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mescaI &
a s s o c i a t e s

C O N S U L T I N G
E N V I R O N M E N T A L &
P O L L U T I O N C O N T R O L
E N G I N E E R S

Administration
Environmental Licensing Programme
Office of Climate Licensing Resources & Research
Environmental Protection Agency
Headquarters
PO Box 3000
Johnstown Castle Estate
County Wexford

11/02/2015

Dear Sirs

Re: W0266-01

In response to yours of 29/09/2014 please find

- Information (2)
- CD -ROMS (16)

We trust you will find the above in order.

Faithfully Yours

Michael Mescal

c. Mallow Contracts Ltd (encl)



ARTICLES 12 and 13 COMPLIANCE REQUIREMENTS

Reference EPA 29/09/2014 for query identification number.

1. Regarding the following :

40(4)(a) The applicant fills with soil and stone and very minor quantities of non hazardous materials. Due cognisance is taken of runoff to headwaters of rivers to ensure they are not adversely affected. Due cognisance is taken also to ensure that ground water quality is not impacted. Full detail is given in the Environmental Impact Statement dated May 2014 showing any impact on all of the environmental topics. None of these impacts are significant impacts.

40(4)(b) The impact of this landfill operation is described in the Environmental Impact Statement dated May 2014. They do not result in environmental pollution.

40(4)(c) The project uses best available technology not entailing excessive cost throughout to eliminate , or where not possible , to reduce the emissions from the activity. These are largely in the areas of water , noise and dust. These are outlined in the Environmental Impact Statement dated May 2014.

40(4)(d) Mallow Contracts Ltd (Directors P.Sheehan , B.Sheehan) have operated landfill operations in Cork and neighbouring counties for some 15 years. This has been carried out without difficulty with the local authorities concerned. Mallow Contracts Ltd have never been prosecuted in the course of their landfill operations.

40(4)(e) The applicant has not had any requirements from EPA regarding Section 53. The applicant satisfied Cork Co Councils requirement for Financial Commitment Discharge Declaration (Waste Facility Permit).

40(4)(f) Energy use will at all times be effective.

40(4)(g) Noise resulting will not contravene any regulation under the Section 106 of the Act 1992.

40(7) Mallow Contracts Ltd have not been convicted of an offence under this Act as prescribed for the purposes of subsection 40(7)

The licensee has the requisite technical knowledge to carry out the activity.

The licensee is in a position to meet any financial commitments or liabilities that the Agency reasonably considers will be entered into or incurred in carrying out the activity to which the waste license relates in accordance with the terms thereof or in consequence of ceasing to carry out that activity.

2. Water from the activity.

Water for truck wheel wash and for domestic use at reception is supplied by pump from the adjacent River Peastinagh. The solids washed off the trucks settle to the bottom of the wheelwash unit . This is periodically removed and returned to the land.

Reception water is for washdown only. Water is not used elsewhere in the activity.

Rainwater off the finished / grassed /grazed surface goes partly to ground and partly runoff to adjacent River Peastinagh. This applies to some 80% of the surface area which is completed.

Rainwater at the incomplete southern end runs to an interceptor and hence goes to a stoned drain and onto the River Martin at some 200 m further south.

The original open drain at the bottom of the main road embankment has been extended southwards. This drain now takes all of the drainage form the roadway . The fill is complete adjacent to it and the land is finished .grassed and grazed.

Groundwater was sampled , as requested by EPA, in conjunction with the EIS dated May 2014.

The well locations and groundwater quality analyses are attached..

3. There are no monitoring / sampling points for dust and noise.

For surface water monitoring see table F3 already submitted with Dwg No 25 showing locations.

4. Upon completion of activity on the land the following shall be carried out :

- Ensure all surfaces are completed and grassed
- Remove remaining soiled water interceptors
- Remove any remaining bunding
- Remove site supervisors office
- Remove signage from entrance area.
- Replace existing high level fencing and gateway at entrance with low level agricultural type units.
Maintain recessed gateway location as it is preferable for traffic close to junction.
- Remove high level ESB line protection posts and bars.
- Stoned pathway along edge , parallel to railway , and wheelwash facility to remain to facilitate landowner

Aftercare of the land will be carried out by the landowner as he continues to use his land agriculturally. This is currently being done over some 80% of the land which has been completed now for some time.

5. The activity is not for the purpose of an establishment to which the European Union (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2000 (S.I. No 476 of 2000) apply.

6. The activity will not give rise to an emissions into an aquifer containing the List 1 and 11 substances

specified in the Annex to the Council Directive 80/68/EEC of 17 December , 1979 – ‘ Protection of Groundwater against Pollution by Certain Dangerous Substances’.

7. See attached submission (Dr Mary O’Connor)

8. Attached are up to date newly surveyed drawings in A3 as requested

- Dwg 14-01 Original Contours
- Dwg 14-02 Existing Contours
- Dwg 14-03 Final Contours
- Dwg 14-04 Sections –Cross
- Dwg 14-05 Sections –Long
- Dwg 14-06 Waterways –Original/Existing

9. It was identified initially that some springs giving rise to the Peastinagh River (flowing northwards) were located in the marshy area in the site. There is an existing drain running from marshy area to the Peastinagh. This drain was dry in summertime with some flow apparent outside of that period during and following wet weather. This drain was filled with selected stone material and covered with Terram lain on a layer rounded stone. This operation was carried progressively as the material came available. Clay fill was not placed in the drain as this would have prohibited natural flow. The drain opens out into the channel which runs along the southside of the roadway and subsequently to the Peastinagh River.

The channel which runs along the west side of the public roadway was extended southwards at the initial stage of this project. This channel serves to assist drainage of the area and also to take up some roadside runoff from the public adjacent roadway.

The order of buildup of material in the site was working from north to south. This commenced in 2007. The rate of filling has been slower than originally anticipated due to reduced activity in the area. As the fill worked from north to south portions were progressively finished off and returned back to the owner for farming. The final activities immediately prior to this were topsoiling . raking out of stone and seeding. Seeding was done during the growing season.

The drain presence in the south end of the site was not as evident as the north end. Springs feeding southwards relief were not as apparent and flow from these together with a small amount of surface water runoff during rainy periods was drained southwards. A smaller drain was treated similarly to northrunning drain referred to above and was covered using stone and Terram. This covered drain goes to an open drain at the southern boundary of the landfill. Here it is joined by another natural channel from the east. It flows on to form the head of the River Martin.

As regards future works planned, the northern end is completed. The southern end, where activity continues, has bunding in place directing surface water runoff to a soiled water containment unit. The overflow from this goes to the small stone filled drain

Upon completion of the landfill the southern end will be topsoiled and grassed. To allow for establishment of the grassing the bund and soiled water containment unit will be left in place for approximately 6 months and then removed and their location tidied up and grassed.

10. Attached is Operational Risk Assessment. Risk is identified as Category 1.

11. Groundwater has been monitored at two locations – one north and one south of the landfill.

The locations are shown on attached 'Sample Locations'.

The analyses of samples taken from the 2 locations in May 2014 – Well North and Well South – are attached.

Well water analyses were not carried prior to application in 2009.

12. See attached EIS Section on Cultural Heritage

There is no significant effect on any aspect of the environment. Further description under Paragraph 2(b) of Schedule 6 of the Planning & Development Regulations as amended is consequently not required.

13. See EIS Section Three on 'Air' ,Page 33. This is subdivided as 'odour' , 'noise' and 'dust'.

Air is viewed under 'Existing Environment' , Characteristics Affecting' and 'Residual Impacts' .

The only noise source is plant and vehicles. These activities are confined to the working day and the noise level at the boundary is limited to 55dBa (15 min Leq). This is a planning requirement . The site and its surrounding area , bounded on the one side by a major roadway and on the other by the railway line , is subject to considerable noise levels throughout day and night.

14. See EIS Section One on 'Alternatives Examined' ,Page 3 . The motive for this development was for the landowner to improve his land. His land is located at Lissard / Ballyhillogue and hence that is where the development was sited. Mallow Contracts , who carry out the landfill, required a location north of the city which was accessible from the main Cork / Mallow roadway. At the time of application south of the city was served and other main routes north of the city were also provided for. They required a big site off the Mallow Road and preferably close to their home base to allow close attention. Other sites were considered but were not viable alternatives due to their size, access and locations.

Revised Non Technical Summary The information above does not identify any additional 'significant impacts'. Consequently the information does not impinge on the non – technical summary.

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Environmental Impact Statement on Cultural Heritage (part of Material Assets)

Existing Environment

The existing environment is a piece of boggy land located between a main road and railway track. There are no dwellings or access road through it. The townlands are identified as Lissard and Ballyhilloge which stand for ' high enclosure' and 'town of willows' respectively. There is no remnant of any of the descriptors in the placenames on the site. Neither is there any visible sign of these descriptors in the immediate vicinity. The area has been altered considerably over the last century – principally with railroad and a number of roadway construction projects.

Characteristics Affecting

The raising of the land and rendering it grassy will make the land more workable. The provision of an access pathway along the side of it makes it more accessible. These additions will make the area more physically and economically useful. This in turn may slightly enliven the area with increased human activity. As this occurs, not only at this location but throughout the region, due cognisance must be given to existing cultural heritage. Care will be taken by the authorities to ensure that further development in the area has due consideration given to the cultural heritage of areas amended.

There is no 'planning' change of use associated with this development. There will be human activity where there was little in the past. However, it does not give rise to any local social or cultural change of significance.

Residual Impact

There will be increased human and agricultural activity on the lands which had been dormant. This, in conjunction with other land upgrades for agriculture, will contribute to the cultural heritage of the area. The impact is not significant.

