Clane

Draft Local Area Plan 2017-2023

Dréachtphlean Cheantair Áitiúil Claonadh

STRATEGIC FLOOD RISK ASSESSMENT

Planning Department
Kildare County Council
September 2016

Comhairle Bhaile Chill Dara

Kildare County Council

DRAFT STRATEGIC FLOOD RISK ASSESSMENT

DRAFT CLANE LOCAL AREA PLAN 2017 TO 2023

Kildare County Council
Planning Department
Aras Chill Dara
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Issue No.6

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Title:	**DRAFT STRATEGIC FLOOD RISK ASSESSMENT**

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1.0 INTRODUCTION

1.1 Requirement for Flood Risk Assessment

Kildare County Council is in the process of preparing the Clane Local Area Plan 2017 to 2023 in accordance with the Core Strategy and the requirements and provisions of the Planning and Development Act 2000 (as amended).

In accordance with Section 28 of the Planning and Development Act 2000 as amended, the planning authority shall have regard to any guidelines issued by the Minister of the Environment, Heritage and Local Government to planning authorities in the performance of their functions including the preparation of Development Plans.

In response to the recommendations of the National Flood Policy Review Group the Minister published statutory planning guidelines entitled *"The Planning System and Flood Risk Management – Guidelines for Planning Authorities"* on 30 November 2009 ['the Guidelines'] which incorporate flood risk assessment and management into the planning system. The Guidelines focus on providing for comprehensive consideration of flood risk in preparing Regional Plans, Development Plans and Local Area Plans, and in determining applications for planning permission.

The Guidelines were issued under Section 28 of the Planning and Development Act 2000 as amended, and require Planning Authorities to introduce flood risk assessment as an integral and leading element of their development planning functions. This is achieved by ensuring that the various steps in the process of making or varying a development plan, together with the associated Strategic Environmental Assessment (SEA), are supported by an appropriate Strategic Flood Risk Assessment (SFRA).

Kilgallen and Partners Consulting Engineers have been appointed by Kildare County Council to undertake a Strategic Flood Risk Assessment (SFRA) for the Clane Local Area Plan 2017 to 2023 in accordance with the Core Strategy and in accordance with the Guidelines referenced above.

It is recommended that the SFRA is adopted as a 'Living Document' and reviewed regularly and updated with any new relevant information that may become available during the lifetime of the Clane Local Area Plan.

It is the responsibility of each applicant for planning permission to determine the flood risk pertaining to the lands on which development is proposed and to include appropriate mitigation works as part of the proposed development for which permission is sought.

1.2 The Planning Guidelines and Flood Risk Management

The assessment of flood risk requires an understanding of the source of the floodwaters, the process and direction of flow and the people and assets affected by flooding. The Guidelines introduce the mechanism of Flood Risk Assessment (FRA) into the planning process by the incorporation of flood risk identification, assessment and management.

The core objectives of the Guidelines are to:

- Avoid inappropriate development in areas at risk of flooding;
- Avoid new developments increasing flood risk elsewhere, including that which may arise from surface water run-off;
- Ensure effective management of residual risks for development permitted in floodplains;
- Avoid unnecessary restriction of national, regional or local economic growth;
- Improve the understanding of flood risk among relevant stakeholders;
- Ensure that the requirements of the EU and national law in relation to the natural environment and nature conservation are complied with at all stages of flood risk management.

These core objectives are achieved through the process of Flood Risk Assessments. The level of detail required for a Flood Risk Assessment depends on the purpose of the FRA. In the subject case of the Clane Local Area Plan, a Strategic Flood Risk Assessment (SFRA) is required to inform the plan making process.

To achieve the objectives of the Guidelines, the following principles are applied:

- Avoid the risk, where possible
- Substitute less vulnerable uses where avoidance is not possible, and
- Mitigate and manage the risk, where avoidance and substitution is not possible.

1.3 Structure of a Flood Risk Assessment (FRA)

The Guidelines recommend that a staged approach is adopted when undertaking a Flood Risk Assessment (FRA). The recommended stages are briefly described below:

- ***Stage 1*** ~ Flood Risk Identification
  To identify whether there may be any flooding or surface water management issues that will require further investigation. This stage mainly comprises a comprehensive desk study of available information to establish whether a flood risk issue exists or whether one may exist in the future.

- ***Stage 2*** ~ Initial Flood Risk Assessment
  If a flood risk issue is deemed to exist arising from the Stage 1 Flood Risk Identification process, the assessment proceeds to Stage 2 which confirms the sources of flooding, appraises the adequacy of existing information and determines the extent of additional surveys and the degree of modelling that will be required. Stage 2 must be sufficiently detailed to allow the application of the sequential approach (as described in Section 1.4.2 herein) within the flood risk zone.

- ***Stage 3*** ~ Detailed Flood Risk Assessment
  Where Stages 1 and 2 indicate that a proposed area of possible zoning or development may be subject to a significant flood risk, a Stage 3 Detailed Flood Risk Assessment must be undertaken.

1.4 The Flood Risk Assessment Process for the Planning Authority

1.4.1 Scales of Flood Risk Assessments

Flood Risk Assessments are undertaken at different scales by different organisations for many different purposes. The scales are as follows:

- Regional Flood Risk Appraisal (RFRA): A Regional Flood Risk Appraisal provides a broad overview of the source and significance of all types of flood risk across a region and highlights areas where more detailed study will be required. These appraisals are undertaken by regional authorities.

- Strategic Flood Risk Assessment (SFRA): A Strategic Flood Risk Assessment provides a broad (area-wide or county-wide) assessment of all types of flood risk to inform strategic land use planning decisions. The SFRA allows the Planning Authority to undertake the sequential approach (described below) and identify how flood risk can be reduced as part of the development plan process.

- Site Flood Risk Assessment (Site FRA): A Site FRA is undertaken to assess all types of flood risk for a new development. This requires identification of the sources of flood risk, the effects of climate change on the flood risk, the impact of the proposed development, the effectiveness of flood mitigation and management measures and the residual risks that then remain.

1.4.2 The Sequential Approach

The sequential approach in terms of flood risk management is based on the following principles: **AVOID - SUBSTITUTE - JUSTIFY - MITIGATE – PROCEED.**

The primary objective of the sequential approach is that development is primarily directed towards land that is at low risk of flooding (AVOID).

The next stage is to ensure that the type of development proposed is not especially vulnerable to the adverse impacts of flooding (SUBSTITUTION).

The Justification Test is designed to rigorously assess the appropriateness, or otherwise, of particular developments that, for various reasons, are being considered in areas of moderate or high flood risk (JUSTIFICATION). The test is comprised of two processes, namely The Plan-Making Justification Test and The Development Management Justification Test. Only the former (Plan-Making Justification Test) is relevant to a Strategic Flood Risk Assessment for a Development Plan, and this is described as follows.

<u>The Plan-Making Justification Test</u>
Where, as part of the preparation and adoption of a development / local area plan, a planning authority is considering the future development of areas in an urban settlement that are at moderate or high risk of flooding, for uses or development vulnerable to flooding that would generally be inappropriate as set out in the Guidelines, all of the criteria listed below, as stated in the Guidelines, must be satisfied. This is referred to as the "*Justification Test For Development Plans":*

(I) The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans as defined above or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act 2000, a amended.

