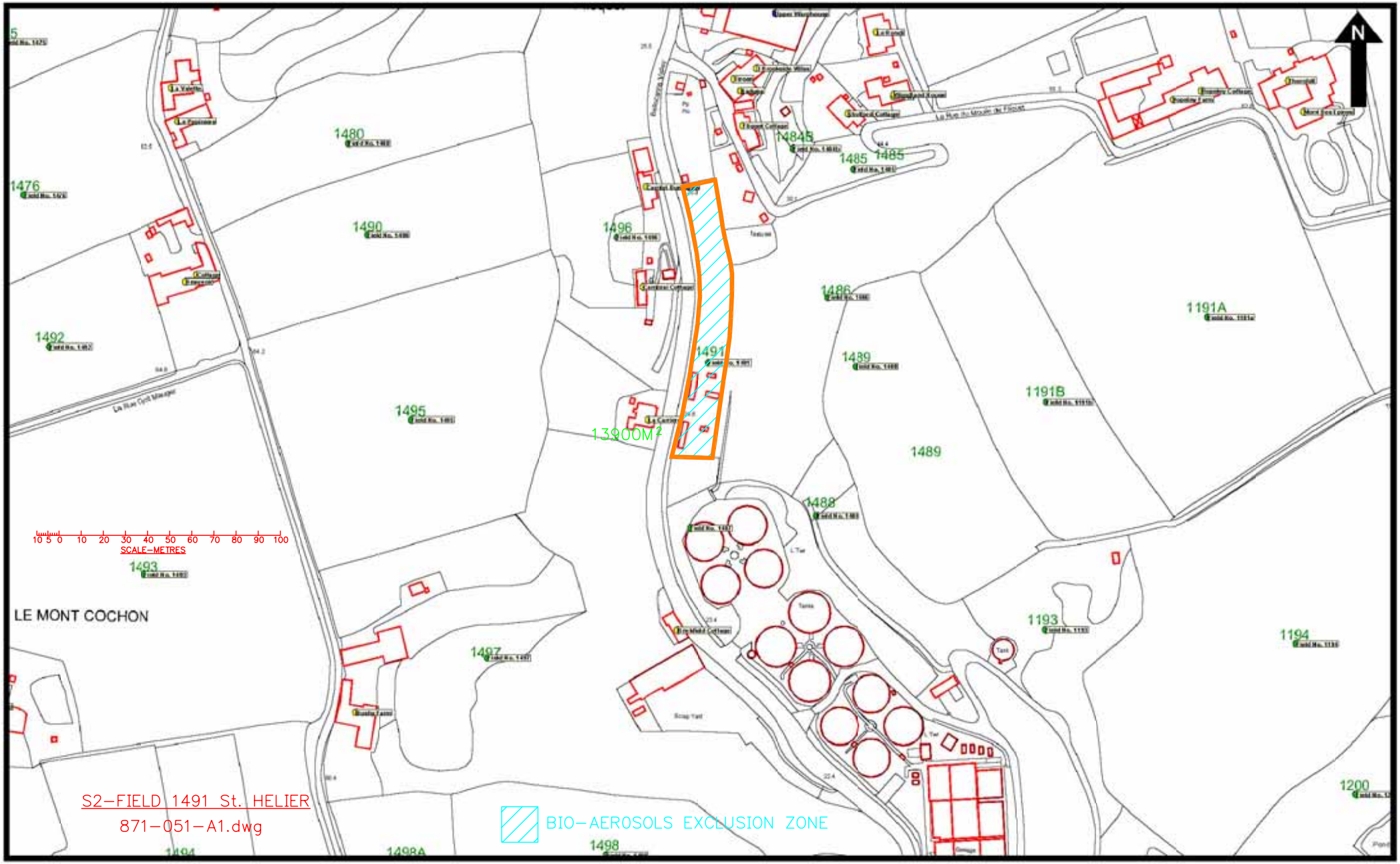
Jersey Mapping

States of Jersey



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Jersey