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COMPLEXITY		Score
Activity is classed as R10 ' Spreading of any waste on land with a consequential benefit for an agricultural activity or ecological system, including composting and other biological transformation processes.	G1	1
ENVIRONMENTAL SENSITIVITY	SubMatrix Score	
Human Occupation		
- between 50 and 250 m from site	3	
Groundwater Protection		
-Poor Aquifer (GSI)	0	
-Groundwater Vulnerability Extreme	3	
Sensitivity of Receiving Water		
-River Peastinagh Northwards Q4 , Class A	3	
Protected Ecological Sites	0	
Air Quality & Topography		
-Intermediate Terrain	1	
Sensitive Agricultural Receptors		
-potential dairy farming inside 50m	2	
Total Environmental Sensitivity	12	2
COMPLIANCE RECORD		
Licenced facility with administrative non compliances	2	2
OVERALL RISK SCORE (Complexity x Environmental Sensitivity x Compliance)	1 x2 x 2	4
RISK CATEGORY		Cat 1

OPERATIONAL RISK ASSESSMENT

TABLE E.2(i): EMISSIONS TO SURFACE WATERS
 (One page for each emission)

Emission Point:

Emission Point Ref. N ^o :	SW1
Source of Emission:	Rainfall Runoff
Location :	Throughout Site
Grid Ref. (10 digit, 5E,5N):	W 58406 88917
Name of receiving waters:	Peastinagh River
Flow rate in receiving waters:	0.1 _____ m ³ .sec ⁻¹ Dry Weather Flow 0.2 _____ m ³ .sec ⁻¹ 95%ile Flow
Available waste assimilative capacity:	Appx 200 SS kg/day

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Emission Details:

(i) Volume to be emitted	
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WASTE Application Form

Normal/day	100m ³	Maximum/day	1000m ³
Maximum rate/hour	100m ³		

(ii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up/shutdown to be included*):

Periods of Emission (avg)	60 min/hr	24 hr/day	365 day/yr
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TABLE E.2(ii): EMISSIONS TO SURFACE WATERS - Characteristics of the emission (1 table per emission point)

Emission point reference number : SW1

Parameter	Prior to treatment				As discharged				% Efficiency
	Max. hourly average (mg/l)	Max. daily average (mg/l)	kg/day	kg/year	Max. hourly average (mg/l)	Max. daily average (mg/l)	kg/day	kg/year	
Suspended solids	250	250		1000	12.5	12.5		50	95

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TABLE E.2(i): EMISSIONS TO SURFACE WATERS

(One page for each emission)

Emission Point:

Emission Point Ref. N ^o :	SW2
Source of Emission:	Rainfall Runoff
Location :	Throughout Site
Grid Ref. (10 digit, 5E, 5N):	W 57972 88445
Name of receiving waters:	River Martin
Flow rate in receiving waters:	0.02 m ³ .sec ⁻¹ Dry Weather Flow 0.04 m ³ .sec ⁻¹ 95%ile flow
Available waste assimilative capacity:	Appx 50 SS kg/day

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Emission Details:

(i) Volume to be emitted



WASTE Application Form

Normal/day	20m ³	Maximum/day	200m ³
Maximum rate/hour	20m ³		

(ii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up/shutdown to be included*):

Periods of Emission (avg)	60 min/hr	24 hr/day	365 day/yr
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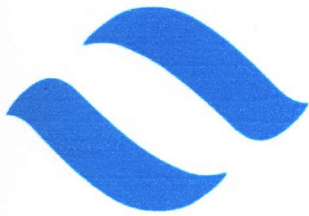
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TABLE E.2(ii): EMISSIONS TO SURFACE WATERS - Characteristics of the emission (1 table per emission point)

Emission point reference number : SW2

Parameter	Prior to treatment				As discharged				% Efficiency
	Max. hourly average (mg/l)	Max. daily average (mg/l)	kg/day	kg/year	Max. hourly average (mg/l)	Max. daily average (mg/l)	kg/day	kg/year	
Suspended solids	250	250		200	12.5	12.5		10	95

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Date: 21st May 2014

LABORATORY REPORT

Date Submitted:

Lab Ref:

Sample 4

Well North

6th May 2014

3/050614

Mallow Contracts Limited

Test	Results
Temperature	Ambient
pH	6.33
BOD	<2
COD	<1
Suspended Solids	1.6
Total Ammonia -N	0.09
Conductivity	251
Molybdate Reactive Phosphorus MRP	0.08
Nitrate as N	3.9
Total Phosphate-P	0.09
Oils Fats Grease	<1
Sulphates as(N)	13
Chlorides as(Cl)	28.4
Phenols	<0.002
Detergents(as Lauryl Sulphate)	0.013
Arsenic	0.000835
Chromium	0.00696
Copper	0.0169
Cyanide	<0.05
Fluoride	<0.5
Lead	0.000059
Nickel	0.000746
Zinc	0.0293

Results expressed in milligrams per Litre

Water Technology Ltd is an ISO 9001 certified Company

Kim Sheehan
Kim Sheehan

Directors

J. P. Mackey, B.Sc., HDE, B. Creedon, B.Sc., B.Sc. (Econ) Ph.D., C.Chem., FICI, MRIC, MICert., MIWES, MIEI, MIW

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Date: 21st May 2014
LABORATORY REPORT
Date Submitted:
Lab Ref:
Sample 4

Well South
6th May 2014

2/050614
Mallow Contracts Limited

Test	Results
Temperature	Ambient
pH	6.65
BOD	<2
COD	<1
Suspended Solids	1.3
Total Ammonia -N	0.13
Conductivity	305
Molybdate Reactive Phosphorus MRP	0.02
Nitrate as N	2.6
Total Phosphate-P	0.04
Oils Fats Grease	<1
Sulphates as(N)	14
Chlorides as(Cl)	42.8
Phenols	<0.002
Detergents (as Lauryl Sulphate)	0.031
Arsenic	0.00116
Chromium	0.0126
Copper	0.0249
Cyanide	<0.05
Fluoride	<0.5
Lead	0.000452
Nickel	0.000932
Zinc	0.0272

Results expressed in milligrams per Litre

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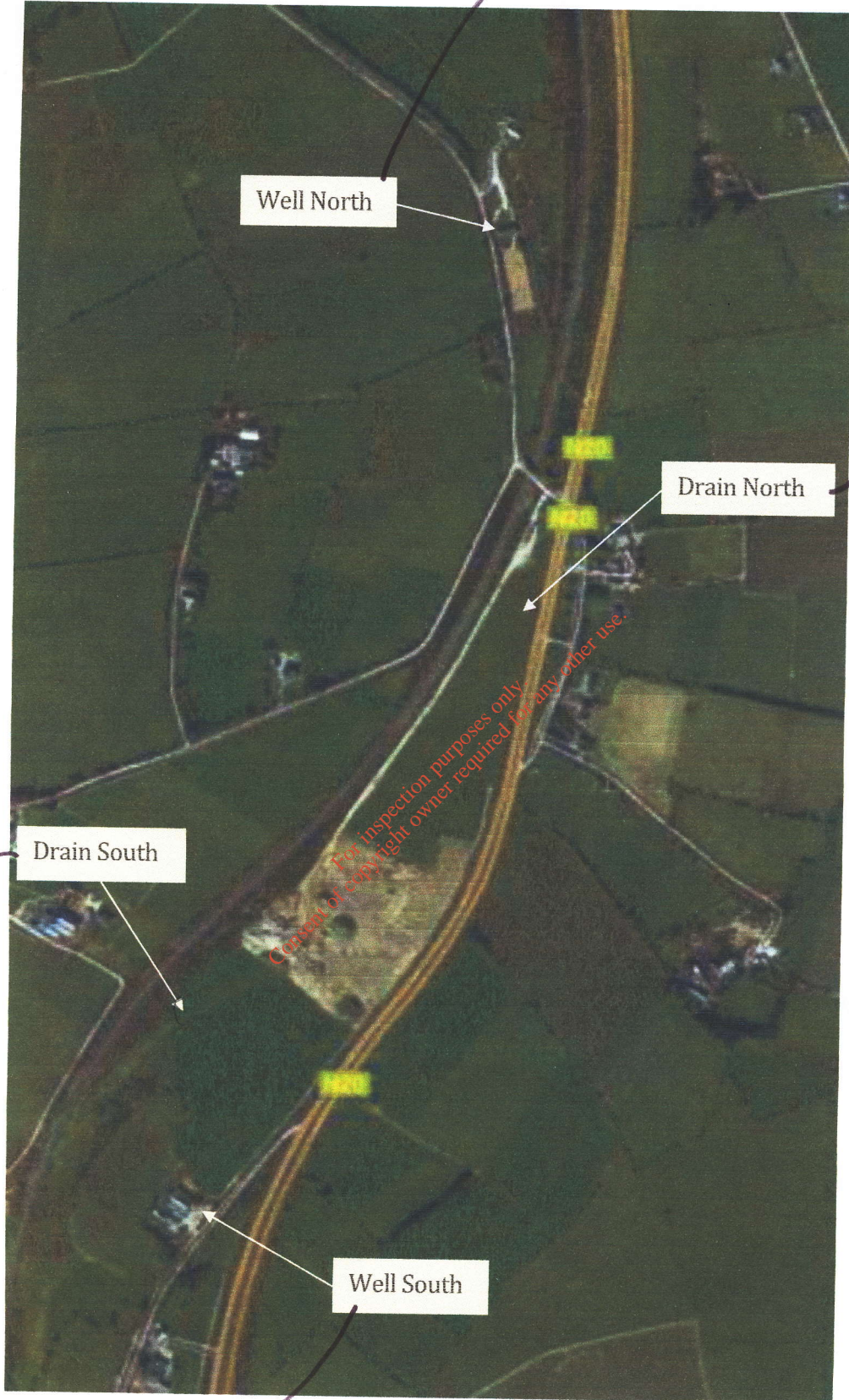
Kim Sheehan
Kim Sheehan

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W - 58360
S - 89673

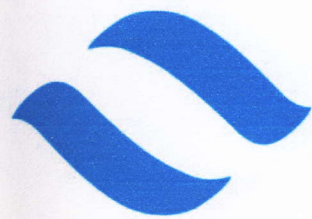


W 58430
S 89065

W 57970
S 88443

W = 58110
S = 88110

SAMPLE LOCATIONS



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Date: 21st May 2014

LABORATORY REPORT

Date Submitted:

Lab Ref:

Sample 4

Drain North

6th May 2014

4/050614

Mallow Contracts Limited

Test	Results
Temperature	Ambient
pH	6.54
BOD	<2
COD	<1
Suspended Solids	2.1
Total Ammonia -N	0.14
Conductivity	294
Molybdate Reactive Phosphorus MRP	0.05
Nitrate as N	3.2
Total Phosphate-P	0.07
Oils Fats Grease	<1
Sulphates as(N)	25
Chlorides as(Cl)	28.4
Phenols	<0.002
Detergents(as Lauryl Sulphate)	0.156
Arsenic	0.000656
Chromium	0.0105
Copper	0.00295
Cyanide	<0.05
Fluoride	<0.5
Lead	0.000079
Nickel	0.0012
Zinc	0.00245

Results expressed in milligrams per Litre

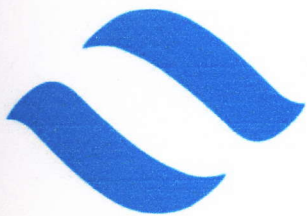
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Kim Sheehan

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Date: 21st May 2014

LABORATORY REPORT

Date Submitted:

Lab Ref:

Sample 4

Drain South

6th May 2014

5/050614

Mallow Contracts Limited

Test	Results
Temperature	Ambient
pH	6.56
BOD	2.6
COD	33
Suspended Solids	12.3
Total Ammonia -N	0.57
Conductivity	364
Molybdate Reactive Phosphorus MRP	0.27
Nitrate as N	4.3
Total Phosphate-P	0.30
Oils Fats Grease	<1
Sulphates as(N)	34
Chlorides as(Cl)	28.4
Phenols	<0.002
Detergents(as Lauryl Sulphate)	0.235
Arsenic	0.00112
Chromium	0.0125
Copper	0.00522
Cyanide	<0.05
Fluoride	<0.5
Lead	0.000046
Nickel	0.00104
Zinc	0.00223

Results expressed in milligrams per Litre

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Kim Sheehan
Kim Sheehan

Directors:

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FEASTINAGH R.
(FLOWS TO RIVER CLYDA)

WATERCOURSE
MONITORING PT #1
W 58430
S 89065

RAILWAY
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OPEN DRAIN
STONE INFILLED
WITH TERRAM
COVER

W 57970
S 88443
WATERCOURSE
MONITORING PT #2

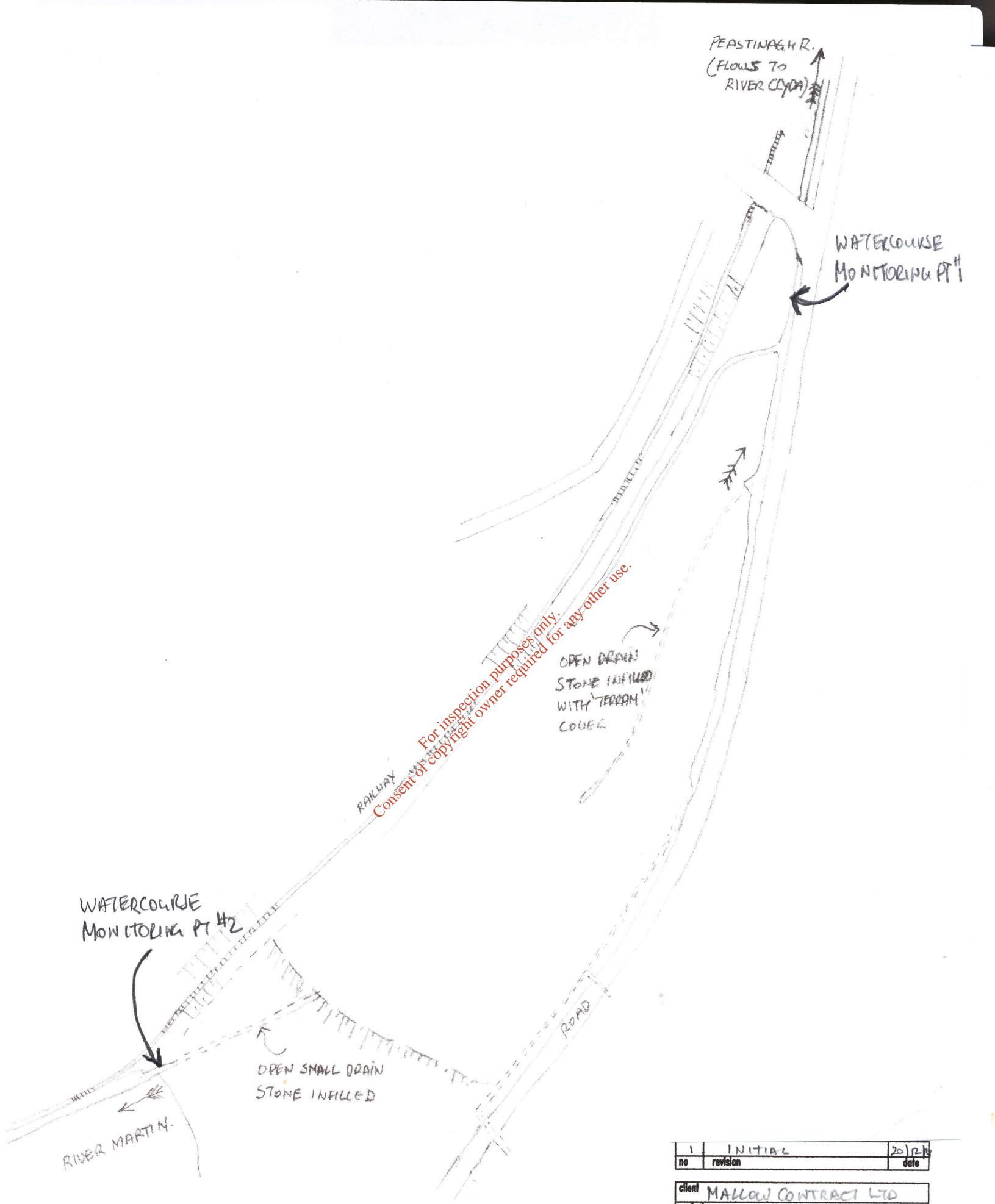
OPEN SMALL DRAIN
STONE INFILLED

RIVER MARTIN.

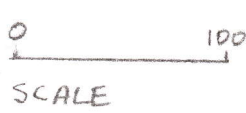
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SCALE

SURFACE WATER SAMPLE LOCATIONS



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1	INITIAL	20/12/14
no	revision	date

client	MALLOW CONTRACT LTD
project	IVY BRIDGE
drawing	WATERCOURSE MONITORING PTS

CONSULTING ENGINEERS

m **mescal & associates**

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scale ASH 1:100 date 20/12/2014 job no _____ fax 021-4314369
org no 4407