(II) The zoning or designation of the lands for the particular use or development type is required to achieve the proper and sustainable planning of the urban settlement and in particular:

- *(i) Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement;*
- *(ii) Comprises significant previously developed and/or under-utilised lands;*
- *(iii) Is within or adjoining the core of an established or designated urban settlement;*
- *(iv) Will be essential in achieving compact or sustainable urban growth;*
- *(v) There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.*

(III) A flood risk assessment to an appropriate level of detail has been carried out as part of the Strategic Environmental Assessment as part of the development plan preparation process, which demonstrates that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere.

N.B. The acceptability or otherwise of levels of any residual risk should be made with consideration for the proposed development and the local context and should be described in the relevant flood risk assessment."

MITIGATION is the process where the flood risk is reduced to acceptable levels by means of land use strategies or by means of detailed proposals for the management of flood risk and surface water, all as addressed in the Flood Risk Assessment.

The decision to PROCEED should only be taken after the Justification Test has been passed.

1.5 Key Outputs from the SFRA

The key outputs are:

- To provide for an improved understanding of flood risk issues within the Development Plan and development management process, and to communicate this to a wide range of stakeholders;
- To produce an assessment of existing flood defence infrastructure and the consequences of failure of that infrastructure and to identify areas of natural floodplain to be safeguarded;
- To produce a suitably detailed flood risk assessment that supports the application of the sequential approach in key areas where there may be tension between development pressures and avoidance of flood risk;
- To inform, where necessary, the application of the Justification Test;
- To conclude whether measures to deal with flood risks to the area proposed for development can satisfactorily reduce the risks to an acceptable level while not increasing flood risk elsewhere;
- To produce guidance on mitigation measures, how surface water should be managed and appropriate criteria.

2.0 FLOOD RISK

2.1 Components of Flood Risk

Flood Risk is defined as a combination of the likelihood of flooding occurring and the potential consequences arising from that flooding.

The likelihood of flooding is defined in the Guidelines as follows:

"Likelihood of flooding is normally defined as the percentage probability of a flood of a given magnitude or severity occurring or being exceeded in any given year."

The consequences of flooding depend on the following:

"Consequences of flooding depend on the hazards associated with the flooding (e.g. depth of water, speed of flow, rate of onset, duration, wave action effects, water quality), and the vulnerability of people, property and the environment potentially affected by a flood (e.g. the age profile of the population, the type of development, presence and reliability of mitigation measures etc)."

2.2 Source-Pathway-Receptor Model

The Source – Pathway – Receptor Model (SPR Model) is a widely applied model which is used to assess and inform the management of environmental risk.

- **Source -** The origin of a hazard (for example, heavy rainfall, strong winds, surge etc).
- **Pathway -** Route that a hazard takes to reach Receptors. A pathway must exist for a Hazard to be realised.
- **Receptor -** Receptor refers to the entity that may be harmed (a person, property, habitat etc.).

For example, in the event of heavy rainfall *(the source) flood* water may propagate across the flood plain *(the pathway)* and inundate housing *(the receptor).* The vulnerability of a receptor can be modified by increasing its resilience to flooding.

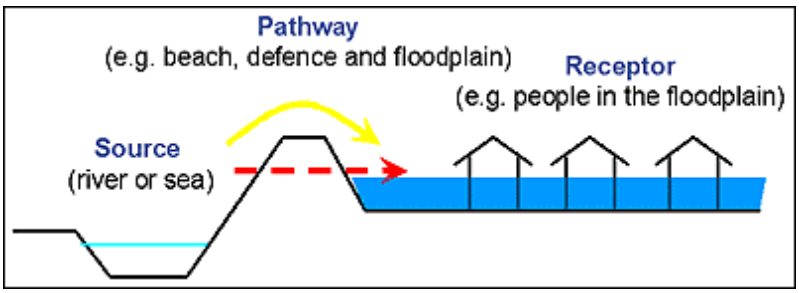


Figure 1: Source-Pathway-Receptor Model (adapted from www.floodsite.net)

3.0 EUROPEAN, NATIONAL AND REGIONAL POLICY

3.1 European Policy

3.1.1 EU Floods Directive

http://ec.europa.eu/environment/water/flood_risk/index.htm

Directive 2007/60/EC on the assessment and management of flood risks became operative on 26th November 2007. This Directive requires Member States to assess the risks of flooding along all watercourses and coast lines. It also requires Member States to map the extent of potential flooding in each case, determine the assets and humans at risk in the areas and to take adequate and coordinated measures to reduce this flood risk. The aim of the Directive is to reduce and manage the risks posed by flooding to human health, the environment, cultural heritage and economic activity.

Member States are required by 2011 to carry out a preliminary assessment identifying the river basins and the coastal areas at risk of flooding. For such zones, flood risk maps are required to be drawn up by 2013 and Member States are required to establish flood risk management plans focused on prevention, protection and preparedness by 2015. The Directive applies to inland waters and to all coastal waters across the whole territory of the EU.

3.1.2 EU Water Framework Directive

www.wfdireland.ie

The Water Framework Directive, which came into force on December 22nd 2000, established a new and integrated approach to the protection, improvement and sustainable use of Europe's rivers, lakes, estuaries, coastal waters and groundwater. It impacts on the management of water quality and water resources and affects conservation, fisheries, flood defence, planning and environmental monitoring.

The primary focus of the Directive is to achieve 'good' ecological status for all waters by 2015.

3.2 National Policy

3.2.1 Planning Guidelines "The Planning System and Flood Risk Management"

The *Planning System and Flood Risk Management* Guidelines were prepared in response to the recommendations of the National Flood Policy Review Group and focused on providing for comprehensive consideration of flood risk in preparing Regional Plans, Development Plans and Local Area Plans, and in determining applications for planning permission.

The Guidelines generally require that development should not be permitted in flood risk areas, particularly floodplains, except where there are no alternative and appropriate sites available in lower risk areas that are consistent with the objectives of proper planning and sustainable development.

3.2.2 Transposition and Implementation of the EU Floods Directive

On 19th March 2010, the Statutory Instrument transposing the EU 'Floods' Directive was signed into Irish law. The Statutory Instrument appointed the Commissioners of Public Works in Ireland as the Competent Authority under the Directive. The Statutory Instrument also identified roles for other organisations, such as the Local Authorities, Waterways Ireland and ESB, to undertake certain duties with respect to flood risk within their existing areas of responsibility.

3.2.3 Office of Public Works

The Office of Public Works is the lead agency for flood risk management in Ireland and is responsible for the coordination and implementation of Government policy on this issue. It is the primary agency responsible for ensuring Ireland's compliance with the EU Floods Directive and particularly for the preparation of a preliminary assessment by 2011, preparation of flood risk mapping by 2013 and preparation of flood risk management plans by 2015. It is the principal agency involved in the preparation of Catchment Flood Risk Assessment and Management Studies.

3.3 Regional Policy

3.3.1 Introduction

For the purposes of regional planning, the Mid-East Regional Authority and the Dublin Regional Authority have partnered to produce Regional Planning Guidelines for the Greater Dublin Area (www.rpg.ie).

On the 15th of June 2010, Regional Planning Guidelines for the Greater Dublin Area 2010~2022 were made. The guidelines give regional effect to the National Spatial Strategy and guide the development plans in each Local Authority area. The guidelines have effect for six years.

