Urban Tree Survey of the South Central Area of Dublin City

FINAL PROJECT REPORT
Submitted to

Dublin City Council

Compass Informatics

SUPPORTED BY THE HERITAGE COUNCIL
LE CUIDIÚ AN CHOMHAIRLE OIDHREACHTA

Document Control

Revision History

Version	Description	Author	Date
1		**Andy Day Gearóid O Riain**	**12/10/2009**

Sign Off

Organisation	Name	Position	Date

Project team:

Charles Duggan, Heritage Officer, Dublin City Council

Andy Day, Gearóid Ó Riain, Alison Robinson - Compass Informatics Limited;

Ray Morrissey - Arborist.
Chris Hemmingway - Arborist
Paul Murphy- Arborist, EirEco Limited

Table of Contents

1 Introduction 4
1.1 Introduction 4
1.2 Objectives 4
1.3 Deliverables 5
1.4 Survey Area 5
2 Methodology 6
2.1 Introduction 6
2.2 Outline Methodology 6
2.3 Methodology research and development 6
2.4 Desk based data analysis and area characterisation 7
2.4.1 Project GIS 7
2.4.2 Capopy Cover Analysis 8
2.5 Field Survey for Tree and Streetscape Assessment 10
2.5.1 Survey Approach 10
3 Field Study Results 11
3.1 Streetscape Survey 11
3.2 Tree Survey 12
4 Dissemination of Data 17
5 Citywide approach 16
5.1 Estimation of citywide effort level 16
5.2 Rollout Approach 17
5.3 Experience levels required by operators 18
5.4 Time inputs 18
5.5 Limitations and challenges of the methodology 18
5.6 Early season project establishment 19
5.7 Dissemination 19
5.8 User guide for data 19
5.9 Amenity value of trees and streetscapes 19
5.10 Evaluation as Planning Tool 19
References 20
Appendix A 22
Appendix B 23
Appendix C 26
Appendix D 29
Appendix E 31

1 Introduction

1.1 Introduction

In accordance with the Natural Environment targets of the Dublin City Heritage Plan 2002-07, a habitat map of Dublin City (*Dublin City Habitats Mapping Project*, Compass Informatics and Mary Tubridy & Associates, 2204, 2006) provided the first comprehensive overview of the city's land cover and quantified the extent of habitat types throughout the city. The City Council Heritage & Biodiversity Office deemed it a requirement that more detailed mapping and assessment of specific biodiversity interests was required, and hence sought to undertake a project on the survey of urban trees.

Compass Informatics Limited was thereafter engaged by Dublin City Council in association with the Heritage Council to develop and implement a methodology for urban tree survey and associated tree streetscape assessment. The methodology development was completed in 2007 and Compass Informatics was subsequently appointed in 2008 and 2009 to survey the southeast and south central section of Dublin City. This document presents the findings and suggests recommendations following the 2009 south central survey for methodology improvements for future survey work.

Trees are of significant ecological value in their own right and also support other species of significant ecological value to the city. In particular, trees support bats, birds, invertebrates, and other flora including lichens, and provide nesting, feeding, and other host functions while also being important in providing a green network throughout the city. They also contribute to air quality, water attenuation, and importantly have a strong visual amenity impact. This amenity aspect is important in its contribution to unified streetscapes, in enhancing the architectural elements of a street or area, or indeed in ameliorating negative elements such as disjointed architecture or screening unsightly areas.

While trees are an important element in the urban experience of Dublin City, little formal protection is afforded to trees. While Tree Protection Orders tend to be specific to individual trees, they are rarely utilised. A looser level of protection may be possible through recognising the contribution of trees to the character of an area and hence to inclusion of trees and tree stands under Architectural Conservation Area (Department of Environment Heritage and Local Government, 2005) approaches.

1.2 Objectives

- The primary objective of the project was to field survey an area of south central Dublin assessing individual trees and assess as a whole the impact of trees within identified streets. The assessment focused on the arboreal, ecological, horticultural and landscape significance of trees, and in doing so

assessed management issues and measures relating to long term retention of trees. The methodology developed during the 2007 pilot survey and implemented in the 2008 survey has been utilised.

- In the 2008 survey a sampling approach was taken to tree surveying however the 2009 survey brief was to survey all trees within the survey area that were on the road network.
- To deliver a dataset that is available through the Dublin City Council intranet website accessible to all parks department.

1.3 Deliverables

The following are the deliverables arising from this project:

- A further refined survey methodology for gathering data on trees in the urban context, but readily used in other environments.
- Recommendations for improvements to the survey methodology.
- Recommendations for a potential 2010 survey.
- Custom software system for data capture using GPS-enabled mobile field computers
- A GIS-format dataset and associated database holding tree and street survey data for project area with hyperlinks to survey images.
- A GIS-format dataset documenting the number of trees on each road.
- Intranet .ASP pages allowing the data to be viewed and queried by Parks Department staff.

1.4 Survey Area

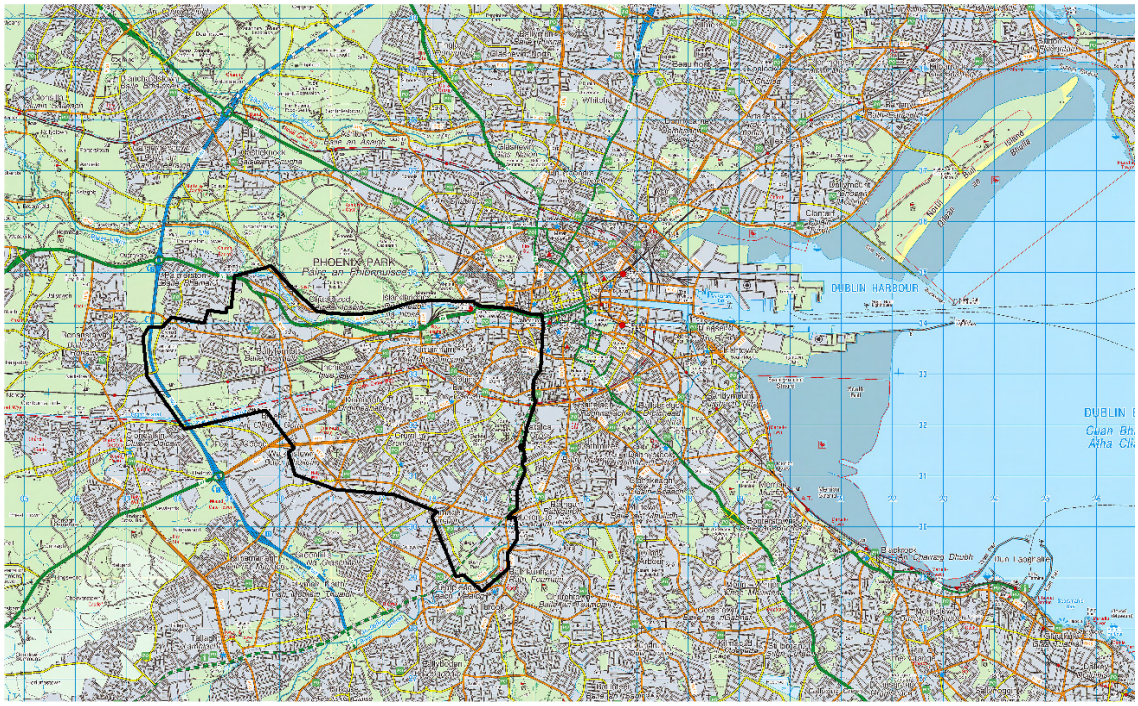


Figure 1.1: Study area

The project study area is in the south central of the Dublin City Council area and covers 26.17km^2. The study area covers the suburbs of Kilmainham, Inchicore, Bluebell, Longmile Road, Ballyfermot, Crumlin, Drimnagh and sections of Terenure, Rathfarnham, Templeogue and Kimmage. The study area covers a range of areas and street types; which includes a variety of formal, ad hoc, and natural tree planting sites and streets.