Ivybridge – New Drawings -Drawing List

14-01 Rev1 Original contours

14-01 Rev 1 Existing Contours

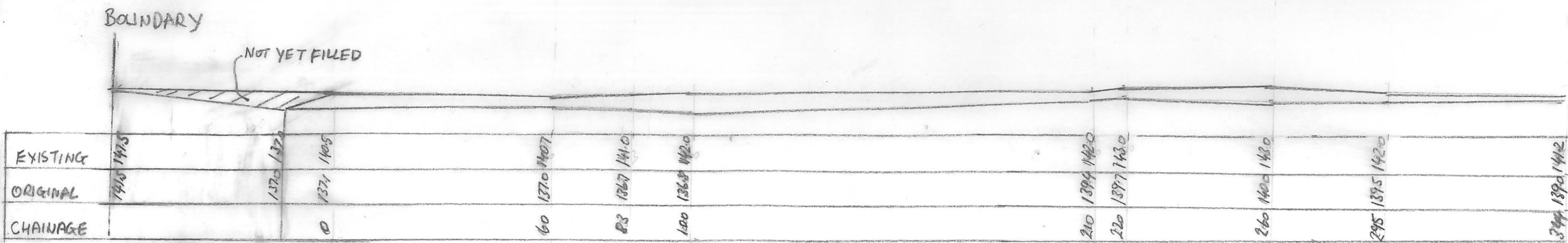
14-03 Rev1 Final Contours

14 -04 Rev1 Sections – Cross

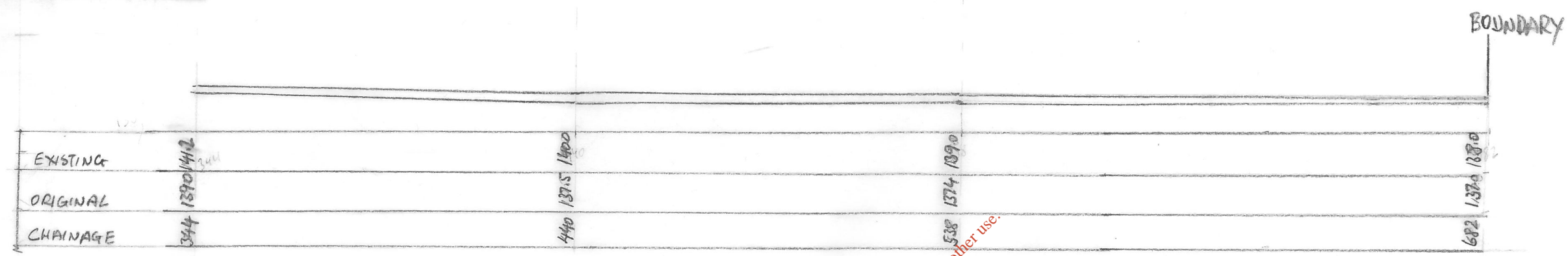
14-05 Rev1 Sections – Long

14-06 Rev1 Waterways – Original/Existing

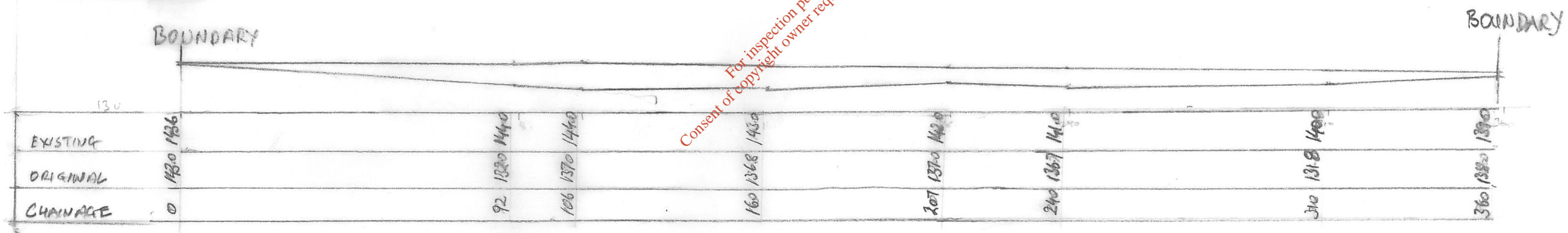
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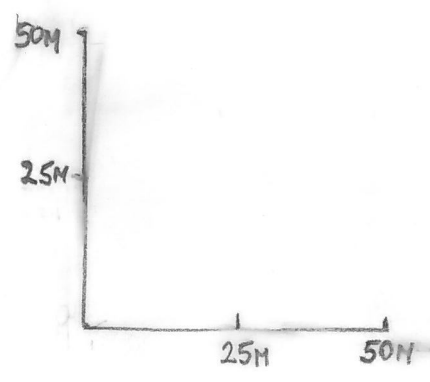
SECTION AA'



SECTION AA''



SECTION AA



SCALE

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no	1 INITIAL	20/12/14
	revision	date

client	MALLOW CONTRACTS LTD
project	IUYBRIDGE
drawing	SECTIONS - LONG

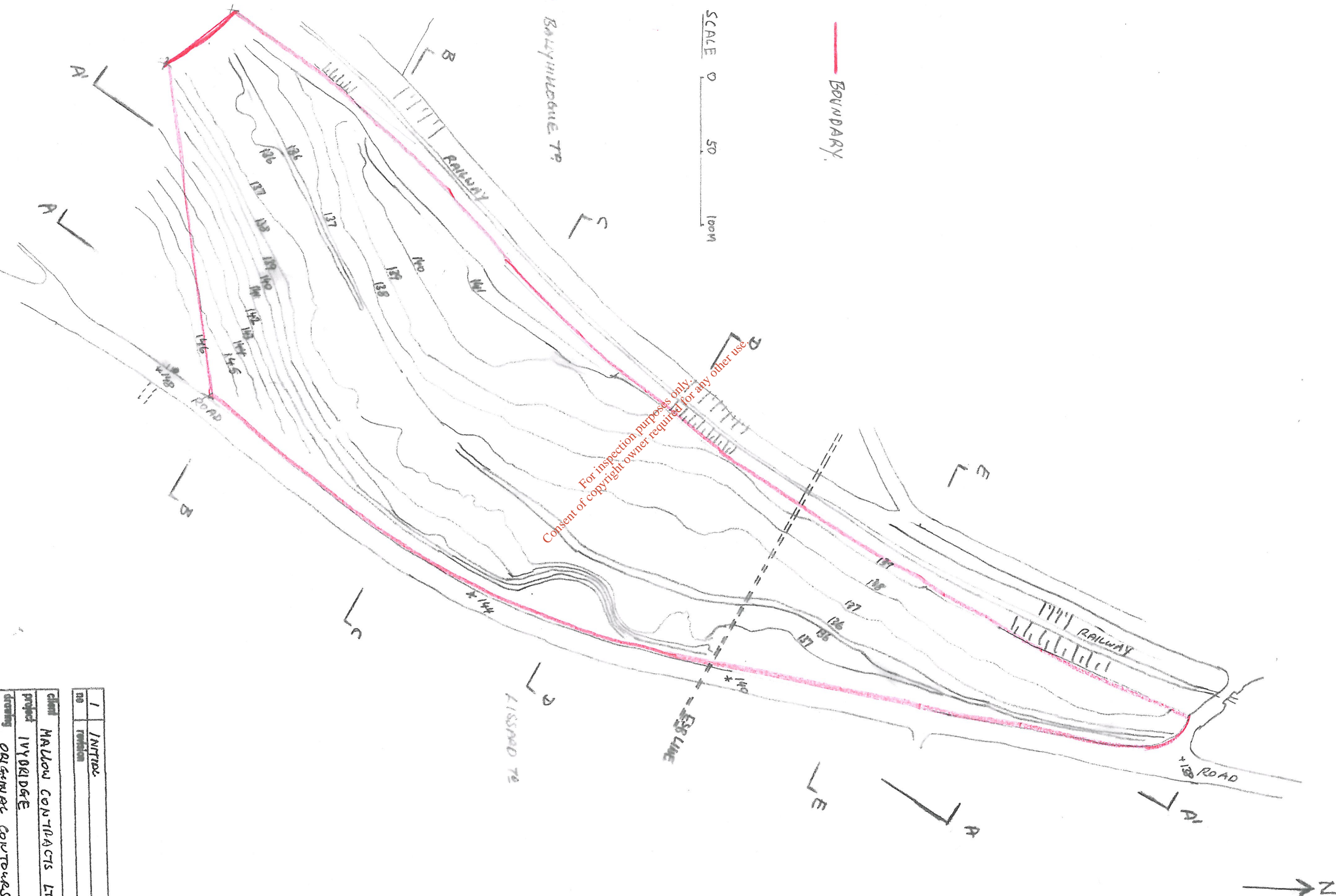
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tel 021-4314388
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scale AS SHOWN date 20/12/14 job no. drg no 14-05



NO	REVISION	DATE
1	INITIAL	20/12/14

client MALLOW CONTRACTS LTD
 project IVY BRIDGE
 drawing ORIGINAL CONTOURS

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 scale AS SHOWN date 20/12/14 job no -
 tel 021-5314308 fax 021-5314309
 email info@mescall.ie



— BOUNDARY.

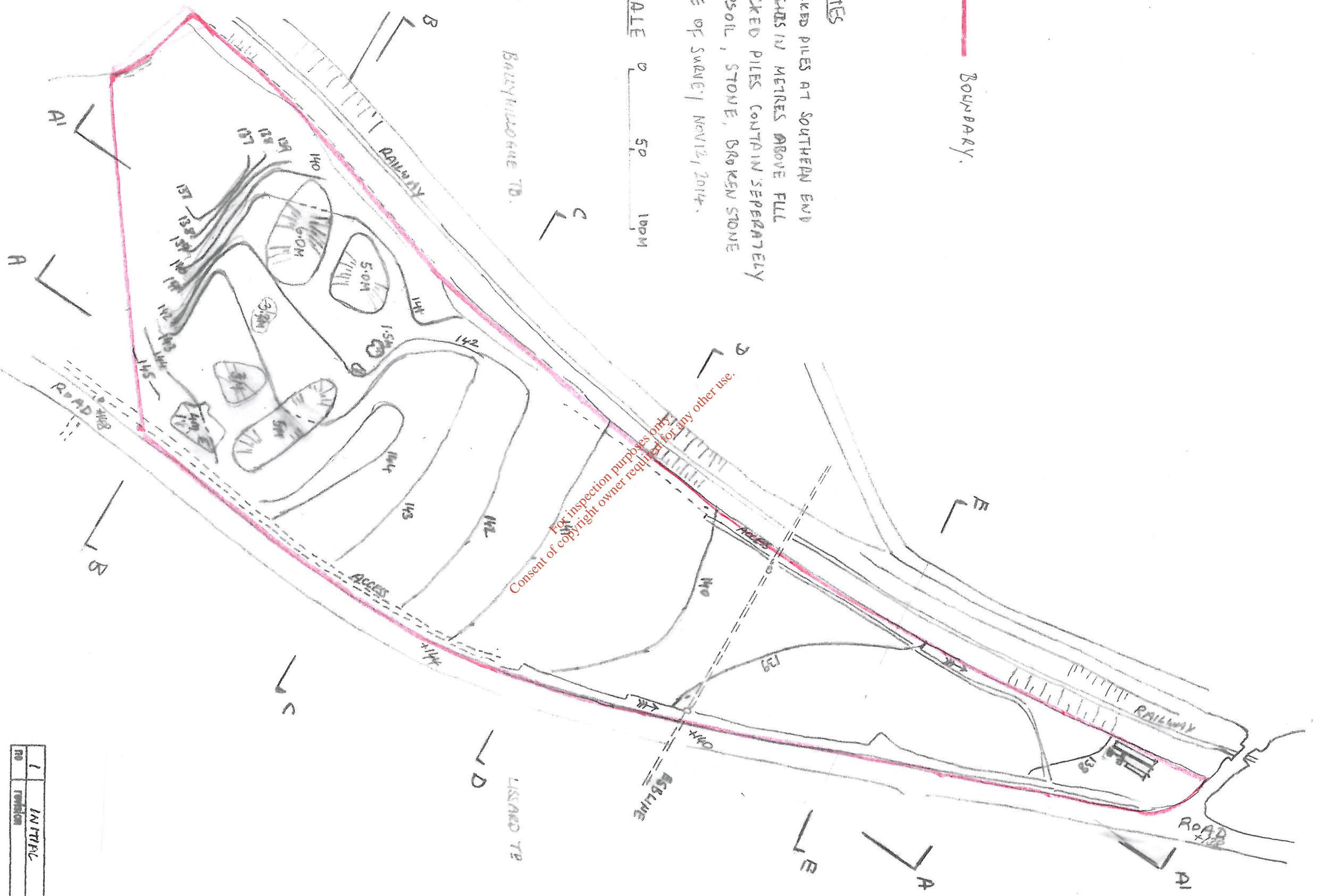
NOTES

- ① STACKED PILES AT SOUTHERN END HEIGHTS IN METRES ABOVE FILL STACKED PILES CONTAIN SEPARATELY TOPSOIL, STONE, BROKEN STONE
- ② DATE OF SURVEY NOV 12, 2014.