Mapping

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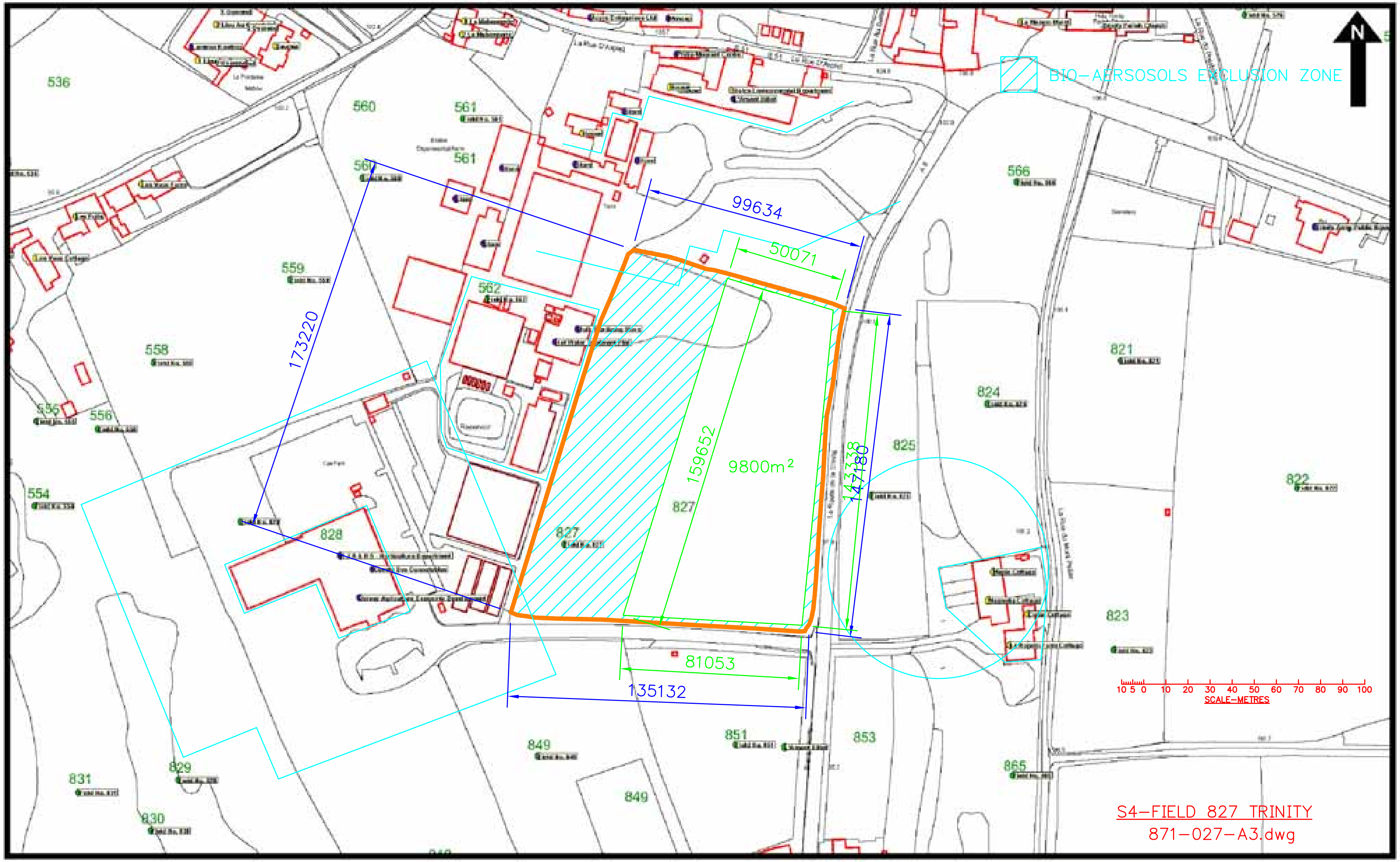