2 Methodology

2.1 Introduction

The project has refined and further tested the tree survey methodology suited to application in the urban environment, but also suitable for other environments as is or with minor modifications. The following report section outlines the project methodology.

2.2 Outline Methodology

The project had five main strands of work as follows:

- Methodology refinement
- Desk-based data analysis and area characterisation
- Field survey for tree and streetscape assessment
- Generation of geodatabase and GIS datasets
- Development and Implementation of DCC Intranet pages
- Reporting

2.3 Methodology research and development

2007 Methodology
A methodology was developed by Compass Informatics under the pilot project for Dublin City Council (DCC) in 2007. The methodology was established after a review of published literature which included a wide range of papers on tree survey methodologies and included British Standards review. Arising from this review and following a series of field tests, a field survey method was drafted and refined through adoption or modification of elements listed in published sources.

2008 Refined Methodology
The 2007 methodology was refined further in consultation with expert arborists, Dublin City Council parks department and from a software review. Project team member, Paul Murphy, who conducted the 2007 field survey used his experiences from the pilot survey to further refine the methodology. Mark Jones and Pat Curran in the City Council Parks Department were consulted as to their requirements. This was deemed necessary as the Parks Department would be one of the biggest users of the created datasets. Elements from known tree management software were also reviewed and suitable parts were incorporated. The most notable tree management software include the ArborTrack system (www.arbortrack.com) and the Canopy

system (www.canopy-worldwide.com). After these refinements the improved methodology was adopted by the Council.

2009 Refined Methodology
The 2008 survey took a sampling approach to tree surveying, during the 2009 survey each tree was surveyed and assessed individually. To facilitate surveying the mobile GIS form was formatted such that the attributes of the previous tree would appear on the next tree. This means that the attributes for Tree A would be replicated for Tree B and then the arborist could amend the attributes accordingly for Tree B. This was implemented following discussions with field arborists who found that often on road trees of the same species have been planted. Implementing this survey approach greatly improved survey speed.

On the maintenance dropdown pick-list the following tasks were added:

- Included Bark
- Further Assessment Required
- Bark Decay
- Trunk Decay
- Limb Decay
- Root Decay
- Limb Structure Decay

On the ancillary dropdown pick-list the following tasks were added:

- Calluses identified
- Petrified bark identified
- Future problematic
- Public Lighting Affected
- Public Signs Affected

2.4 Desk based data analysis and area characterisation

2.4.1 Project GIS

A Project Geographical Information System was established with various reference datasets including:

- Orthophotography – 2005, 25cm ground resolution
- OSi 1:1,000 scale vector mapping
- Habitat mapping based on 1:1,000 scale mapping – as previously generated by Dublin City Council habitat mapping projects (Ó Riain et al (2004, 2006)).
- Historic mapping including 1850s Borough maps, and 1850s 1:10,560 scale maps.
- Dublin Environmental Inventory data (Dublin City Council, Urban Institute University College Dublin)
- Urban tree survey data 2007 and 2008 (Compass Informatics, Dublin City Council)

Recommendation:
It is recommended that tree survey projects collate and utilise the above map layers and other reference datasets in support of tree surveying initiatives.

2.4.2 Survey Area Reconnaissance

To utilise the arborist resources a pre survey reconnaissance was carried out. This was completed using a pushbike and cycling all roads within the survey area. For each road the presence or absence of trees was recorded, the number of trees and an average class for the trees on the road. An average class ranged from 1 to 3 (where 1 is a young tree 1-3m tall and 3 is a 15+m mature tree). Recording of a class gave the surveyor an indication of the trees he would likely encounter on the particular road.

Once this reconnaissance was completed a study area map series was produced that the surveyor used as a guide for planning his survey day.

The example shown (figure 2.1) shows roads in red indicating no trees on this road, and roads marked in green as roads to be surveyed with the number of trees indicated. This map series was regularly updated with trees surveyed so that no roads were surveyed twice.

Recommendation:
This dataset while only produced to facilitate surveying contains very useful data for example highlighting roads and areas that contain no trees or limited trees. It is recommended that this layer of data is added to the DCC intranet pages.