SCALE 0 50 100M

BALLYMULLENE TD.

LISKARD TD.

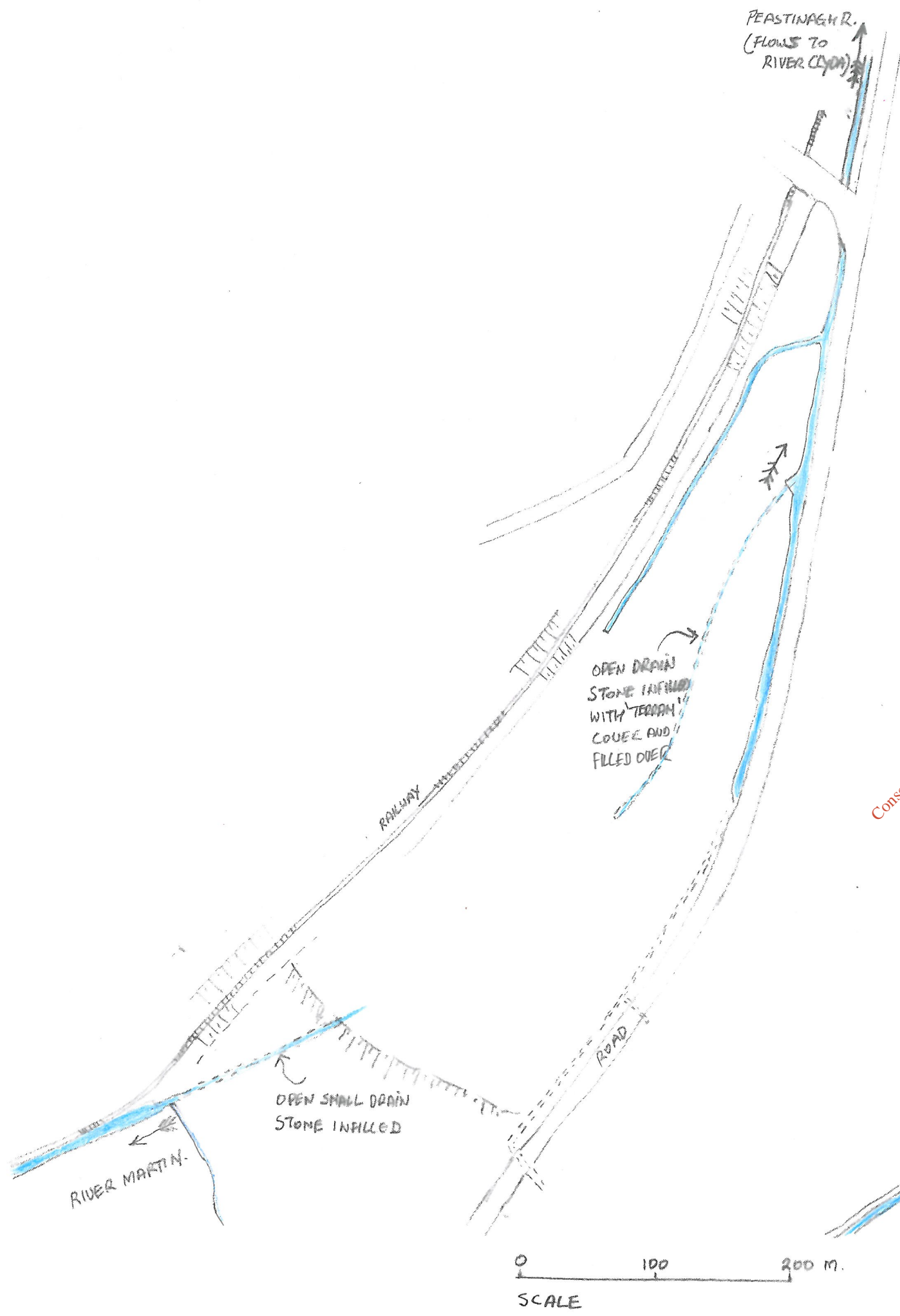


1	INITIAL	20/12/14
no	revision	date

client MALLOW CONTRACTS LTD
 project IVYBRIDGE
 drawing EXISTING CONTOURS

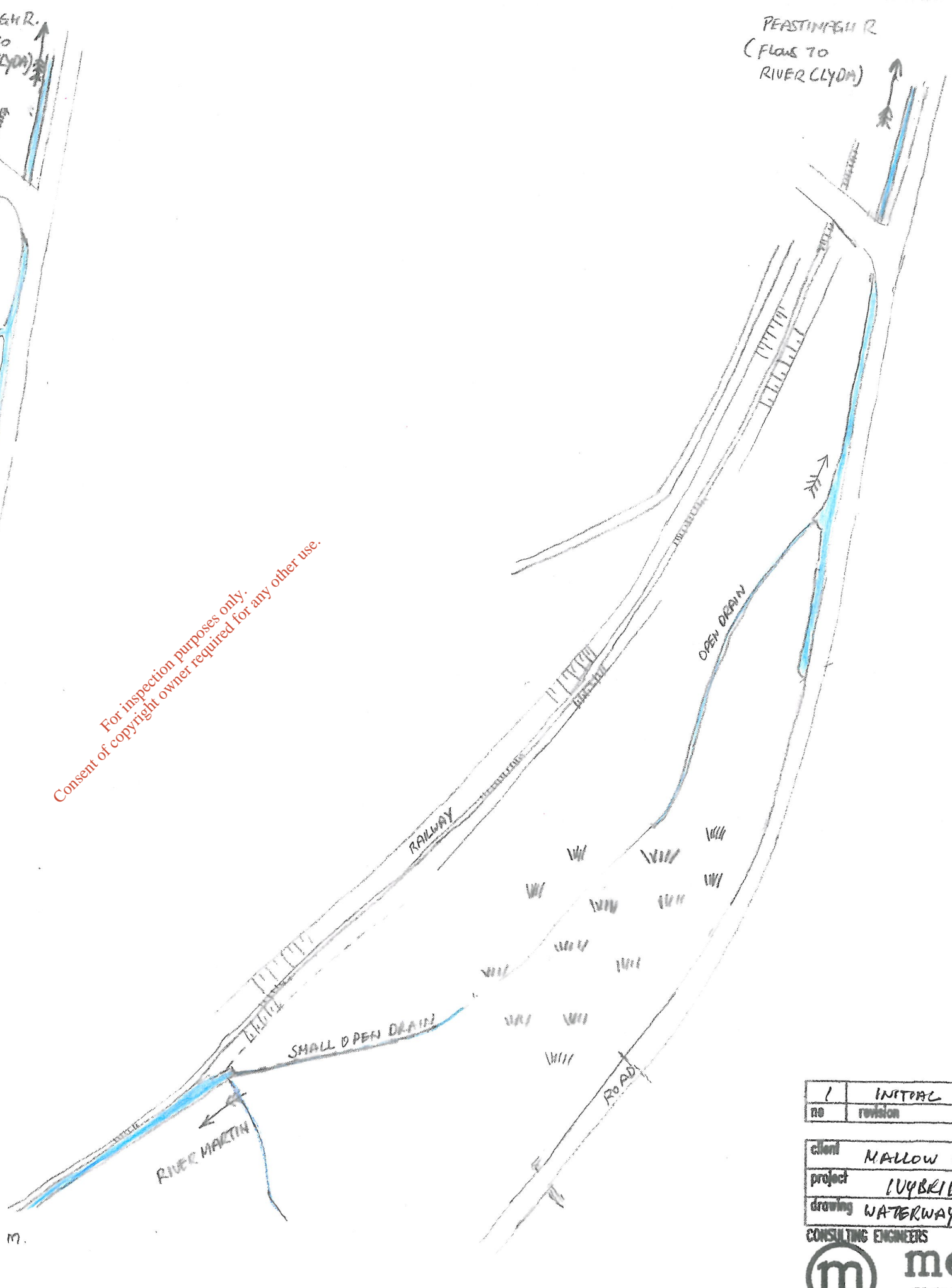
m mescal & associates
 CONSULTING ENGINEERS

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 tel 021-4314300 fax 021-4314309
 email info@mescal.ie