The guidelines contain a Regional Flood Risk Appraisal (RFRA), which is a high-level broad-brush appraisal of flood risk across an entire regional authority area, based on existing readily available information.

Paragraphs 3.3.2 to 3.3.5 herein present a summary of the Regional Flood Risk Appraisal together with an outline of the main outputs of relevance to the Clane Local Area Plan.

3.3.2 Regional Flood Risk Appraisal Process

The RFRA process examines the issue of major flood risk from river, estuarine and coastal flooding and does not examine groundwater or artificial drainage flood events. The process of preparing the RFRA involved the mapping of historical flood events in the Greater Dublin Area (GDA) to provide a general indication at a regional scale of where flood vulnerable locations are located in the GDA.

The mapping of alluvial soils indicating flood plain locations in the GDA was also examined at a regional level.

The studies indicate that significant sections of the built up area of Dublin together with key towns in the GDA are vulnerable to flooding, particularly along the coast, near estuaries and lands proximate to the rivers flowing through the region.

3.3.3 Strategic Policies and Recommendations for Regional Flood Risk Management

- **Strategic Policy FP1:** That flood risk be managed pro-actively at all stages in the planning process by avoiding development in flood risk areas where possible and by reducing the risks of flooding to and from existing and future development.
- **Strategic Recommendation FR1:** New development should be avoided in areas at risk of flooding. Alongside this, the Regional Flood Risk Appraisal recognises the need for continuing investment and development within the urban

centres of flood vulnerable designated growth towns and the City and for this to take place in tandem with the completion of Catchment Flood Risk Assessment and Management (CFRAM) Studies and investment in comprehensive flood protection and management.

- **Strategic Recommendation FR2:** Development and Local Area Plans should include a Strategic Flood Risk Assessment and all future zoning of land for development in areas at risk of flooding should follow the sequential approach set out in the Departmental Guidance on Flood Risk Management. All Flood Risk Assessments and CFRAM studies should take place in coordination and consultation with adjoining local authorities and regions and in coordination with the relevant River Basin Management Plans.
- **Strategic Recommendation FR3:** Local authorities should take the opportunities presented to optimise improvements in biodiversity and amenity when including policies and actions in development plans/local area plans (such as flood plain protection and SuDS) for existing and future developments.
- **Strategic Recommendation FR4:** Plans and projects associated with flood risk management that have the potential to negatively impact on Natura 2000 sites will be subject to a Habitats Directive Assessment (HDA) according to Article 6 of the habitats directive and in accordance with best practice and guidance.

3.3.4 Role of Local Authorities (from RFRA)

Local Authorities must take account of the issues raised in this Regional Flood Risk Appraisal and undertake Strategic Flood Risk Assessment for future Development and Local Area Plans in line with the Department's Guidance on the Planning System and Flood Risk Management Guidelines. Local Authorities should ensure that they adhere to the principles of avoiding risk where possible in preparing such future Plans.

The Regional Planning Guidelines seek to emphasise the need to protect across the Greater Dublin Area the natural flood plains and riparian corridors of all rivers that have not already been built on, and seek that this is explicitly stated and spatially designated in all future Development and Local Area plans following the completion of CFRAM studies for the area in question. In the absence of the CFRAM studies, Planning Authorities should identify the areas at risk using other data such as data that is available from the OPW, available historical information (mapped or otherwise), and if necessary, through additional studies or investigations.

Land required for current and future flood management should be safeguarded from development.

Allocation of future areas for development as extensions to existing built up areas, villages or towns should follow a sequential approach; be within the lowest risk sites appropriate for the development; and should include adequate provision for adaptation to, or protection against, the projected impacts of climate change.

3.3.5 Recommendations from Regional Flood Risk Appraisals

In the preparation of future Development and Local Area Plans, Local Authorities are advised to:

- Identify and consider at the earliest stage in the planning process flood hazard and potential risk.
- Identify flood risk areas on the Development Plan and Local Area Plan maps.
- Review existing Development Plans and Local Area Plans to ensure that the issue of Flood Risk has been addressed in a manner consistent with the Flood Risk Management Guidelines.
- Where lands are already zoned for housing or other vulnerable development in flood risk areas, the Planning Authority should undertake a re-examination of the zoning in accordance with the sequential approach. Regional Planning Guidelines may need to identify Plans which will require a variation to take account of flood risk assessments.
- Include policies which ensure that flood risk areas targeted for development following the sequential approach should be planned, designed and constructed to reduce and manage flood risk and be adaptable to changes in climate.
- Include policies to ensure that flood risk and impact is considered as a key element in the assessment of future waste and mineral planning strategies and developments.
- Include policies that ensure that the location of key infrastructure will be subject to flood risk assessment.
- Include policies on the importance of the inclusion of Sustainable Drainage Systems (SuDS) in future developments, in accordance with the recommendations of the Greater Dublin Strategic Drainage Study Guidelines and Appendix B of the Planning System and Flood Risk Management Guidelines.

Flooding events, whether widespread or localised, can cause serious damage to key infrastructure (e.g. power stations, sub-stations, communication hubs, wastewater treatment plants etc.). The cost of such disruption is significant to business, causes hardship to residents and also can place people in "at risk" situations. For this reason, it is recommended that on completion of Catchment Flood Risk Assessment and Management Studies and upon identification of areas of high flood risk in each Planning Authority area, that key infrastructure suppliers are advised of the risk to such installations and encouraged to assess current infrastructure for risk and stress test future projects against flood risk, where this has not been previously undertaken.

4.0 STRATEGIC FLOOD RISK ASSESSMENTS–CLANE LOCAL AREA PLAN

4.1 Introduction

The Strategic Flood Risk Assessment provides an appraisal and assessment of available flood risk data for the land-use proposals within the boundaries of the Clane Local Area Plan. This process identifies flood risk indicators in each area and, where it is demonstrated that lands may be at risk of flooding, recommends modifications to land-use proposals or the carrying out of more detailed flood risk assessment as appropriate.

4.2 Available Flood Risk Data

Most of the data utilised is historically derived, not prescriptive in relation to flood return periods and not yet predictive or inclusive for climate change analysis.

4.2.1 Flood Records on Floodmaps.ie

As part of the National Flood Risk Management Policy, the OPW developed the www.floodmaps.ie web based data set, which contains information concerning historical flood data and displays related mapped information and provides tools to search for and display information about selected flood events. (A summary report from this website for Clane Local Area Plan is reproduced in the Appendices).

Additional mapped information, such as the Ordnance Survey of Ireland background maps, rivers, hydrometric gauge stations, drainage districts and land benefiting from drainage schemes is included as additional contextual information.

4.2.2 Catchment Flood Risk Assessment and Management (CFRAM)

Ireland is required under the EU Floods Directive to carry out Preliminary Flood Risk Assessments of its river basins and associated coastal zones. The OPW has developed a Catchment Flood Risk Assessment and Management (CFRAM) Programme, which lies at the core of the assessment of flood risk and the long-term planning of the flood risk management measures throughout the country, including capital structural and non-structural measures.

As part of this programme, flood maps for Areas of Potentially Significant Risk have been produced. Although not final and subject to modification, the CFRAM mapping is considered an important flood-risk indicator.