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Jersey Mapping

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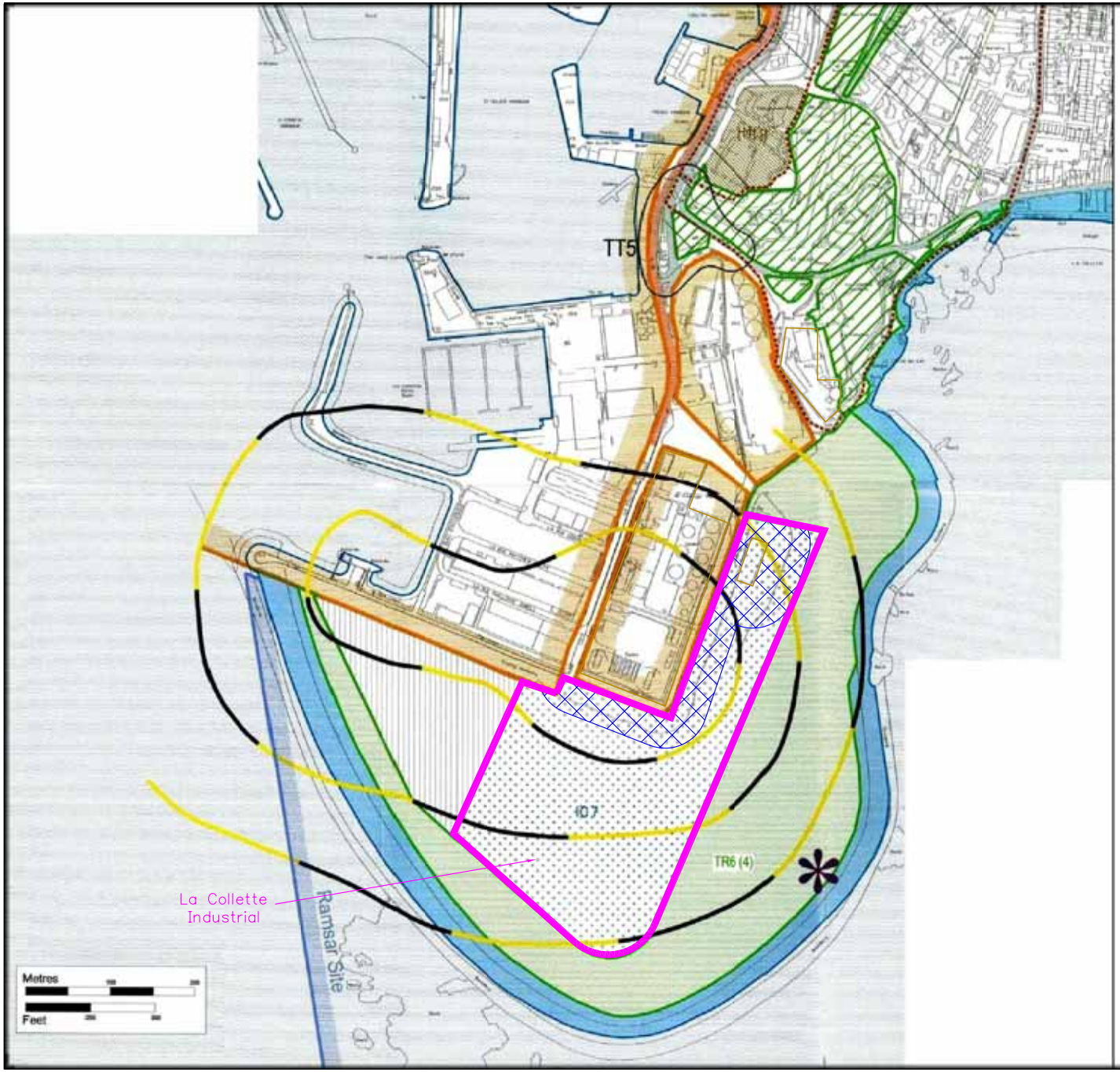