EXISTING WATER COURSES

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ORIGINAL WATER COURSES

1	INITIAL	20/12/19
NO	revision	DATE

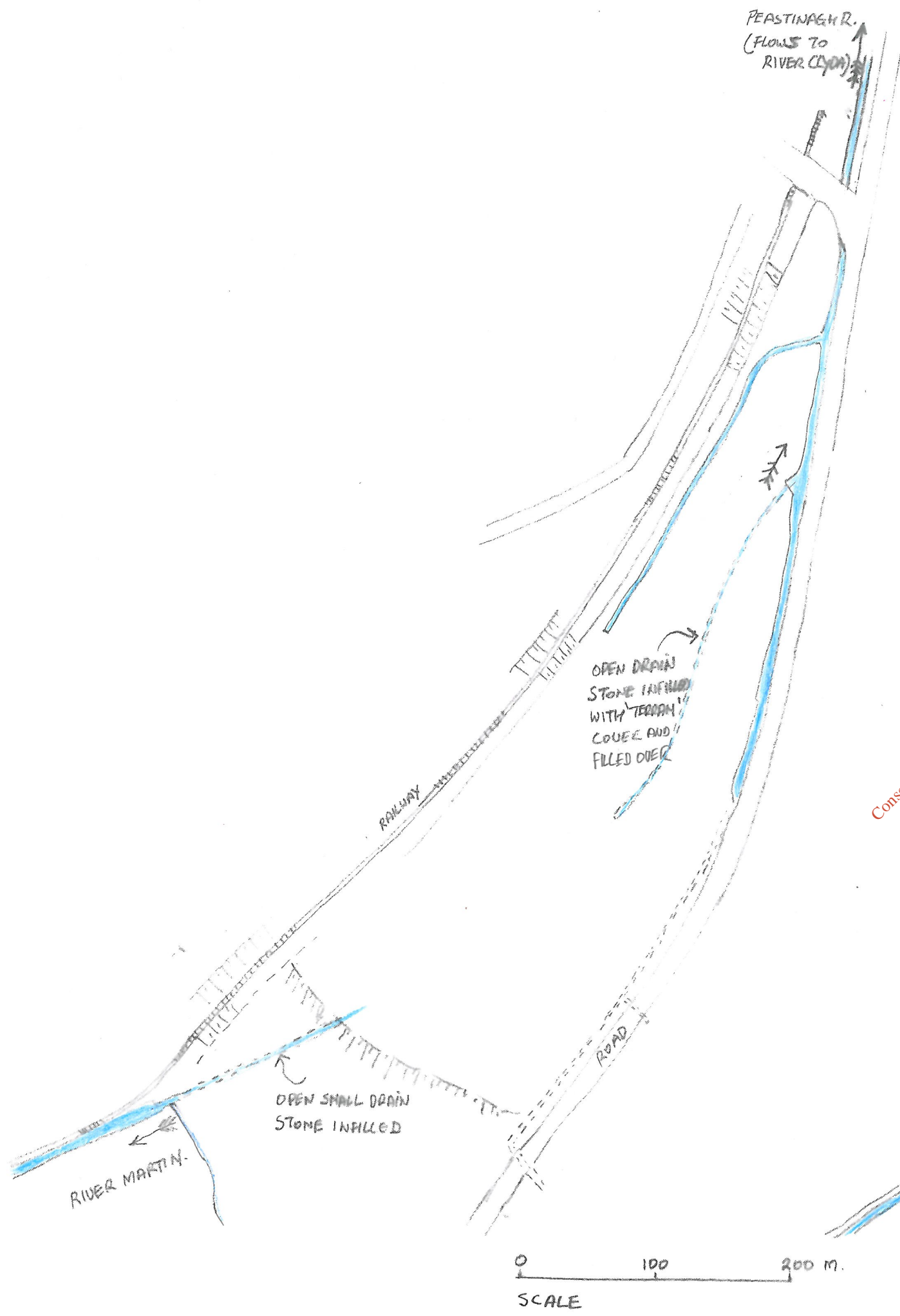
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 project LUYBRIDGE
 drawing WATERWAYS - ORIGINAL / EXISTING.

CONSULTING ENGINEERS

m mescal & associates

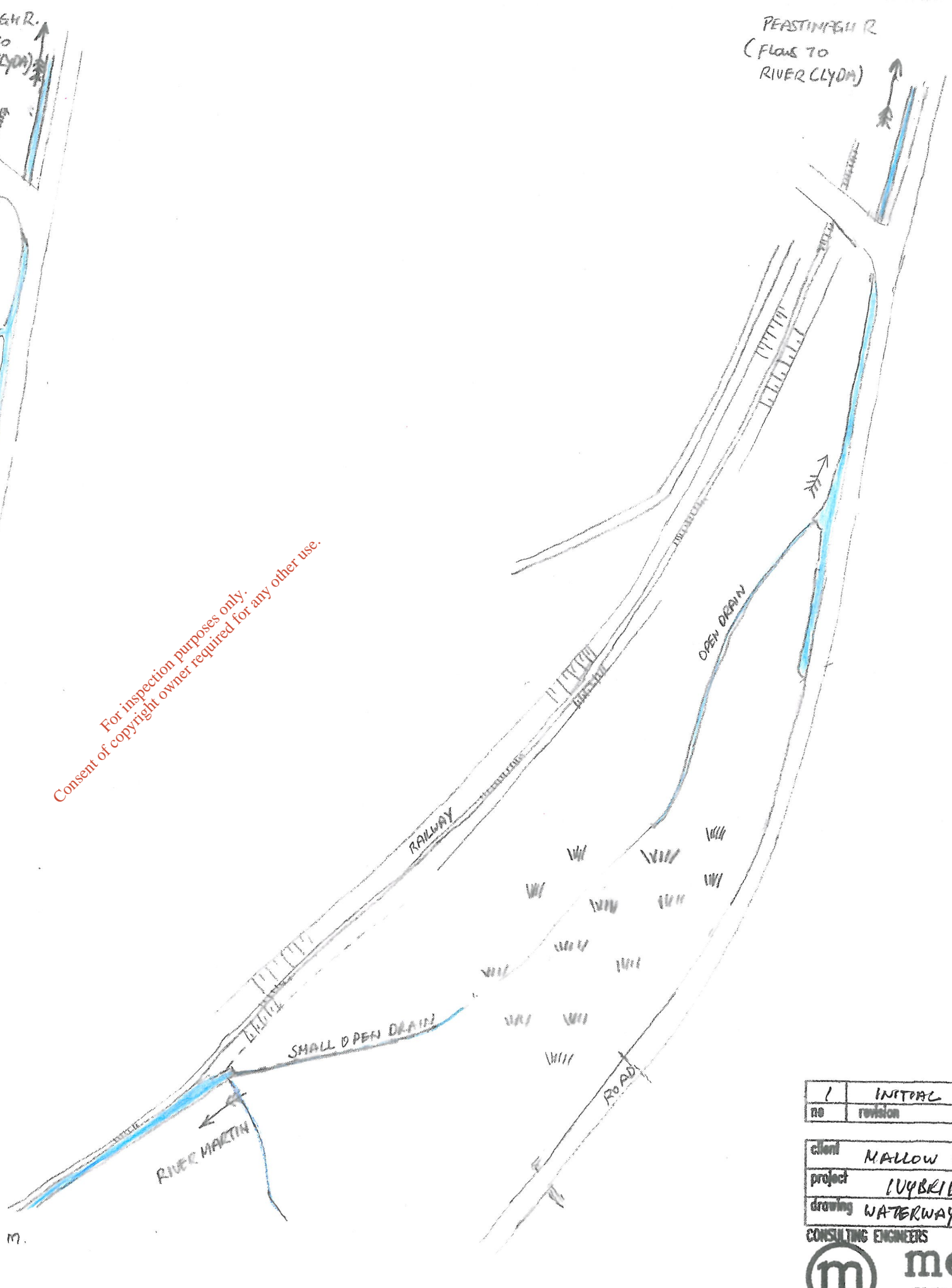
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 Centre Park Road, Cork, Ireland. tel 021-431438
 fax 021-431434

scale AS SHOWN date 20/12/19



EXISTING WATER COURSES

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ORIGINAL WATER COURSES

1	INITIAL	20/12/19
NO	revision	DATE

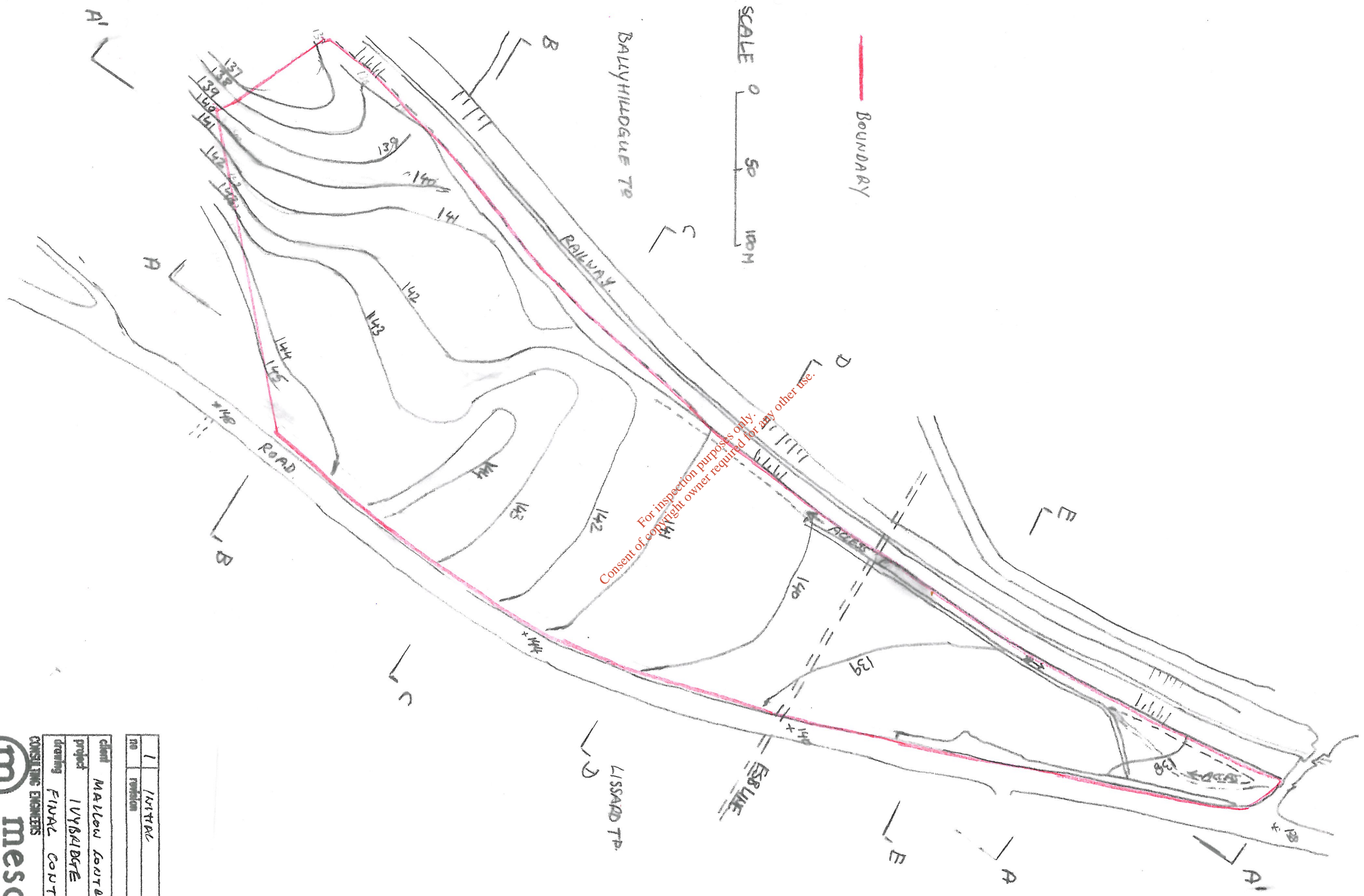
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1	ISSUED	29/12/14

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Natura Impact Statement

**for Development of at Mallow Contracts,
Ivybridge Mallow**

Dr Mary O'Connor

Consultant Ecologist

October 2014

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1 Introduction

The information in this report, required for a competent authority to undertake an “Appropriate Assessment” (or AA), has been prepared by Dr. Mary O’Connor, on behalf of Mallow Cintracts(‘the applicant’). It provides information on and assesses the potential for the proposal to impact on Natura 2000 sites.