4.2.3 6" (1:10560) Ordnance Survey Maps

6" Ordnance Survey maps include areas which are marked as being "Liable to Floods". Generally, these areas are only shown identified indicatively and suggest historical flooding, usually recurrent. In addition, the maps indicate areas of wet or hummocky ground, bog, marsh, springs, rises and wells as well as surface water features including rivers, streams, bridges, weirs and dams.

4.2.4 Local Authority Personnel

Detailed consultations were held with Local Authority personnel regarding historical flooding and any flood relief works which either have been carried out or are proposed for the areas encompassed by the boundaries of the Clane Local Area Plan.

4.2.5 Flood Studies, Reports and Flood Relief Schemes

Flood reports have been completed for a number of areas within County Kildare and many areas with a history of flooding have undergone flood relief works in the recent past. A number of surface water / flood alleviation schemes are listed in the Capital Programme 2016 ~ 2018.

4.3 Flood Risk Indicators

The extent of Clane Local Area Plan, as defined by the boundaries of the draft Local Area Plan, has been assessed for the presence of flood risk indicators by reference to the datasets described in Section 4.2. Table 1 provides a matrix showing these indicators at various locations throughout Clane Local Area Plan.

Location	Available data (by source)			
	www.floodmaps.ie / CFRAM Maps	**Local Authority**	**25" & 6" OS maps**	**Other**
Lands at northern boundary of LAP (townland of Mainham)	CFRAM shows localised flooding in lands immediately north, adjacent to the Gollymochy River.			
Area of land within Loughbollard adjacent to College Road East (townland of Loughbollard Commons)	Floodmaps website refers to repeated flooding at a location in Loughbollard along the Clane to Kilcock Road (Flood ID 1293). CFRAM mapping shows 1% and .1% AEP flood risk in lands adjoining the Gollymochy River	Clane Area Engineer has recorded previous flooding incidents in this low lying area.	25" mapping indicates springs, open drains and the Gollymochy River in the immediate proximity of these lands. A spring is mapped north of the lands.	Soils underlying the lands are mapped by the EPA as Poorly Drained topsoil whose parent material is Limestone Till.
Lands north and south of the Butterstream within the LAP boundary (townlands of Hoganswood East, Clane and Crockaun Commons)	CFRAM mapping indicates lands north of the Prosperous Road and as being affected by 1% and .1% AEP flood risk. Floodmaps website refers to repeated flooding in Commons, Clane (Flood ID 1285) by the Butterstream and flooding on the Millicent Road at a low lying area due to inadequate and frequently blocked drainage (Flood ID 1291).	The Butterstream Flood Alleviation Scheme has been completed. There has been a history of flooding in this area.	Extensive drainage features are mapped on the OS 6" and 25" Historic Mapping on lands around the Butterstream including rises, land drains and springs.	There has been a history of flooding in this area. Of particular note was the flooding which occurred in November/December 2009 when the nearby nursing home was evacuated.
Lands south of the Clane to Prosperous Road and lands east of the Clane to Sallins Road south of the Roman Catholic Church	CFRAM mapping indicates these lands as being affected b 1% and .1% AEP flood risk		Numerous springs and drainage features including the Butterstream are mapped within this area.	
Lands along the River Liffey within the LAP boundary (townlands of Carrigeen, Abbeyland (Clane By),Blackhall (Ed Bodenstown) and Capdoo)	CFRAM mapping indicates a likelihood of significant flooding, with up to 10% AEP, within large portions of these lands. Floodmaps website refers to significant flood event around Alexandra Bridge in 1954.		The Butterstream enters the Liffey near Alexandra Bridge. Numerous open drains, springs, wells and rises are mapped on the OS 25" Historic Mapping. An area mapped as 'including water' lies north of the Liffey within the townland of Abbeyland near Clane Abbey.	Extensive development has occurred throughout large portions of these lands in recent years.
Extensive lands within the LAP boundary east of lands zoned Town Centre	CFRAM mapping indicates a likelihood of significant flooding, with up to 10% AEP, within large portions of these		OS 6" and 25" Historic Mapping indicates that these lands contain extensive drainage features including numerous springs and rises, wells, open field drains and small streams.	Extensive development of land areas east of Clane has occurred.

(including lands lying within townlands of Capdoo Commons, Castlebrown or Clongowes north of the Celbridge Road and lands east and west of the recently constructed link road between the Celbridge Road and the Sallins Road)	lands.			

Table 1: Flood Risk Indicators for Clane

4.4 Recommendations for modification to or additional assessment of land-use proposals

The SFRA carried out an Initial Flood Risk Assessment based on the flood risk indicators listed in Table 1 in relation to the land-use proposals contained in the initial draft Local Area Plan (shown in Appendix I).

Clane has been subject to repeated historical flooding as well as more recent flood events. Prior to the damming of the River Liffey, Clane experienced regular extensive flooding. The Butterstream in Clane has flooded in recent times.

Historical indicators suggested the potential for minor localised flooding at several locations. OPW flood-mapping also identified a recurrent flooding problem arising from inadequacies in the surface water drainage infrastructure and low-lying lands.

In those areas where the Initial Assessment indicated a risk of minor localised flooding of undeveloped or partially developed lands, the SFRA recommended that Site-Specific Flood Risk Assessment (SSFRA) be carried out for any proposals for development of these lands. The SFRA also recommended SSFRA for development proposals (i.e. re-development) of lands that are already developed but found by the Initial Assessment to be at risk of Flooding. All SSFRA should be appropriate to the nature and scale of the development being proposed.

In a number of cases, the Initial Assessment indicated a more significant flood risk in undeveloped or partially developed lands which were being considered for types of development not generally compatible with flood risk areas *(i.e. development classed as vulnerable in accordance with the criteria set out in the Planning System and Flood Risk Management Guidelines)*. The SFRA recommended that Detailed Flood Risk Assessment (Detailed FRA) be carried out for these lands (areas where Detailed FRA was carried out are shown on the Drawing included in Appendix III).

Detailed FRA was carried out for these areas in accordance with the Guidelines and Flood Zones established for the 1 in 100year and 1 in 1000year flood events (Flood Zones A and B respectively). Land parcels being considered for types of development not generally compatible with flood risk were found to be located within Flood Zones A and B. In accordance with the Guidelines, the Justification Test was carried out for each land parcel where the encroachment of Flood Zones A and B was considered to be significant relative to the scale of the parcel. Records of these Justifications Tests are reproduced in Appendix II.

The Drawing included in Appendix III show the recommendations of the SFRA further to completion of this Detailed Flood Risk Assessment together with the flood risk zones established by the Detailed FRA.

The Land-Use Map for the draft Clane Local Area Plan 2017 to 2023, as amended inter-alia by the SFRA process, is provided in Appendix IV.

It is recommended that Development proposals in Clane have regard to the general policies, requirements and objectives which are set out in Chapter 7 (Water, Drainage and Environmental Services) of the County Development Plan.