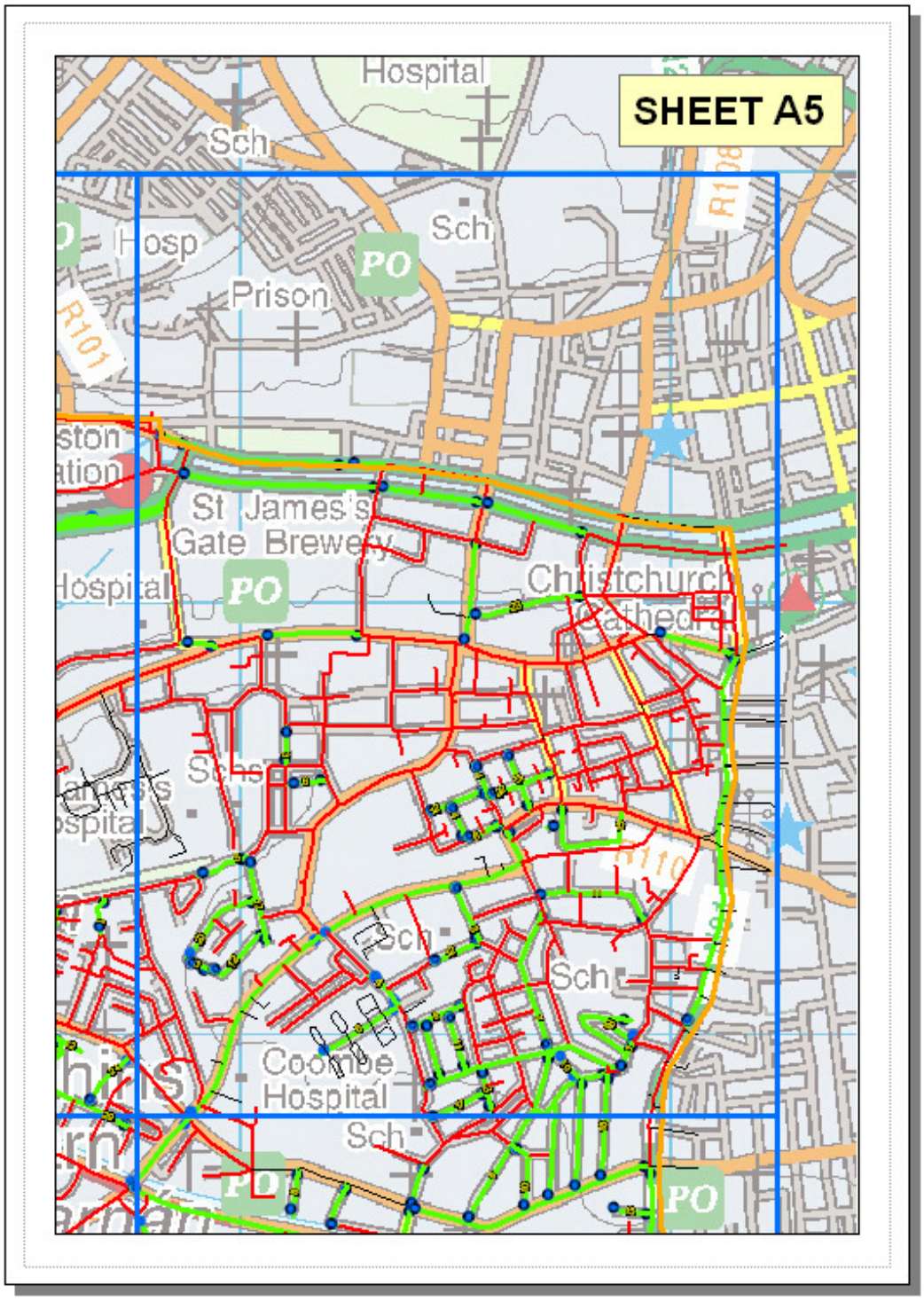


Figure 2.1: Example of field sheet provided to Arborists

2.5 Field Survey for Tree and Streetscape Assessment

2.5.1 Survey Approach

Arising from the project's literature and methods review and also a series of field tests, the field survey methodology has been drafted and refined. The recommended survey approach follows a three tier assessment as follows:

1. Streetscape Survey
2. Tree Survey
3. Tree Inspection

Each of these survey elements was typically undertaken as part of the same field survey sortie, where the surveyor has the required skills. As outlined below, a qualified arborist is required for the tree inspection element.

The following is an overview of each survey element, noting the required skills level for the surveyor.

1) Streetscape Survey:

- Overview of trees including presence / absence / visual impact etc. on streetscape;
- Overview of street character and function;
- The survey element flags a need for a full tree survey as well as characterising the trees on the street, management issues, planting opportunities and so forth.
- The surveyor skills required include capacity to identify tree species, to assess condition and comparative rating, general ecological aspects, and to have a sense of urban function and architecture.

2) Tree survey:

- This covers a representative sample of trees where trees are of uniform age, species, condition, or function.
- Where mature (or veteran) trees are involved all trees are typically surveyed.
- Specific management requirements are noted for individual trees, or groups of trees where trees are of uniform nature and requirements.
- Trees in grounds or properties adjacent to the street and visible from the street can be subject to assessment.
- The tree survey flags the need for tree inspection where condition pose potential risk (health and safety or otherwise).
- The surveyor skills include capacity to identify tree species, to assess condition and comparative rating, and general ecological value.

3) Tree inspection:

- The inspection level assessed the requirements of trees which are of suspect condition, have potential H&S risk, and may have structural impacts on the built environment.
- This level of survey would be undertaken only by appropriately qualified personnel. Given that there may be liability arising in relation to carrying out an assessment of risk and damage to trees, it is important also that appropriate insurance is in place for this level of survey.

3 Field Study Results

Arborist, Ray Morrissey, was employed to do the majority of the fieldwork for the duration of the fieldwork, with Paul Murphy who carried out fieldwork in 2007 and 2008 worked on the 2009 survey acting in a senior guiding role. Fieldwork commenced in the beginning of July and was carried out until early October.

3.1 Streetscape Survey

194 streets in total were surveyed with the main findings presented below:

- Of the 194 streets 1% had no trees at all, a further 36% had 1-10 trees, a further 50% had 11-20 trees with the remaining 13% of streets having greater than 40 trees.
- 97% of the streets that have trees are classed as having trees with good physiological condition.
- 92% of the streets that have trees are classed as having trees with good structural condition.
- 6% of the street tree format is considered as random high impact
- 84% of the street tree format is considered as random low impact.
- The dominant tree species are Maple (16%) Rowan (13%) and Hornbeam (9%).

Recommendation

The condition and health of the trees on a general assessment level is very good. It is recommended that to maintain this level of health a monitoring programme is put in place. A quick visual inspection referencing the survey image would suffice to ascertain that the general health of trees on a road has not deteriorated.

The streetscape survey has highlighted streets where planting trees would benefit the street and the streetscape. It is recommended that the feasibility of this is assessed.

3.2 Tree Survey

A total of 5999 trees were individually assessed in the study area. The main findings from this surveying are presented below with the same statistics for 2008 listed allowing comparison:

- *2008:* 30% of trees surveyed are planted in concrete and 27% are planted in tarmac.
- *2009:* 51% of trees surveyed are planted in concrete and 11% are planted in tarmac.

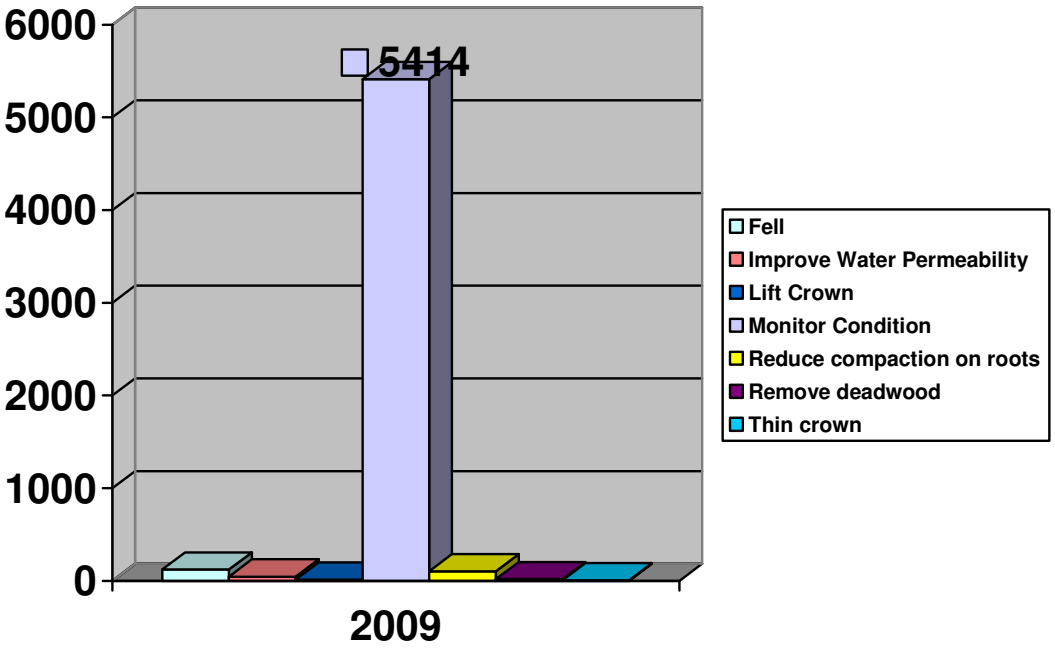
- *2008:* 52% of the trees are classed as mature.
- *2009: 20%* of the trees are classed as mature.