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, better known as “The Habitats Directive”, provides legal protection for habitats and species of European importance. Articles 3 to 9 provide the legislative means to protect habitats and species of community interest through the establishment and conservation

of an EU-wide network of sites known as Natura2000. This comprises candidate Special Areas of Conservation (cSACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Conservation of Wild Birds Directive (79/409/EEC).

Paragraph 3 of Article 6 of the Habitats Directive state that:

6(3) Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.

Where such an assessment finds that all potential impacts cannot be successfully avoided or mitigated against, then Paragraph 4 of Article 6 is applied:

6(4) If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted. Where the site concerned hosts a priority natural habitat type and/or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest.

It is the responsibility of the competent authority, in this case the Environmental Protection Agency, to make a decision as to whether or not the proposed development is likely to have significant effects, either individually or in combination with other plans or projects, on the Natura 2000 site in question. Therefore if the competent authority so requires, data and information on the project and on the site and an analysis of potential effects on the site must be obtained and presented in a Natura Impact Statement (NIS) which must be presented by the applicant

The information in the NIS will assist the competent authorities in undertaking an Appropriate Assessment, forms part of and should be read in conjunction with all documentation associated with the application for the proposal.

2 Methodology

2.1 Guidance on Appropriate Assessment

This Natura Impact Statement (NIS) has been prepared with regard to the following guidance documents where relevant:

Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities. (Department of Environment, Heritage and Local Government, 2010 revision).

Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities. Circular NPW 1/10 & PSSP 2/10.

“Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments” issued by the Department of the Environment, Heritage and Local Government (DoEHLG) in 2008. This Natura Impact Statement has been prepared in accordance with the following guidance:

Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, European Commission Environment DG, 2000.

As set out in these guidance documents, AA comprises up to four stages:

Stages of Appropriate Assessment

Stage One: Screening

The process which identifies the likely impacts upon a Natura 2000 site of a project or plan, either alone or in combination with other projects or plans, and considers whether these impacts are likely to be significant.

Stage Two: Appropriate Assessment

The consideration of the impact on the integrity of the Natura 2000 site of the project or plan, either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are adverse impacts, an assessment of the potential mitigation of those impacts.

Stage Three: Assessment of Alternative Solutions

The process which examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the Natura 2000 site.

Stage Four: Assessment where no alternative solutions exist and where adverse impacts remain.

This assessment includes a thorough exposition of compensatory measures where, in the light of an assessment of imperative reasons of overriding public interest (IROPI), it is deemed that the project or plan should proceed.

2.2 Stage 1: Screening

A screening assessment was carried out for the site of the development by the Environmental Protection Agency.

On this basis consideration of the site has progressed to the Appropriate Assessment of the site.

2.3 Stage 2: Provision of Information for an Appropriate Assessment

Once the screening stage has demonstrated that an Appropriate Assessment is required, then the current normal practice is that the proponent of the plan or project prepares and submits information necessary to undertake the Appropriate Assessment to the competent authority in the form of a NIS. The competent authority then uses this information to undertake the Appropriate Assessment and to inform its decision as to whether the plan or project may be permitted.

The Appropriate Assessment is focused on the potential impact of the proposed plan or project to impact on the conservation objectives of Natura 2000 sites, and furthermore, on whether the proposed plan or project would impact on the integrity of Natura 2000 sites. Therefore this stage involves the collection of information which is specifically relevant to determining this, including:-

A description of the proposed plan or project (outlined in Section 3B).

The conservation objectives of the Natura 2000 sites and an understanding of current factors which either maintain or threaten those conservation objectives (included in Table 2).

An assessment of aspects of the proposed plan or project which could negatively impact the conservation objectives of the Natura 2000 sites, both in the absence of and with mitigation measures (outlined in Tables 3).

Desktop sources of information relied upon in this NIS include the following:

Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie.

Information on water quality in the area available from www.epa.ie

Information on soils, geology and hydrogeology in the area available from www.gsi.ie

Information on the location, nature and design of the proposed development supplied by the applicant's design team.

Other key information sources¹:

The Status of EU Protected Habitats in Ireland – Backing Documents Volumes 1 to 3. (National Parks & Wildlife Service, 2007)

Cork County Development Plan

This Document Comprises the Natura Impact Statement for the proposed development

2.4 Reason(s) EPA requirement for Natura Impact Statement for the Proposed Development

To ensure that sufficient information is available to the competent authority for a fully informed Appropriate Assessment Cork County Council has requested that the Natura Impact Statement and associated documents address the following:

The following reasons contributed to the determination that the Appropriate Assessment of the activity is required:

- A. The potential for waste activities to affect local hydrology and water quality, including filling surface water courses, namely the Martin and Peastinagh rivers with waste, possible discharge of sediment from the soil and stone fill and excavation of a new drainage channel to Peastinagh

River;

- B. Close proximity (1km) of the facility to the Blackwater River (Cork/Waterford) SAC(Site Code: 002170).

The Natura Impact Statement of the Appropriate Assessment is carried out to assess the impact to the European site the Blackwater River (Cork/Waterford)SAC (Site Code: 002170). As such this document describes the impact of the site to the Blackwater River catchment only and does not deal with the Lee River catchment, i.e. watercourses flowing south from the site.

Consultation

A number of important stakeholders and other organisations with an interest in the Blackwater and Clyda River were formally consulted during the assessment.

These included:

- National Parks and Wildlife Service (Eva Sweeny)
- Inland Fisheries Ireland
- Coillte (Pat Roche Regional Manager)

Mallow Pat Walsh

3: Provision of Information for an Appropriate Assessment (Natura Impact Statement)

3A – Description of the Designated Areas

Geographic Setting of the area of the SAC in relation to the proposed development site

The upper reaches of the Clyda River is included in the Blackwater River SAC and includes a small portion of the Peastinagh River. This SAC is located at a remove of over a kilometre downstream from the development site. The Peastinagh drains the western slopes of the Nagles Mountains and continues in a northward flow to the main channel of the Clyda River.

The site is located in the area where the Peastinagh River and the River Martin rise. The Peastinagh River rises and flows north from the site, approx. 1km downstream it joins the River Clyda which eventually joins the River Blackwater. The River Martin rises and flows south from the site eventually joining the River Bride.

The development site is located on the watershed between the Blackwater and the Lee Rivers with the northern portion of the site drained by the Peastinagh River flowing north to the Blackwater catchment via the Clyda tributary and the southern portion of the site draining south to the Lee River catchment *via* the Martin River. The Martin River and the main channel of the Lee is not protected as a European Site. Therefore this Natura Impact Statement deals with impact to the Blackwater River SAC and does not discuss impact to the Lee River and its Catchment as it is not a European site.

Climate

The Climate of the area is inland Atlantic with lower average wind speeds than coastal areas, a mean annual air temperature of 10 degrees centigrade and an average rainfall of circa 1200-1400mm per annum (Rohan 1986).

Topography

The most striking physical features of the area are the hill ranges and river valleys. The Boggeragh Mountains to the west and the Nagle Mountains to the east. These rounded hills without protruding rocky escarpments, or steep slopes are much afforested. The principal river the Clyda occupies a gently sloping valley and drains the catchment northwards to the Blackwater River.

Geology & Soils

The Peastinagh River valley is principally dominated by a geology comprised of rocks which largely belongs to the Devonian (415-360 million years ago [Ma]). These are dominated by conglomerates (coarse grained rock) and sandstone that collectively make up the Old Red Sandstone (GSI Cork County Geology summary). The watercourses that flow in the large catchment from these support mildly acid to circum-neutral waters.

The principal soil type of the areas is fine loamy drift with siliceous stones i.e. Soil association: Kilrush (700b) the original composition of the soil is a Clay/Loam (Teagasc EPA Soil Map 2015).

At the proposed development site some areas of gleyed soils occur associated with areas of waterlogging but the field is for the most part free draining.

Name & site code of the relevant Natura site

Blackwater River SAC Site Code 002170. See Appendix 2, 4, 5 and 7.

The qualifying interests & conservation objectives for the site.

The Blackwater River SAC Site Code 002170 comprises the Blackwater River and several of its major tributaries, including the Clyda River.