4.5 Forthcoming Information to Inform Future Flood Risk Consideration

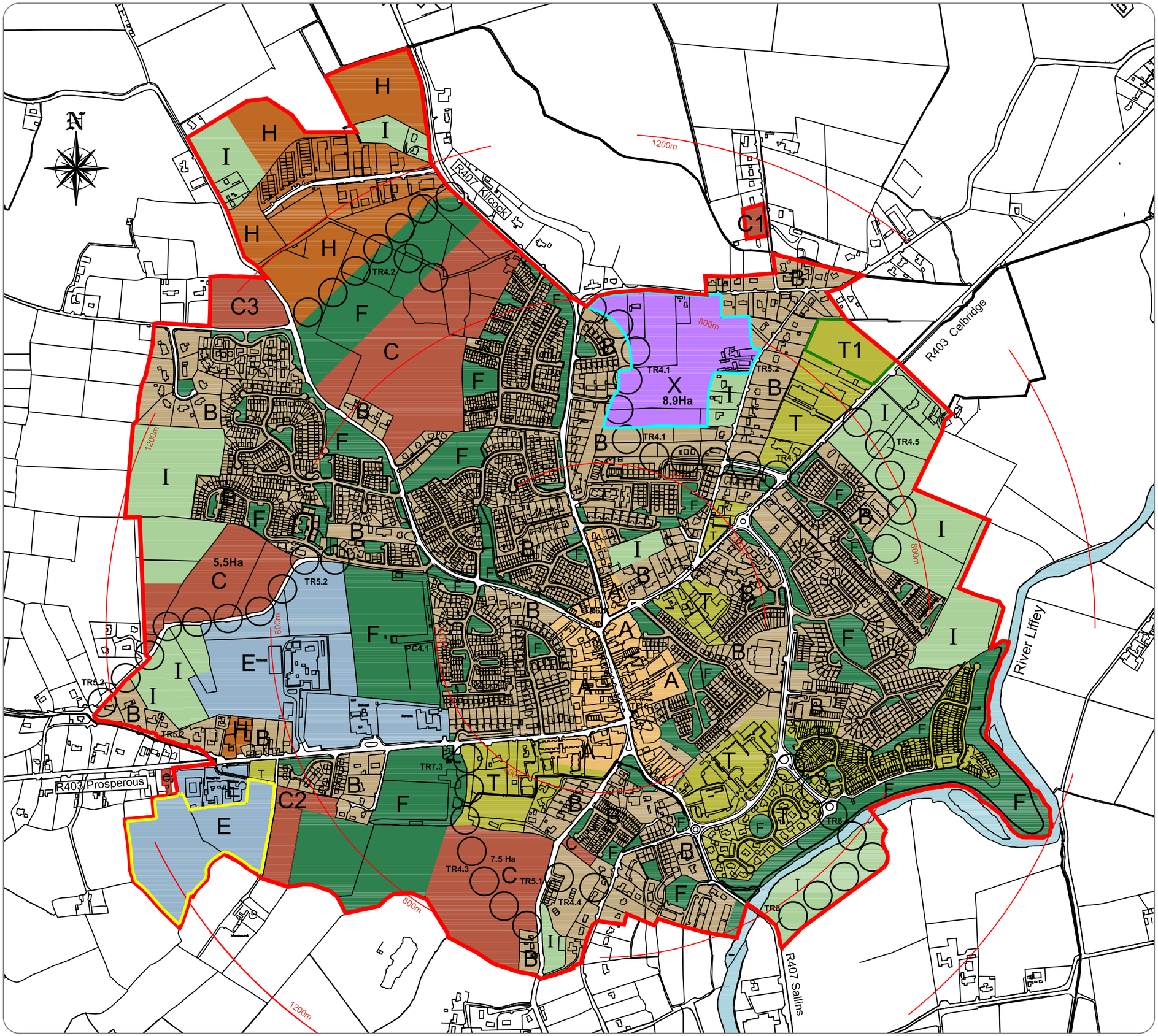
This SFRA is based on currently available data and in accordance with its status as a "living document" it will be subject to modification by emerging datasets of maps and plans as they become available.

5.0 MONITORING AND REVIEW

The catchment-based Flood Planning Groups will monitor and review progress in addressing flood risk in the County with reference to the "The Planning System and Flood Risk Management Guidelines", the EU Floods Directive and this Strategic Flood Risk Assessment together with other data sources as they become available.

It is recommended that the relevant statutory bodies and the catchment based Flood Planning Groups are consulted, and that their progress in implementation of the requirements of the EU Flood Directive be reviewed prior to the preparation of any new Clane Local Area Plan.

APPENDIX I
INITIAL DRAFT LAND-USE MAP



Kildare County Council
Planning Department
Áras Chill Dara,
Devoy Park, Naas,
Co Kildare.

Clane Local Area Plan 2009
Adopted 25th May 2009

Legend :

- A: Town Centre
- B: Existing / Permitted Residential
- C: New Residential, C1: New Residential (Infill)
  C2: New Residential (Low Density)
  C3: New Residential (Services Sites)
- E: Community and Educational
- F: Open Space and Amenity
- H: Office/Light Industry & Warehousing
- I: Agricultural
- T: General Development
- T1: General Development
- X: Masterplan Objective (Refer to Table 13)
- Local Area Plan Boundary 2009
- Refer to Table 14 Zoning Matrix
  (Zoning Objective E Community and Educational)
- Distance from Town Centre
  (at 400m intervals) 5 Mins Walking Distance
- River Liffey
- Roads Objective (Indicative only)

Land Use Zoning Objectives Map

Scale: N.T.S.	Map Ref.: 5(a)
Date: 25th May 2009	Drawing No.: 200/08/214
	Drawn by: N.Hopkins

This drawing is to be read in
conjunction with the written statement

APPENDIX II

RECORDS OF JUSTIFICATION TESTS

	Clane Local Area Plan 2017-2023	**Site A: Lands previously zoned Office / Light Industry and Warehousing (H) To the north of the town on the Kilcock Road**
1	The Regional Planning Guidelines for the Greater Dublin Area 2010-2022 set out the planned direction for growth within the Greater Dublin Area up to 2022 by giving regional effect to national planning policy under the National Spatial Strategy (NSS). The RPG's have not designated Clane but it is a Small Town under the Kildare County Development Plan 2011-2017 and proposed draft Kildare CDP 2017-2023.	Clane as a Small Town is intended to support the development of small locally-financed business, and other economic investment opportunities are to be supported where sustainable Arising from the RPGs and the draft County Development Plan 2017-2023, a growth target of an additional 780 residential units is prescribed for Clane during the lifetime of the plan. The Council will seek to encourage new local employment opportunities at a scale appropriate to the town's role and growth, to assist in reducing long distance commuting patterns and thus creating more sustainable communities.
2	The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and in particular:	The lands were zoned 'H' Office/Light Industry and Warehousing under the 2009 Clane LAP. This zoning provides for employment generating uses such as light industry, manufacturing, warehousing. It is considered that, while the zoning of some lands for Light Industrial/Warehousing is required, it is not evident that these specific lands present the optimum location. This site is currently undeveloped and located on the outskirts of the town. The Clane Business Park and other such zoned lands are located to the south of the site, and parts of this remain undeveloped.
	(i) Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement;	The lands are approximately 1.5 from the centre of Clane. Given their location they would not facilitate regeneration or expansion of the centre of Clane.
	(ii) Comprises significant previously developed and / or underutilized lands;	The lands are undeveloped; there is no planning history on the site.
	(iii) Is within or adjoining the core of an established or designated urban settlement;	The lands are not within or adjoining the core of the settlement.
	(iv) Will be essential in achieving compact	Other lands in closer proximity to the town centre are

	and sustainable urban growth; and	available for development and would provide more compact growth.
	(v) There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.	As stated, there are other lands available in closer proximity to the town centre which are of lesser risk of flooding.
	SFRA	
3	SFRA must demonstrate that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere.	A significant portion of the site is affected by flood risk. However the depth of floodwater is generally shallow. Given that the site failed to pass other elements of the Justification Test, the SFRA recommends that the subject lands be reclassified for water compatible development only in accordance with the Flood Risk Management Guidelines. Development of the lands for water compatible uses must include such mitigation measure as are required to ensure that: (i) There is no net reduction in the volume of floodplain storage contained within the lands being developed: (ii) Existing flow paths will not be compromised; (iii) Surface water runoff from development to be limited to the existing Greenfield run off from the site in accordance with the GDSDS.