- *2008:* 91% of the trees are classed as having a good physiological condition.
- *2009:* 90% of the trees are classed as having a good physiological condition.

- *2008:* 92% of the trees have a remaining contribution of 40+ years.
- *2009:* 94% of the trees have a remaining contribution of 40+ years.

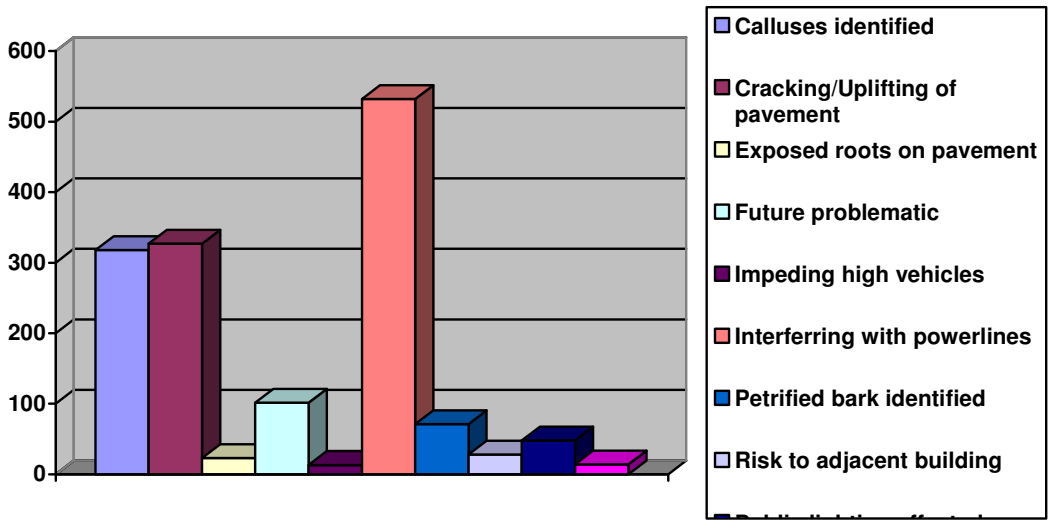
NB: The full list of results are presented in Appendix E

Maintenance Recommendations are presented below:



- 90% of trees have been identified for a continued monitoring programme.
- 2% of trees (122 trees) have been surveyed as "to fell".

The main ancillary problems are presented below:



- Interfering with powerlines, calluses and cracking/uplifting of the pavement are the major ancillary problems identified.
- Over 500 trees have been identified as interfering with powerlines.

Looking at the details for cracking/uplifting of pavement on a map it quickly becomes obvious where problem "hotspots" occur. Locations 1-4 on figure 3.1 below account for over 50% of the cracking identified. Analysis like this could help maximise resources in the parks department.

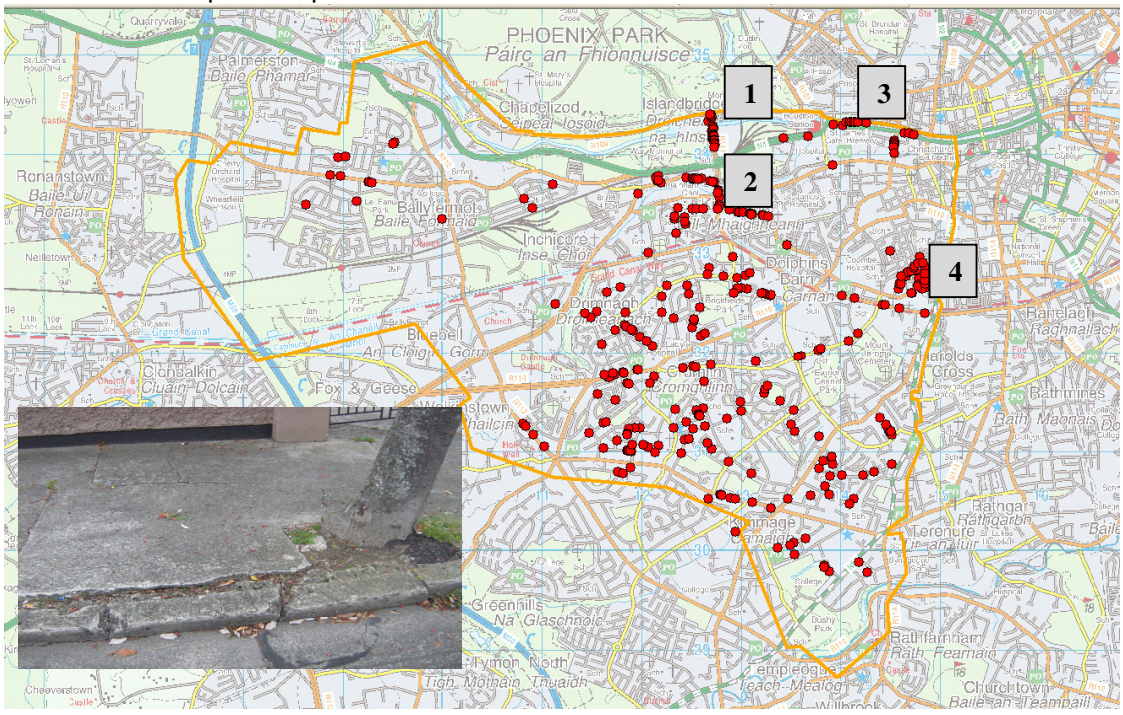
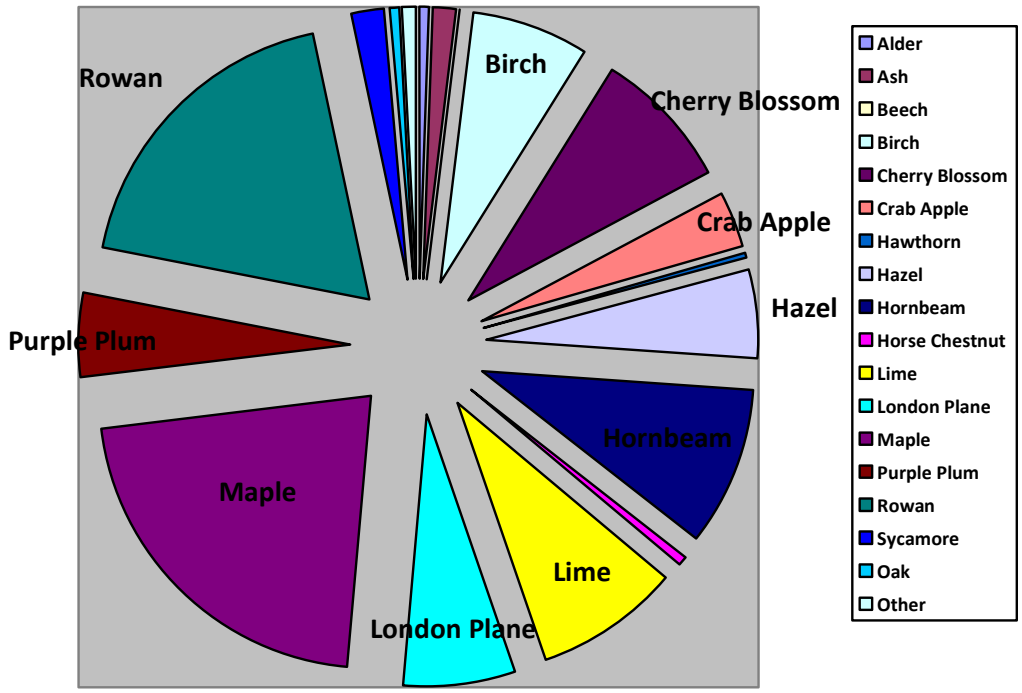