Drawing No. 2-02/A

Jersey Island Plan 2002
TOWN PROPOSALS MAP

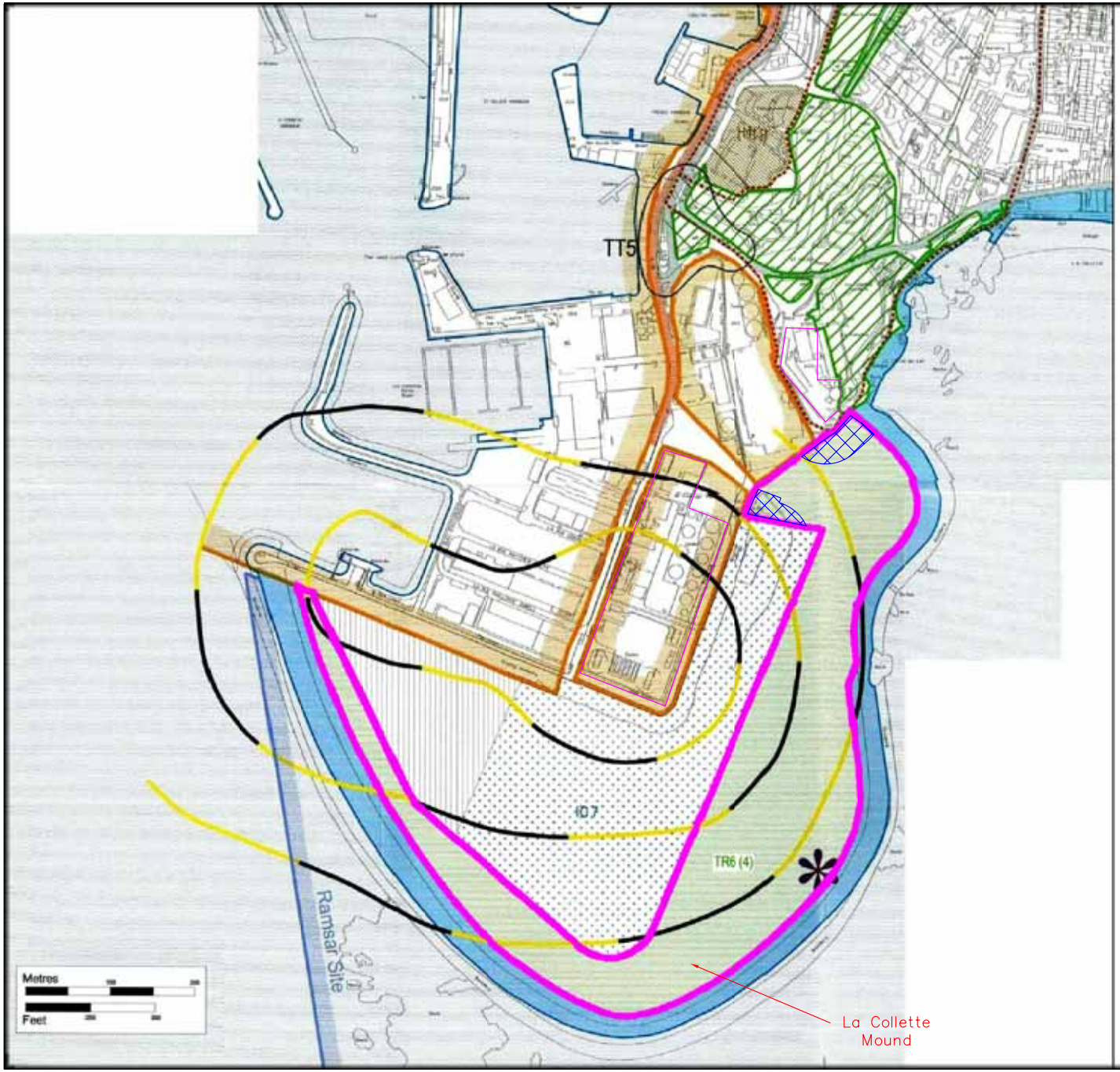
as approved by the States of Jersey, 11 July 2002

M6	Ramsar Site	IC7	Site Proposed for Industry
TR6	Land for Recreation		Harbour Operational Area
BE6	Action Area	TT3	Island Route Network: Secondary
BE8	Important Open Space	TT5	Primary Route Traffic Studies
BE11	Shoreline Zone		Built-Up Area Boundary
H4	Site Safeguarded for Future Category A Housing Needs	NR10	Off-Loading Facility for Aggregates
TR6	Land for Marine Leisure	NR13	Safety Zone for Hazardous Installation
M1	Marine Protection Zone		