	Clane Local Area Plan 2017-2023	**Site No B: Lands zoned Business & Technology and Community & Institutional to the east of the town on the Celbridge Road.**
1	The Regional Planning Guidelines for the Greater Dublin Area 2010-2022 set out the planned direction for growth within the Greater Dublin Area up to 2022 by giving regional effect to national planning policy under the National Spatial Strategy (NSS). The RPG's have not designated Clane but it is a Small Town under the Kildare County Development Plan 2011-2017 and proposed draft Kildare CDP 2017-2023.	Clane as a Small Town is intended to support the development of small locally-financed business, and other economic investment opportunities are to be supported where sustainable Arising from the RPGs and the draft County Development Plan 2017-2023, a growth target of an additional 780 residential units is prescribed for Clane during the lifetime of the plan. The Council will seek to encourage new local employment opportunities at a scale appropriate to the towns role and growth, to assist in reducing long distance commuting patterns and thus creating more sustainable communities. The river Gollymochy stream runs to the north of the site and is a tributary of the River Liffey. It appears that a portion of the site could be impacted by a flood event, particularly the portion of the site to the north west adjacent residential properties.
2	The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and in particular:	This site was included for 'T1' General Development in the 2009 Clane Local Area Plan. The site is zoned for Business & Technology and Community & Institutional under the draft LAP. These zonings are intended to provide for employment generating uses (such as offices and high technology) and a childcare facility. There are no other undeveloped lands zoned for B&T in the LAP area. The site has advantages in terms of access, opportunity to provide a landmark development, potential to drive the intensification of development on adjacent sites and (in conjunction with Key Development Area 1, strategic reserves and strategic open space) would consolidate the form of the settlement.
	(i) Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement;	The subject site is not within the centre of the settlement but is within 1km of same.
	(ii) Comprises significant previously developed and / or underutilized lands;	There is no planning history on the site. The lands are considered underutilised in the following context:

		• good access to regional road network • potential for landmark type development announcing the town • potential to drive the regeneration and intensification of development on adjacent sites and • consolidation of the form of the settlement in conjunction with the lands zoned to the south.
	(iii) Is within or adjoining the core of an established or designated urban settlement;	The site is not within or adjoining the core of the settlement but are c. 900m from the town centre and should also be considered in the context of adjoining B&T lands.
	(iv) Will be essential in achieving compact and sustainable urban growth; and	While at the edge of the town, the site is adjacent other B&T zoned lands. In conjunction with these lands and lands in Key Development Area 1, the site will contribute to compact and sustainable urban growth.
	(v) There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.	Although there are other lands available for Light Industry and Warehousing Use, there are no other undeveloped lands available for Business & Technology use and there are no other undeveloped lands identified for Community and Institutional use in the north-east quadrants of the town.
	SFRA	
3	SFRA must demonstrate that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere.	The site has passed other elements of the Justification Test. Approximately 20% of the site is located in a flood risk zone (at the northern boundary), however the depth of floodwater is generally shallow. It is anticipated that flood risk will not undermine the strategic decision to classify the lands for Business & Technology and Community & Institutional. It is recommended that development of these lands be accompanied by a Site Specific Flood Risk Assessment appropriate to the nature and scale of development being proposed. Such development proposals shall also : 1)Indicate and quantify loss of floodplain storage arising from the development proposal; 2) Provide compensatory storage location within or adjacent to the proposed development; 3) Indicate measures to ensure that water vulnerable elements of the development would not be flooded during the 1000 year flood (in this regard a freeboard

		of 500m shall be provided) 4) Ensure that existing flow paths for flood water will not be compromised.

	Clane Local Area Plan 2017-2023	**Site No C: Lands formerly zoned Community and Educational, to the west of the town on the Prosperous Road.**
1	The Regional Planning Guidelines for the Greater Dublin Area 2010-2022 set out the planned direction for growth within the Greater Dublin Area up to 2022 by giving regional effect to national planning policy under the National Spatial Strategy (NSS). The RPG's have not designated Clane but it is a Small Town under the Kildare County Development Plan 2011-2017 and proposed draft Kildare CDP 2017-2023.	*Note: The majority of these lands are no longer proposed to be zoned for Community and Education, other than that portion containing the existing hospital and nursing home. As such a justification is not required for them. However, a justification test was carried out on these lands as part of the initial assessment of all lands zoned in the previous LAP and is retained in this report as part of the record of SFRA carried out.* Clane as a Small Town is intended to support the development of small locally-financed business, and other economic investment opportunities are to be supported where sustainable. Arising from the RPGs and the draft County Development Plan 2017-2023, a growth target of an additional 780 residential units is prescribed for Clane during the lifetime of the plan. The Council will seek to encourage new local employment opportunities at a scale appropriate to the towns role and growth, to assist in reducing long distance commuting patterns and thus creating more sustainable communities and will support and facilitate improvements to existing educational, childcare and healthcare facilities supporting the local community The subject site is located in close proximity to the Butterstream which flows into the Liffey further to the east. The lands were zoned Community and Educational under the 2009 Clane LAP. This location reflected community uses (hospital and nursing home) at the location and identified land to the rear of the hospital intended for further healthcare-related development with the requirement that any housing be ancillary to community/educational uses.
2	The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the	The need for an extensive amount of lands for further Community/Institutional development adjacent the hospital has not been demonstrated and there is no specific objective to intensify such uses in Clane.