Figure 3.1: Location showing cracking pavement

Species Identified:



Viewing this data spatially shows that the same tree species are generally located in the same area the example below is from Drimnagh which is dominated by the planting of Rowan (Sorbusaucuparia):

Figure 3.2: Drimagh tree species planted

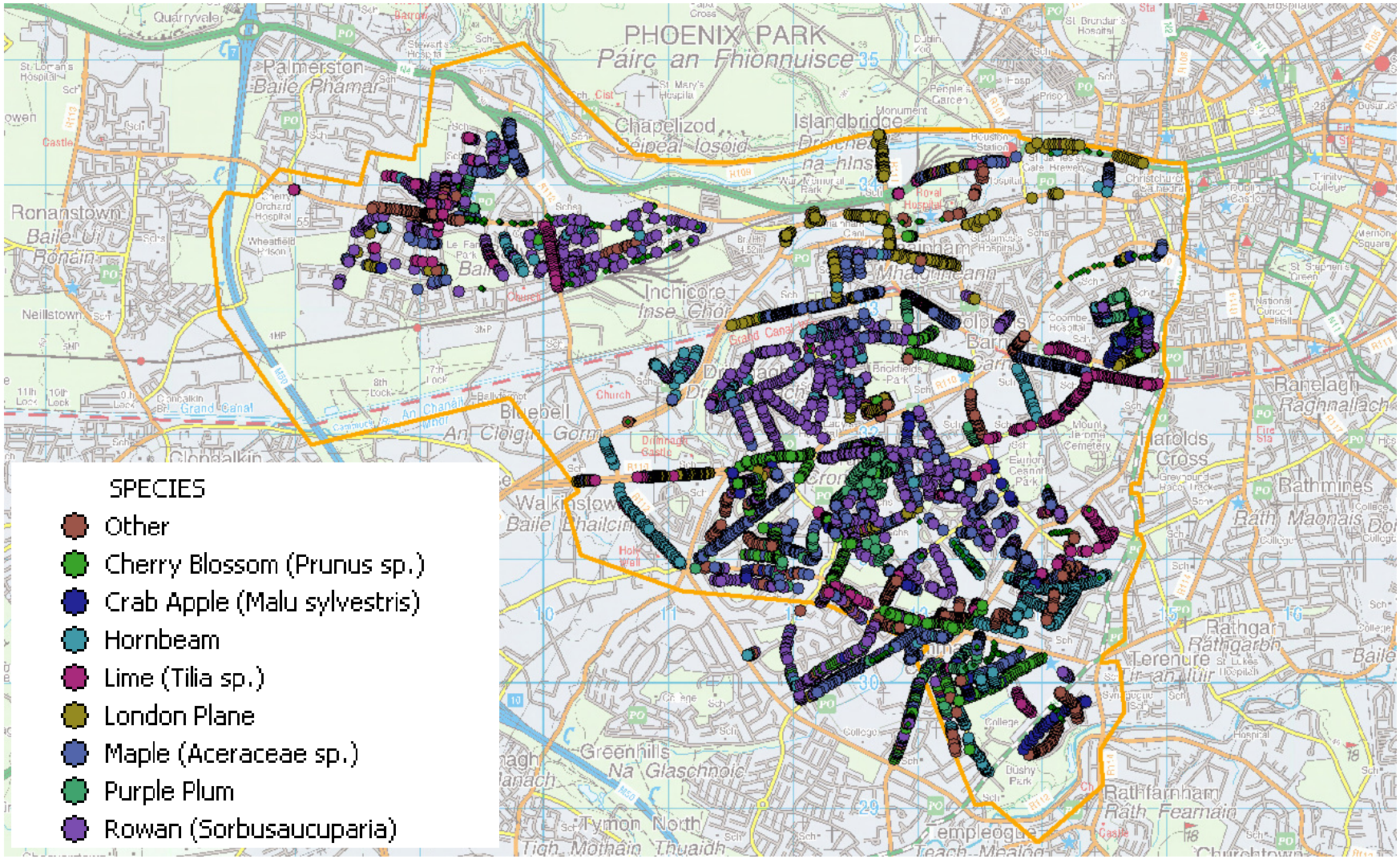


Figure 3.3: Distribution of tree species

4 Dissemination of Data

A Tree Data & Mapping System has been developed which integrates with existing GIS systems, in particular the City Council's intranet mapping system which is based on the GeoMedia WebMap platform.

We envisage that data will be downloaded direct from the mobile mapping ESRI ArcPad system to the City Council network. From the chosen location this geodatabase can be interrogated from within the ArcGIS copy in use by the Biodiversity Officer. The geodatabase will be loaded on a nightly basis and in an automated manner to the intranet mapping system. The data will therefore be available within the intranet mapping system in a seamless manner and transfer of data from the field to the user will be smooth. A data view form has been developed that will integrate with the intranet mapping system. This form will allow permitted users to view all survey data by tree or street.

With this approach no additional software costs arose and investment to date by the previous projects and the City Council was optimised.