BIO–AEROSOL EXCLUSION ZONE

SITE BOUNDARY

S5 – LA COLLETTE INDUSTRIAL
871–028–A4.dwg



Drawing No. 2-02/A

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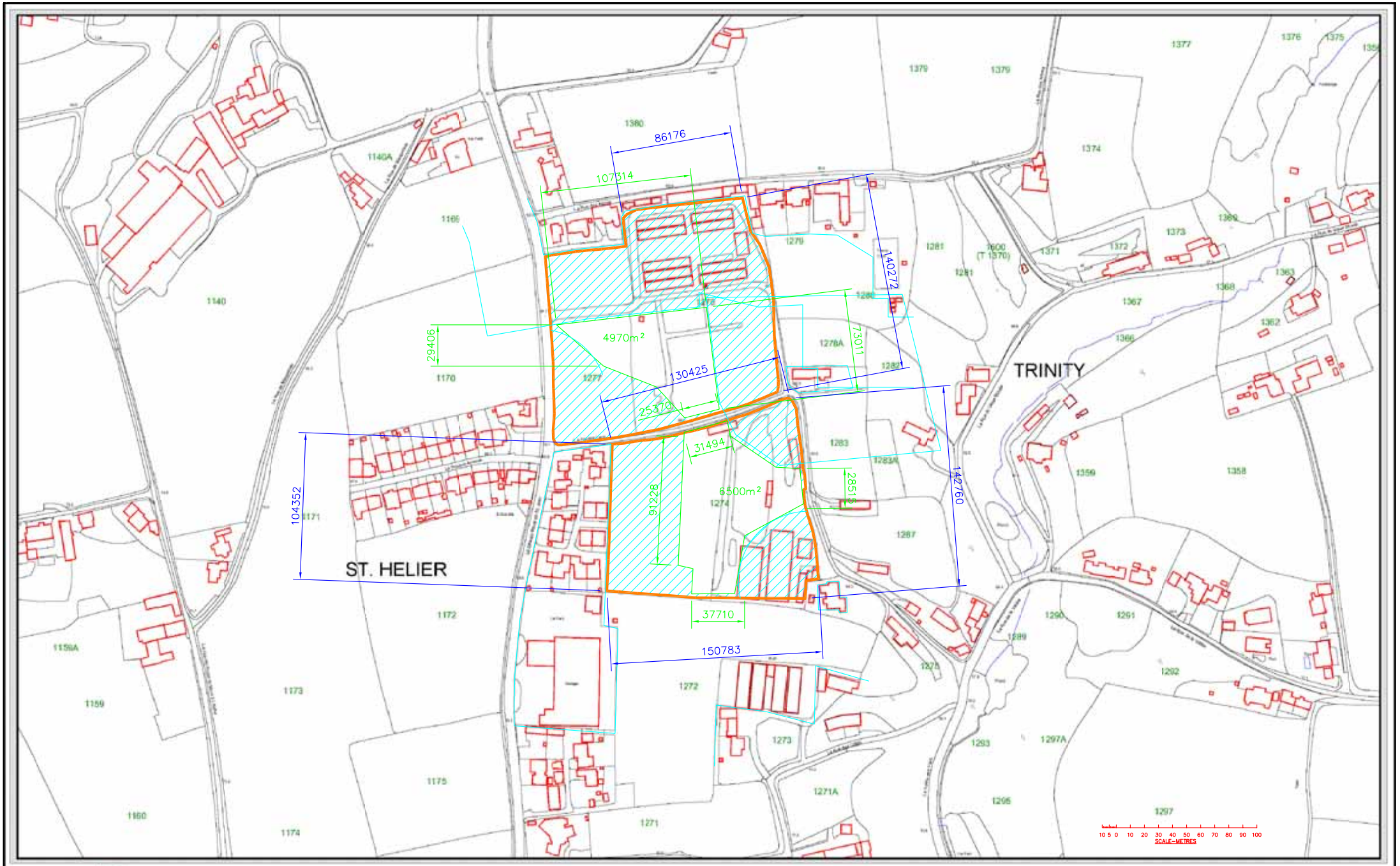
BIO–AEROSOL EXCLUSION ZONES