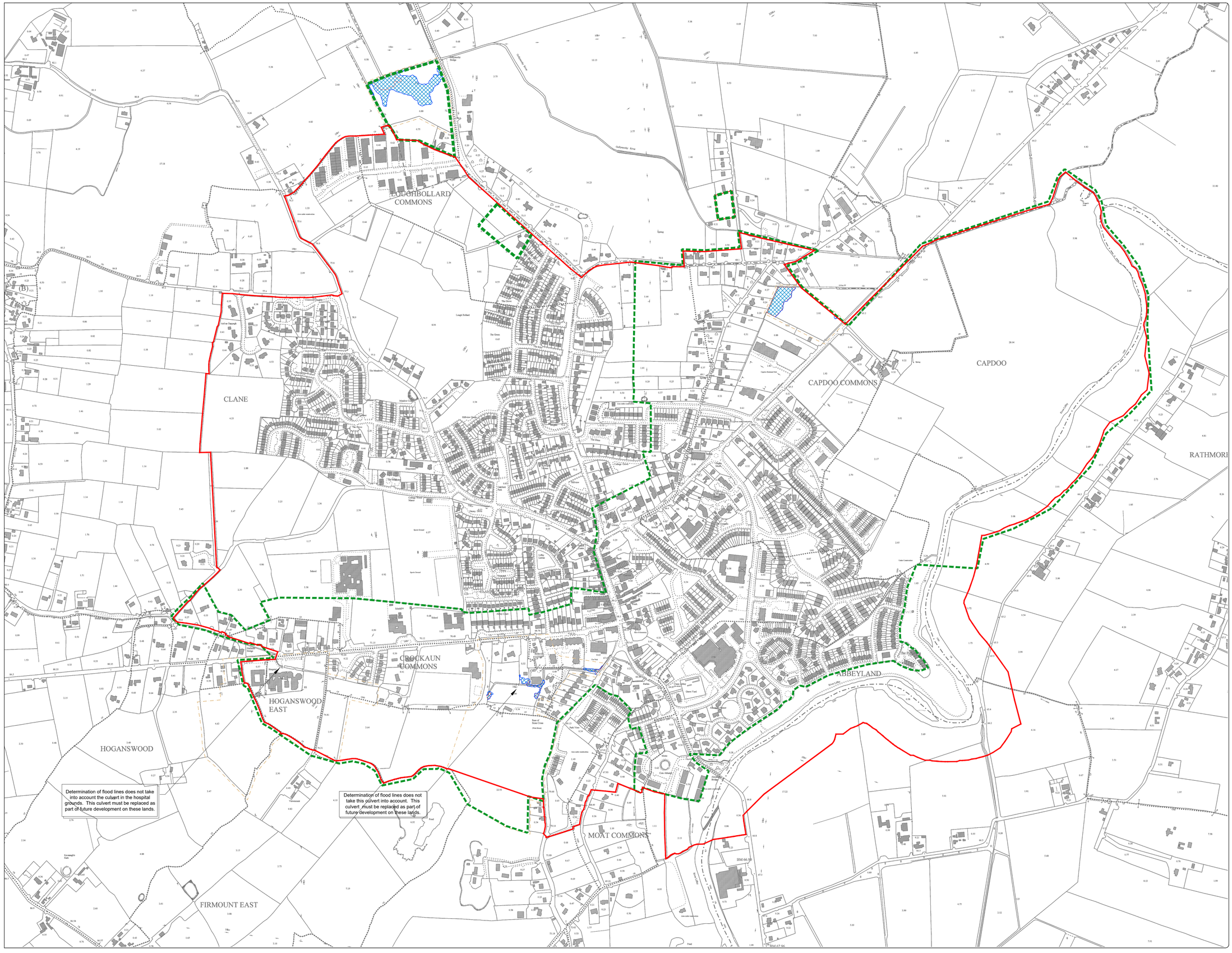
	urban settlement and in particular:	
	(i) Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement;	The lands are located at the edge of the town and would not contribute to expansion or regeneration of the core.
	(ii) Comprises significant previously developed and / or underutilized lands;	The lands are undeveloped. While there have been a number of planning permissions on the site of the existing healthcare facilities, no development proposals have been made on the subject lands.
	(iii) Is within or adjoining the core of an established or designated urban settlement	The site is located on the outskirts of the town on the Prosperous Road.
	(iv) Will be essential in achieving compact and sustainable urban growth; and	It has not been demonstrated that there is a need for the lands for expansion of healthcare facilities or associated residential development. As such the lands are not essential for compact/sustainable growth.
	(v) There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.	There are other lands zoned for Community and Institutional development with lower risk of flooding and there is scope for the intensification of healthcare uses within its current site.
	SFRA	
3	SFRA must demonstrate that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere.	A section of the stream flowing through the site is culverted. It is considered that the capacity of this culvert will not be sufficient to carry flows in the stream during rainfall events of higher return periods. It is recommended that this culvert be replaced with a culvert of sufficient capacity and that the capacity of the channel be determined and increased if required. It is recommended that development of these lands be accompanied by a Site Specific Flood Risk Assessment appropriate to the nature and scale of development being proposed. Such development proposals shall also : 1)Indicate and quantify loss of floodplain storage arising from the development proposal; 2) Provide compensatory storage location within or adjacent to the proposed development; 3) Indicate measures to ensure that water vulnerable elements of the development would not be flooded during the 1000 year flood (in this regard a freeboard of 500m shall be provided) 4) Ensure that existing flow paths for flood water will not be compromised.

	Clane Local Area Plan 2017-2023	Site No D: Lands between the Prosperous and Millicent Roads, beside the GAA grounds.
1	The Regional Planning Guidelines for the Greater Dublin Area 2010-2022 set out the planned direction for growth within the Greater Dublin Area up to 2022 by giving regional effect to national planning policy under the National Spatial Strategy (NSS). The RPG's have not designated Clane but it is a Small Town under the Kildare County Development Plan 2011-2017 and proposed draft Kildare CDP 2017-2023.	Arising from the RPGs and the draft County Development Plan 2017-2023, a growth target of an additional 780 residential units is prescribed for Clane during the lifetime of the plan. Clane as a Small Town is intended to support the development of small locally-financed business, and other economic investment opportunities are to be supported where sustainable The subject site had two zoning objectives (T General Development and C New Residential) under the 2009 LAP. The lands are zoned New Residential under the draft LAP, with small portions zoned Existing Residential/Infill and Town Centre. The subject site is located in close proximity to the Butterstream which flows into the Liffey further to the east.
2	The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and in particular:	The majority of the lands are zoned for New Residential development. Parts zoned Existing Residential and Town centre reflect existing development. The zoning of adequate lands for residential development is necessary in order to enable the growth of Clane in compliance with the Core Strategy of the CDP. The zoning of these specific lands is in accordance with proper planning and sustainable development as they are sequentially the closest landbank to the town centre, are adjacent amenities and offer the best opportunity for sustainable residential development.
	(i) Is essential to facilitate regeneration and / or expansion of the centre of the urban settlement;	The zoning of these lands is necessary for the sustainable development of the town and the development of a compact urban structure as these sites are in close proximity to the Main Street. The currently undeveloped new residential lands are located adjacent to existing residential development, amenity facilities and education facilities.
	(ii) Comprises significant previously developed and / or underutilized lands;	The lands were not previously developed. Permission was refused in 2010 on part of these lands due to insufficient capacity in the wastewater treatment

		infrastructure. They are underutilised as they currently in use predominantly as agricultural lands with one residential premises.
	(iii) Is within or adjoining the core of an established or designated urban settlement;	Parts of these lands are within the town centre area. The portion of the land zoned for residential development site is adjoining the core of the settlement.
	(iv) Will be essential in achieving compact and sustainable urban growth; and	The development of these lands is essential for the future expansion of the town and provision of residential areas in a compact and sustainable manner.
	(v) There are no suitable alternative lands for the particular use or development type, in areas at lower risk of flooding within or adjoining the core of the urban settlement.	This site is the most suitable location for further residential development.
	SFRA	
3	SFRA must demonstrate that flood risk to the development can be adequately managed and the use or development of the lands will not cause unacceptable adverse impacts elsewhere.	A section of the stream flowing through the site is culverted. It is considered that the capacity of this culvert will not be sufficient to carry flows in the stream during rainfall events of higher return periods. It is recommended that this culvert be replaced with a culvert of sufficient capacity and that the capacity of the channel be determined and increased if required. There is also thrash screen on this stream and this must be cleared regularly and also in advance of significant rainfall events. It is recommended that development of these lands be accompanied by a Site Specific Flood Risk Assessment appropriate to the nature and scale of development being proposed. Such development proposals shall also : 1)Indicate and quantify loss of floodplain storage arising from the development proposal; 2) Provide compensatory storage location within or adjacent to the proposed development; 3) Indicate measures to ensure that water vulnerable elements of the development would not be flooded during the 1000 year flood (in this regard a freeboard of 500m shall be provided) 4) Ensure that existing flow paths for flood water will not be compromised.