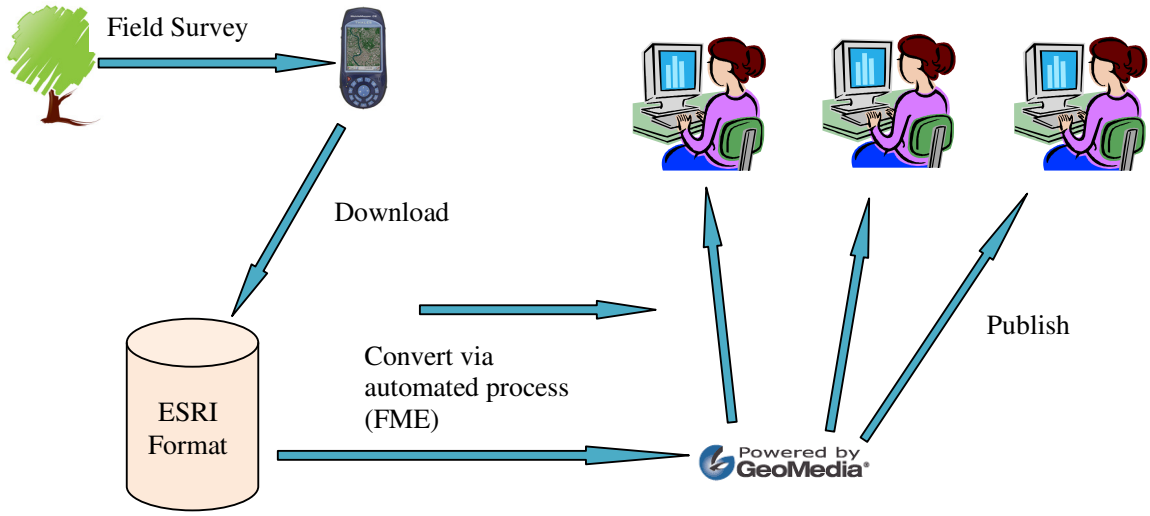


Figure 4.1: Conceptual overview of GIS system

5 Citywide approach

5.1 Estimation of citywide effort level

Dublin City Council hope to rollout the methodology used during the 2008 survey citywide. Further to this, the Parks Department of the Council recommend that every individual tree be surveyed as opposed to taking a representative tree as has been the approach thus far. This project took a few selected roads and surveyed all the trees to gauge the feasibility of rolling this methodology citywide.

Herbert Park road between Pembroke Road and Morehampton Road was selected as the target area as this road has a mixture of species and planting locations. It also has primarily mature trees that take longer to survey. There are 109 trees on this stretch of 700m road. To survey this road it took the surveyor just over one day.

The surveyor found that if every tree was being surveyed a repeat previous entry on the survey form would greatly speed up the process as he was encountering rows of similar trees.This would work in the following manner:

Step 1: Record all attributes for a tree (eg: Height 10m, Species Hornbeam, Cracking Pavement etc…)
Step 2: Record a new tree location but with the same attributes from the tree in step 1 with the ability to change values (eg: Height 11m, Species Hornbeam, Cracking Pavement etc…)

Using this technique for areas of uniform trees would speed up the process to approximately 150 trees per day.

It would still be a recommendation to take a picture of each individual tree to act as a historical record.

There is approximately 1,675km of road network in the Dublin City Council area. In the study area less than half of the road network had any trees so applying this citywide 837km would have to be covered. If we assume 155 trees per kilometre (109/700*1000) then a total of 129,735 trees would potentially have to be surveyed. This breaks down into 865 survey days (129735/150).

The proceeding sections outline how such a task could potentially be undertaken.

5.2 Rollout Approach

In order to effectively and in a structured fashion rollout a survey that might ultimately cover the Dublin city area, it is recommended that manageable areas of the city be taken and surveyed as distinct projects. These are likely to be subdivisions of the Council electoral or management areas.

In order to facilitate planning of such tree surveys and in order to estimate effort levels and associated budgets, it is recommended that a desk-based tree crown assessment be carried out as soon as possible. Such a tree crown data generation exercise would take of the order of twenty days effort for the city area. By reference to this dataset, each project area can then be assessed for level of street surveys and associated tree surveys required. In this manner, streets and neighbourhoods would be assessed for survey requirements e.g. industrial areas devoid of trees with limited demand for tree planting would require a rapid street survey or no survey; new suburban housing estates would require street surveys only as few established trees may be present; but inner urban or well established areas would need street and tree level surveys. For each project area, these draft survey requirements would be generated, used to support internal budgeting and scheduling, and where relevant any tendering process.

5.3 Experience levels required by operators

The proposed methodology as outlined has three levels – streetscape survey; tree survey, and tree inspection. While each of these may be undertaken by the same surveyor during the same survey, it is important to note that the tree inspection level should be undertaken only by appropriately qualified personnel, namely a qualified arborist. Given that there may be liability arising in relation to caring out an assessment of risk and damage to trees, it is important also that appropriate insurance is in place for this level of survey.

The surveyor skills required for the streetscape or tree survey levels include capacity to identify tree species, to assess condition and comparative rating, general ecological aspects, and to have a sense of urban function and architecture. The tree survey level may also highlight those trees that may require a full tree inspection by an arborist.

5.4 Time inputs

A trained surveyor can survey up to 150 trees per day (with the repeat functionality described in section 4.1), dependent on complexity of the trees, and uniformity of trees in a neighbourhood. The tree inspection element can be undertaken by an aborist as part of the main tree survey and does not change the range of trees that can be surveyed per day.

The number of street surveys that can be undertaken per day varies according to complexity of the streets, level of tree presence on the street, and uniformity of the trees and tree impacts. Where a street contains a number of segments each with different characteristics, each may require a separate survey. A street survey may take between ten and sixty minutes to undertake, varying from simple housing estate roads and neighbourhoods, to major tree lined streets with a range of mature trees with multiple varying issues. A typical urban street is likely to take fifteen minutes to undertake with some transfer time between streets.

5.5 Limitations and challenges of the methodology

In using the methodology a number of issues have arisen. Among these are the following:

Lack of uniformity on many streets - Streets which vary in character - architecturally, treescape, function – may require to be treated as segments, and separate street surveys carried out for each segment. Treescapes can also vary from one side of a street to another, with for example garden trees dominating on one side and planted row of kerbside trees on the other.

Assessment of trees outside of the public domain - Access may be difficult and certainly time consuming but the trees may still have a significant presence and impact.

5.6 Early season project establishment

In other to facilitate surveying by non-arborists it is recommended that surveying be undertaken when trees are in leaf (arborists can undertake surveying at any time of year, often with advantages in terms of seeing structural deficiencies). In order to have teams in place for a long field survey season, it is recommended that project teams are put in place as early as possible in the year. This may need to be taken into account when arranging tendering procedures, where these are relevant.

Timely commencement of projects will also facilitate collation of information and data on trees and habitats which would support the proper planning and implementation of surveys.

5.7 Dissemination

It is recommended that the data results of the project be disseminated internally within the City Council on a web mapping system platform, and likewise on a public system for the public and other interested municipal and local authority organisations to view, assess, and provide feedback.

5.8 User guide for data

In order to guide the use of data outputs of the methodology it is suggested that user guide is prepared. This should be prepared after a period of use by a range of users from different disciplines.

5.9 Amenity value of trees and streetscapes

The survey methodology captures all required field parameters to support the Helliwell (2000) method of amenity value calculation/estimation, and also directly or indirectly those of the Council of Tree & Landscape Appraisers (CTLA) method (Arboricultural Association, 1994). Where an amenity value approach is of interest, it is recommended that a short study be undertake to assess the objectives and required outputs that would be of value to the City Council, and generate sample values for evaluation by end users.

5.10 Evaluation as Planning Tool

Using the results of this study, it is recommended that an assessment be made of the potential value of tree survey data in support of tree, treescape, and streetscapes. The Tree Protection Order and Architectural Conservation Area approaches are relevant in this respect.