SITE BOUNDARY

S6– LA COLLETTE LEISURE
871–029–A4.dwg



States of Jersey

BIO–AEROSOLS EXCLUSION ZONES

S11–FIELDS 1274, 1276, 1277 & 1278 St. HELIER

871–043–A4.dwg

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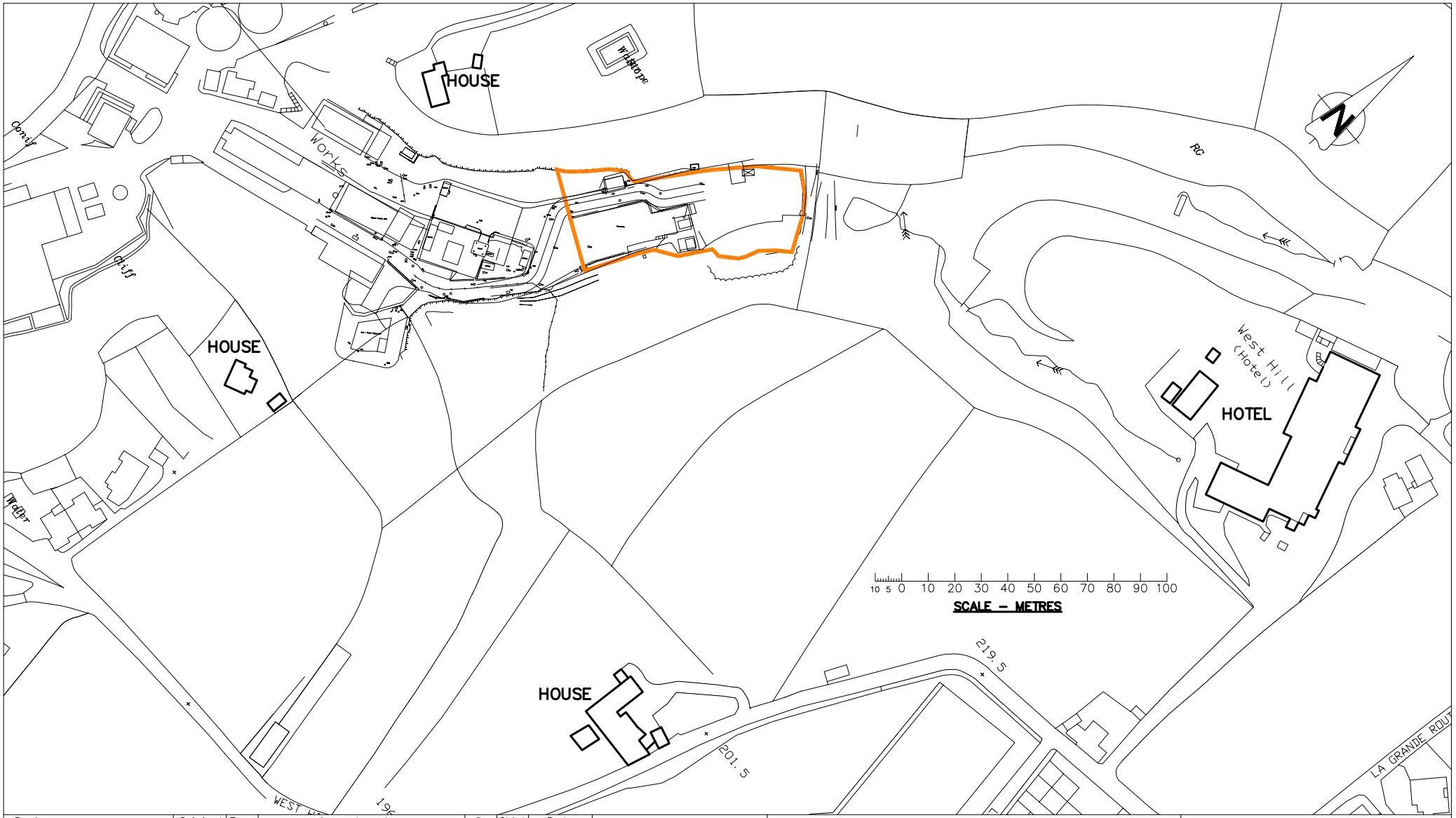

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Drawn By:	Date:
RK	18.10.07
Checked By:	
ASV	18.10.07

CAD Ref.: 871–057–A2

Rev.	Amendment	By	Chkd	Date
A1	PRELIMINARY	RK	ASV	17.10.07
A2	PRELIMINARY	RK	ASV	02.11.07

Client	JERSEY TTSD
Site	S12 – RHP
Project	GREEN WASTE COMPOSTING
Title	Site Boundary Map

Office of Issue	Telephone No.
STOCKPORT	0161–476 0032

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Drawing No.	Revision
871–057	A2