APPENDIX III

Maps showing findings of SFRA including those areas for which site-specific flood risk assessment is recommended



NOTES A1

LEGEND

Development proposals for lands outlined thus are to be the subject of site-specific Flood Risk Assessment appropriate to the type and scale of the development being proposed. Such Development Proposals shall also:

- Indicate and quantify loss of floodplain storage arising from the development proposal;
- Provide compensatory storage located within or adjacent to the proposed development;
- Indicate measures to ensure that water-vulnerable elements of the Development would not be flooded during the 1000year flood;
- Ensure that existing flow paths for flood waters will not be compromised.

Development Plan boundary

Outline of areas which were subject to Detailed Flood Risk Assessment
(Flood risk zones have only been established within those areas which were the subject of Detailed Flood Risk Assessment)

1000year flood zone established by Detailed Flood Risk Assessment

Extent of 100year flood zone established by Detailed Flood Risk Assessment

N

REV	DATE	BY	DETAILS
DR5	08/09/16	PB	For Issue with draft report issue 04
DR3	06/07/16	PB	For Issue with draft report issue 03

KILDARE COUNTY COUNCIL
Comhairle Chontae Chill Dara

STATUS
DRAFT REPORT

CLIENT
KILDARE COUNTY COUNCIL

PROJECT
STRATEGIC FLOOD RISK ASSESSMENT
CLANE DRAFT LOCAL AREA PLAN
2017- 2023

TITLE
RECOMMENDATIONS OF SFRA
FLOOD RISK ZONES WHERE ESTABLISHED BY DETAILED FRA

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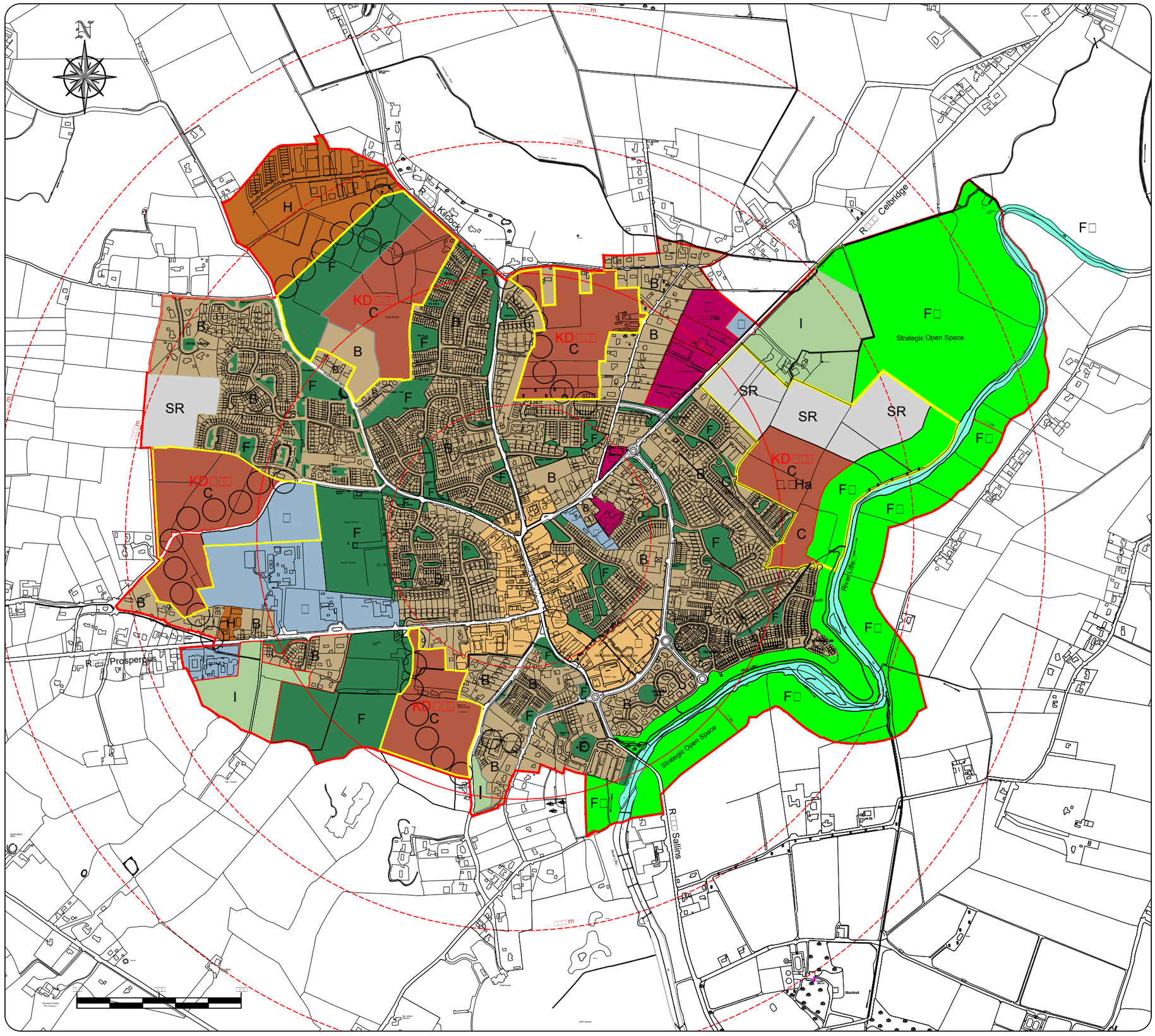
DRN:	SCALE:	DRAWING NO.:	REV.:
DQ	1:5000 @ A1	11049-CLA-102	DR5
CHKD: PB	DATE: 06.07.16		

APPENDIX IV

DRAFT CLANE LOCAL AREA PLAN 2017 TO 2023 - LAND-USE MAP



Kildare Count□ Council
Planning Department
Áras Chill Dara,
Devo□ Park□Naas□
Co Kildare.

Clane Local □rea Plan □□□□ □□□□□
Proposed Draft

Legend

- Local □rea Plan Boundar□
- □□To□n Centre
- B□ □□isting Residential
- C□ Ne□ Residential
- □□ Communit□ and Institutional
- F□ Open Space and □menit□
- F□□Strategic Open Space
- H□Light Industr□□ □ arehousing
- I□ □griculture
- □□Business and Technolog□
- SR□Strategic Reserve
- KD□□Ke□Development □reas
  □KD□ □to □□
- River Liffe□
- Distance from To□n Centre
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- Roads Ob□ective □Indicative onl□□

Land □se □oning Ob□ectives Map

Scale□ N.T.S.	Map Ref.□ □□.□
Date□ September □□□□	Dra□ing No.□ □□□□□□□□□□
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con□unction □ith the □ritten statement