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Appendix A - British Standards BS 5837:2005 – Tree Quality Assessment

Table : British Standards BS 5837:2005 – Cascade Chart for Tree Quality Assessment

Trees for Removal		
Category and Definition	**Criteria**	**Identification on plan**
Category R Those in such a condition that any existing value would be lost within 10years and which should, the current context, be removed for reasons of sound arborcultural management	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other R category trees • Trees that are dead or are showing signs of significant, immediate and irreversible overall decline • Trees infected with pathogens of significant to the health and/or safety of other trees nearby	Dark Red

Trees to be considered for retention				
Category and definition	**Criteria – Subcategories**			**Identification on plan**
	1 Mainly arboricultural values	**2 Mainly landscape values**	**3 Mainly cultural values, including conservation**	
Category A: Those of high quality and value. A condition as to be able to make a substantial contribution (min of 40 years suggested)	Trees that are particularly good examples of their species, especially if rare or unusual, or essential components of groups, or of formal or semi-formal arboricultural feature	Trees, groups or woodland which provides a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance	Trees, groups or woodland of significant conservation, historical, commemorative or other value	Light Green
Category B: Those of moderate quality and value Those that are in such a condition as to maje a significant contribution (min of 20years remaining)	Trees that might be included in the high category but are downgraded because of impaired condition	Trees present in number, usually as groups or woodland, such that they form distinct landscape feature, thereby attracting a higher collective rating than they might as individual but which are not, individually, essential components of formal or semi-formal arboricultural features or trees situated mainly internally to the site, therefore individually having little visual impact on the wider locality	Trees with clearly identifiable conservation or other benefits	Mid Blue
Category C: Those of low quality and value Currently in adequate condition to remain until new planting could be established (min 10 years remaining) or younger trees with a stem diameter below 150 mm	Trees not qualifying in higher categories	Trees present in groups or woodland, but without this conferring on them significantly greater landscape value, and/or trees offering low or only temporary benefit	Trees with very limited conservation or other cultural benefits	Grey
	NOTE: Whilst C category tress will usually not be retained where they would impose a significant constraint on development, young trees with a stem diameter of less than 150mm should be considered for relocation			

Appendix B – Tree Survey Template

Note that the survey form version within the field software is presented differently and with varying options.

Tree SurveyID	
Street Name	
Coordinate X	

Survey ID	
Area Name	
Coordinate Y	

Species				
Hazel *(Corylus Avellana)*		Willow *(Salix Spp)*		**Species not mentioned**
Birch *(Betulla Spp)*		Oak *(Quercus Spp)*		
Beech *(Fagus Sylvatica)*		Larches *(Larix Spp)*		
Sycamore *(Acer Pseudoplatanus)*		Spruce *(Picea Spp)*		
Horse Chestnut *(Castanea Sativa)*		Elms *(Ulmus Spp)*		

Height (m)	
Height Crown Clearance (m)	

Stem Diameter (mm)	

Location	
Verge	
Kerbside	
Median	
Garden	
Park	
Hedgerow	
Woodland	
Riparian Woodland	
Brownfield	
Graveyard	

Location Domain	
Public	
Private	
Institutional	
Unknown	

Tree Size	
Very Small 2-5 m2	
Small 5-10 m2	
Medium 25-50 m2	
Large 100-150 m2	
Very large 200 m2 +	

Age	
Young	
Middle Aged	
Mature	
Over-Mature	
Veteran	

Physiological Condition	
Good	
Fair	
Poor	
Dead	

Structural Condition	
Excellent	
Good	
Fair	
Poor	
Very Poor	

ERC Years	
<10 Years	
10-20 Years	
20-40 Years	
40 Years +	

Category Grading	
R	
A	
B	
C	

Importance Arboricultural	
High	
Moderate	
Low	

Importance Landscape	
High	
Moderate	
Low	

Importance Cultural	
High	
Moderate	
Low	

Importance Biodiversity	
High	
Moderate	
Low	

Category Importance	
International	
National	
Regional/City	
Local High	
Local Moderate	
Local Low	

Importance Positioning	
None	
Very Little	
Little	
Some	
Considerable	
Great	

Presence Of Other Trees	
Woodland	
Many	
Some	
Few	
None	

Relation To Setting	
Totally Unsuitable	
Moderately suitable	
Barrely suitable	
Fairly suitable	
Very suitable	
Especially suitable	

Physical Form	
Ugly	
Poor	
Fair/Average	
Good	
Especially Good	

Biodiversity Bat Roost	
Biodiversity Bird Roost	
Biodiversity Lichen %	

Photo ID	
Video ID	

Biodiversity Note

Damage Impacts *(Damage caused by the tree, e.g. lifting of partway by roots, Risk to houses etc….)*

Special Factors *(Unique features etc…)*

Management Recommendations *(Protective fencing, pruning required, etc…)*

Appendix C – Street Level Tree Survey Template

Note that the survey form version within the field software is presented differently and with varying options.

Street Survey ID	
Street Name	
Coordinate X	
Start time	
Street Function	**Street Transport Function**
Residential	Major Arterial
Commerical	Minor Arterial
Industrial	Collector
Residential / Commercial Mix >30% Each	Local
Residential / Commercial Mix >30% Each	
Residential / Industrial Mix >30% Each	
Dominant Building Height	
Street Age	**Tree Format**
200 Years +	Boulevard
100-200 Years	Boulevard Effect - Garden Trees
50-100 Years	Random - High Impact
20 Years-Present Day	Random - Low Impact
	No / Few Trees
Dominant Species	
Hazel *(Corylus Avellana)*	Larches *(Larix Spp)*
Birch *(Betulla Spp)*	Spruce *(Picea Spp)*

Survey ID	
Area Name	
Coordinate Y	
End time	
Street/Surround Architecture	**Street Architecture Era**
Terrace - cottages	Georgian 1760-1840
Terrace - 2 storey	Victorian 1840-1890
Terrace - 3 storey +	Edwardian 1890-1920
Semi-detached	Inter-war 1920-1945
Detached	Post-war 1945-1960
Office blocks	1960s-70s
Industrial premises	1980s-90s
Brownfield	New millenium
Parkland	
Graveyards	
Notes	
Species not Mentioned	

Beech *(Fagus Sylvatica)*	Elms *(Ulmus Spp)*
Sycamore *(Acer Pseudoplatanus)*	Horse Chestnut *(Castanea Sativa)*
Willow *(Salix Spp)*	
Oak *(Quercus Spp)*	

Dominant Age Class of Trees	
Young	
Middle Aged	
Mature	
Over-Mature	
Veteran	

Dominant Physiological Condition	
Good	
Fair	
Poor	
Dead	

Dominant Structural Condition	
Excellent	
Good	
Fair	
Poor	
Very Poor	

Dominant ERC Years	
<10 Years	
10-20 Years	
20-40 Years	
40 Years +	

Dominant Tree Size	

Dominant Tree Height	

Dominant Category Grading	
R	
A	
B	
C	

Management Recommendations

Importance Arboricultural	
High	
Moderate	
Low	

Importance Landscape	
High	
Moderate	
Low	

Importance Cultural	
High	
Moderate	
Low	

Importance Biodiversity	
High	
Moderate	
Low	

Importance Positioning	
None	
Very Little	
Little	
Some	
Considerable	
Great	

Presence of other Trees	
Woodland	
Many	
Some	
Few	
None	

Relation to Setting	
Totally Unsuitable	
Moderately Suitable	
Barrely Suitable	
Fairly Suitable	
Very Suitable	
Especially Suitable	

Physical Form	
Ugly	
Poor	
Fair / Average	
Good	
Especially Good	

Category Importance	
International	
National	
Regional/City	
Local High	
Local Moderate	
Local Low	

Special Factors

Photo ID	

Video ID	

Appendix D – Natura Ecological Evaluation Scheme

An attempt has been made to evaluate streets and associated treescapes for their ecological importance in the tree and street survey methodology (see Category Importance fields). The categories and qualifying criteria are loosely based on the NATURA scheme for ecological evaluation of sites (after Fossitt et al, 2002).

NATURA scheme for ecological evaluation of sites (after Fossitt et al, 2002)	
Rating	***Qualifying Criteria***
A	**Internationally important** Sites designated (or qualifying for designation) as SAC* or SPA* under the EU Habitats or Birds Directives. Undesignated sites containing good examples of Annex I priority habitats under the EU Habitats Directive. Major salmon river fisheries. Major salmonid (salmon, trout or char) lake fisheries.
B	**Nationally important** Sites or waters designated or proposed as an NHA* or statutory Nature Reserves. Undesignated sites containing good examples of Annex I habitats (under EU Habitats Directive). Undesignated sites containing significant numbers of resident or regularly occurring populations of Annex II species under the EU Habitats Directive or Annex I species under the EU Birds Directive or species protected under the Wildlife (Amendment) Act 2000. Major trout river fisheries. Water bodies with major amenity fishery value. Commercially important coarse fisheries.
C	**High value, locally important** Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or significant populations of locally rare species. Small water bodies with known salmonid populations or with good potential salmonid habitat. Sites containing any resident or regularly occurring populations of Annex II species under the EU Habitats Directive or Annex I species under the EU Birds Directive. Large water bodies with some coarse fisheries value.
D	**Moderate value, locally important** Sites containing some semi-natural habitat or locally important for wildlife. Small water bodies with some coarse fisheries value or some potential salmonid habitat. Any water body with unpolluted water (Q-value rating 4-5).
E	**Low value, locally important** Artificial or highly modified habitats with low species diversity and low wildlife value.

	Water bodies with no current fisheries value and no significant potential fisheries value.

Appendix E- Tree Results

Area	Count
Ballyfermot	731
Bluebell	57
Crumlin	922
Dolphins Barn	694
Drimnagh	684
Harolds Cross	321
Islandbridge	20
Kilmainham	358
Kimmage	1025
Terenure	532
Walkinstown	583

Tree location	Count
Hedgerow	5
Kerbside	3888
Median	217
Park	26
Verge	1861

Height	Count
0-5m	2012
6-10m	3680
11-15m	181
16-20m	80
21+m	4

Stem diameter (cm)	Count
NA	15
0-50	2747
51-100	2474
101-150	564
151-200	130
201-250	41
251-300	54
301-350	11
350+	0

Crown Height (m)	Count
1	312
2	3115
3	2200
4	207
5	75
6	15
7	3
8	1

Branch Spread (m)	Count
0-5	3181
6-10	2474
11-15	302
16-20	39
21+	3

Tree age category	Count
Mature	1227
Over Mature	52
Semi Mature	2869
Young	1838

Physiological condition	Count
Dead	104
Fair	368
Good	5401
Poor	118

Remaining Contribution	Count
10-20 Years	98
20-40 Years	46
40 Years +	5659
<10 Years	187

Category grading	Count
A	5193
B	549
C	115
R	135

Relative to setting	Count
Espically Suitable	1
Moderately Unsuitable	29
Suitable	5956
Very Suitable	8

Bat Roosts	Count
No	5999
Yes	0

Bird Roosts	Count
No	5999
Yes	0

Main Maintenance Recommendations	Count
None	156
Bark Decay	4
Fell	122
Further Assessment Req	1
Improve water permeability	46
Included Bark	23
Lift crown	14
Limb Decay	4
Limb Structure Decay	1
Limb Structure crack	1
Monitor Condition	5414
Prune to boundary	1
Reduce compaction on roots	102
Reduce crown	2
Remove cracked limb	1
Remove deadwood	18
Remove snags	6
Stake tree	3
Sucker growth	9
Thin crown	7
Trunk Decay	32
Unstake tree	20
cracked limb	1
fiix grill	1
fix metal gril	4
m	1
major crack	1
remove low limb	1
remove lower limb	1
stress crack	1
stress cracks	1

2nd Maintenance Rec	Count
Add drainage shore	1
Add protective fencing	1
Bark Decay	10
Fell	3
Further Assessment Req	8
Improve water permeability	85
Included Bark	31
Lift crown	76
Limb Decay	6
Limb Structure Decay	5
Monitor Condition	61
Potential for planting	1
Prune to boundary	1
Reduce compaction on roots	1876
Reduce crown	8
Remove deadwood	79
Remove limb	1
Remove snags	12
Reshape crown	5
Root Decay	2
Stake tree	16
Sucker growth	136
Thin crown	52
Trunk Decay	76
Unstake tree	99
bad fork	1
canker weep	1
crack in fork	1
reStake tree	1
remove protective fencing	1
stress crack	1

Main Ancilliary Problems	Count
Calluses identified	318
Cracking/lifting of pavement	327
Cracking/lifting of road	2
Damage to wall	6
Exposed roots	1
Exposed roots on pavement	23
Future problematic	101
Impeding high vehicles	13

2nd Ancilliary Problems	Count
Calluses identified	59
Cracking/lifting of pavement	33
Cracking/lifting of road	10
Exposed roots on	1
Exposed roots on pavement	12
Future problematic	91
Impeding high vehicles	3
Interferring w/powerlines	87

Interferring bus stop	1
Interferring w/powerlines	532
Petrified bark identified	71
Public Lighting Affected	48
Public Signs Affected	14
Risk to adj building	28
exposed rroots	1
fire damage	1
stress cracks	1

Petrified bark identified	30
Public Lighting Affected	24
Public Signs Affected	4
Risk to adj building	16
bark damage	1
crack limbs	1
stem damage	1
stress cracks	1

Tree Base	Count
Concrete	3099
Grass	2033
Metal gril	64
Paving Slab	111
Tarmac	678

Creepers	Count
No	5978
Yes	21

SPECIES	Count
Alder (Alnus glutinosa)	41
Ash (Fraxinus excelsior)	71
Aspen (Populus tremula)	6
Beech (Fagus sylvatica)	12
Birch (Betula sp)	405
Cherry Blossom (Prunus sp.)	493
Crab Apple (Malu sylvestris)	198
Elm (Ulmus sp.)	3
Hawthorn (Crataegus monogyna)	19
Hazel (Corylus avellana)	326
Holm Oak (Quercus ilex)	1
Hornbeam	557
Horse Chestnut (Aescululs hippocastanum)	35
Lime (Tilia sp.)	505
London Plane	407
Maple (Aceraceae sp.)	1294
Purple Plum	291
Rowan (Sorbusaucuparia)	1119
Silver Birch (Betula pendula)	1
Sycamore (Acer pseudoplatanus)	109
acacia	5
cedar	7
fern beech	4
gingo	1
ginko	3
hornbeam	36
laburum	1
liquid amber	1
mixhedge	1
oak	30
purple plum	2
purpleplum	1
robinia	1