The Blackwater River is one of the largest rivers in Ireland, draining a major part of Co. Cork and parts of Cos. Kerry, Limerick, Tipperary and Waterford. The site consists of most of the freshwater stretches of the system as well as the estuarine component at Youghal. Tidal influence extends almost to Cappoquin. The Blackwater rises in the east Kerry uplands where Namurian grits and shales build the

low heather covered plateaux. In the lowlands in the Mallow district it passes over limestone and later cuts through ridges of old red sandstone to the south of Cappoquin. The main tributaries include the Rivers Lickey, Bride, Allow and Clyda. A wide range of habitats are included within the sites, the habitats for which the river system is protected are thus;

Habitats of Qualifying Interest in the Blackwater River cSAC

- Estuaries [1130]
- Mudflats and sandflats not covered by seawater at low tide [1140]
- Perennial vegetation of stony banks [1220]
- Salicornia and other annuals colonizing mud and sand [1310]
- Atlantic salt meadows (*Glauco-Puccinellietalia maritima*) [1330]
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410]
- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation [3260]
- Old sessile oak woods with *Ilex* and *Blechnum* in British Isles [91A0]
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]
- *Taxus baccata* woods of the British Isles [91J0]

Nine species listed under Annex II of the Habitats Directive form qualifying interests for the Blackwater River cSAC. The species for which the river system is protected are thus;

Mammals

Otter (*Lutra lutra*) [1355]

Fish and Invertebrates

- Freshwater pearl mussel (*Margaritifera margaritifera*) [1029]
- White-clawed crayfish (*Austropotamobius pallipes*) [1092]
- Sea lamprey (*Petromyzon marinus*) [1095]
- Brook lamprey (*Lampetra planeri*) [1096]
- River lamprey (*Lampetra fluviatilis*) [1099]
- Allis shad (*Alosa alosa*) [1102]
- Twait shad (*Alosa fallax fallax*) [1103]
- Salmon (*Salmo salar*) [1106]

Plants

- Killarney fern (*Trichomanes speciosum*) [1421]

The populations of invertebrates for which the site is selected are in less good condition and are of more restricted occurrence and some are extremely rare in a European wide context e.g. Freshwater pearl mussel (*Margaritifera margaritifera*) [1029]. However, the viable populations of Freshwater pearl mussel (*Margaritifera*

margaritifera) [1029] do not occur in the Clyda river and all significant areas of population occur upstream of the development site, on the main channel of the Blackwater river. Some isolated mature adults have been found downstream of Mallow (C. Saitch pers comm.) and small areas of suitable habitat for this species also occur on the main channel of the Blackwater but breeding populations are not known to occur.

Conservation Objectives for the Blackwater River SAC

The conservation objective for the Blackwater River SAC Site Code 002170 is to maintain or restore the favourable conservation condition of the Annexed habitats and species for which the SAC has been selected see list below. Detailed descriptions of conservation of habitats and species which may potentially be impacted by the proposed development are given in Stage 2 C below.

Qualifying Interest Habitats, Plants and Animals	Level of Protection
Alluvial wet woodland (code: 91E0)	Habitats Directive Annex 1 Priority
Old sessile oak woods with Ilex and Blechnum in British Isles [91A0]	Habitats Directive Annex 1
Eutrophic tall herbs (code: 6430)	Habitats Directive Annex 1
Floating river vegetation (code: 3260)	Habitats Directive Annex 1
Estuary (code: 1130)	Habitats Directive Annex 1
Salicornia mudflats (code: 1310)	Habitats Directive Annex 1
<i>Taxus baccata</i> woods of the British Isles [91J0]	Habitats Directive Annex 1
Mudflats and sandflats not covered by seawater at low tide [1140]	Habitats Directive Annex 1
Atlantic salt meadows (code: 1330)	Habitats Directive Annex 1
Mediterranean salt meadows (code: 1410)	Habitats Directive Annex 1
Killarney Fern (<i>Trichomanes speciosum</i>)	Habitats Directive Annex 2 and 4 and Flora protection Order 1999
<i>Vertigo moulinsiana</i> [1016]	Habitats Directive Annex 2
Freshwater pearl mussel (<i>Margaritifera margaritifera</i>) [1029]	Habitats Directive Annex 2
White-clawed crayfish (<i>Austropotamobius pallipes</i>) [1092]	Habitats Directive Annex 2 and 5
Sea lamprey (<i>Petromyzon marinus</i>) [1095]	Habitats Directive Annex 2
Brook lamprey (<i>Lampetra planeri</i>) [1096]	Habitats Directive Annex 2
River lamprey (<i>Lampetra fluviatilis</i>) [1099]	Habitats Directive Annex 2 and 5

Allis shad (<i>Alosa alosa</i>) [1102]	Habitats Directive Annex 2 and 5
Twaite shad (<i>Alosa fallax fallax</i>) [1103]	Habitats Directive Annex 2 and 5
Salmon (<i>Salmo salar</i>) [1106]	Habitats Directive Annex 2 and 5
Otter (<i>Lutra lutra</i>) [1355]	Habitats Directive Annex 4

Table 1 Qualifying Interest Habitats, Plants and Animals of Blackwater River SAC Site Code 002170

Stage 3B – Description of the project

The project aims to bring material (mostly excavated soils) from building and development activity in the region to the site. This excavated material will be used to raise the level of the site and to make it usable for agriculture

The site is located between the railway line and the N20 Cork/Limerick road. It has been in operation since 2007, see site location map Appendix 1.

The site consisted of marshy ground towards the roadway and slightly firmer ground toward the railway line. The marshy ground was very soft and waterlogged during winter months, with the summer months being slightly more passable. The principle benefit is in reclaiming this wet land for agricultural uses.

Any concrete or stone brought in small amounts to the site with topsoil is crushed on site and is used for local works and agricultural improvement

The works were granted planning permission 2007 and commenced operation in the same year.

Currently, the site has reached it is approximately 80%-capacity. The project is completed in 3 phases working from the north.

Ground is being made good, top-soiled and grassed at the end of each phase. Each phase involves the following steps:

- Strip topsoil and store
- Import material and then place, compacting in layers
- On achievement of elevation clear any top stone
- Allow to rest/consolidate
- Re-spread topsoil over the surface and rake
- Grassed at next suitable time of year
- Available for normal agricultural use

Prior to filling across the channel the bed of the channel was open piped and stoned with a protective Terram on top to ensure no sediment/debris entered the channel.

Two soil water containments were placed on the northern end of the site on the Peastinagh River and on the newly constructed drainage ditch which links to the River Martin which runs south from the site. A bund was constructed at the southern end to ensure all run-off goes to the soiled water containment.

The entrance at the north end of the site is equipped with a wheelwash and spray. This is for vehicles exiting the site to ensure cleanliness upon re-entering the public road, soiled water from this activity is directed to the northern soil water containments.

The site is compliant with all permit/license requirements. Permission was sought for from the Cork County Council Environmental Department, the ESB, Iarnrod Eireann, and the Southern Regional Fisheries Boards, before sending applications to the EPA.

The only Natura 2000 site within a 15km radius from the site is the Blackwater cSAC 002170. See attached Map 1. The SAC is at a remove of *circa* 1km downstream from site and comprises the lower stretch of the Peastinagh River before it confluences with the Clyda River.

Project location

The site of the development is located in an area of agricultural pastureland at the watershed of the Peastinagh and Martin watercourses, see map Appendix 1 0 for location details.

The site is located in an area of improved agricultural grassland and the watercourses are fringed by grassland scrub lines and treelines.

The development site supports a variety of habitats but none of these is annexed under the EU Natural Habitats Directive. Site was visited in October 2014., see site photos Appendix 6.

Habitats include, as defined by the Fossit (2000) Irish habitat types;

Drainage ditches FW4
Improved agricultural grassland GA1
Wet grassland GS4
Dry meadows and grassy verges GS2
Hedgerows WL1
Treelines WL2

Is the Project or Plan directly connected with or necessary to the management of the Natura 2000 site (provide details)?

No.

Stage 3C – Potential impacts on the integrity of the Designated Areas-i.e. Nature and Significance of any potential impacts on the qualifying interests of the Natura Site arising from the implementation of the project

SIZE, SCALE & LAND-TAKE

The proposed development comprises an area of 8 hectares and lies in its entirety outside any designated areas.

The size and land take of the development site will thus not directly impact on the scale or intrinsic integrity of the Blackwater River SAC.

DISTANCE FROM OR KEY FEATURES OF THE NATURA 2000 SITES

The proposed development site is at a remove of over 1km from the boundary of Blackwater River SAC. Here a very small portion of the lower reaches of the Peastinagh River is included before its confluence with the main Clyda Channel.

See Map Appendix 2.

Nature and Significance of any potential impacts on the qualifying interests of the Natura site arising from the implementation of the project

Table 2 below summarises any qualifying interest of the SAC i.e. qualifying habitat or species which may be impacted by the proposed development and the reasons why. Other qualifying species or habitats of the SAC which are not predicted to be impacted are also included.

Qualifying Interest	Level of Protection	Relevant	Likelihood of Impact	Cause of Impact
Alluvial wet woodland (code: 91E0)	Habitats Directive Annex 1 Priority 1	no	None This habitat does not occur in the locality of the proposed development.	N/A
Old sessile oak woods with Ilex and Blechnum in British Isles [91A0]	Habitats Directive Annex 1	no	None This habitat does not occur in the locality of the proposed development.	N/A
Floating river vegetation (code: 3260)	Habitats Directive Annex 1	yes	Very unlikely as this habitat does not occur in the vicinity of the development site.	Input of Fines
Estuary (code: 1130)	Habitats Directive Annex 1	no	None This habitat occurs in the tidal lower stretches of the River Blackwater 10s of kilometres downstream, None of the Clyda River is tidal.	N/A

Qualifying Interest	Level of Protection	Relevant	Likelihood of Impact	Cause of Impact
Salicornia mudflats (code: 1310)	Habitats Directive Annex 1	no	None This habitat occurs in the tidal lower stretches of the River Blackwater 10s of kilometres downstream, None of the Clyda River is tidal.	N/A
Spartina swards (Spartinion maritimae) [1320]	Habitats Directive Annex 1	no	None This habitat occurs in the tidal lower stretches of the River Blackwater 10s of kilometres downstream, None of the Clyda River is tidal.	N/A
Mudflats and sandflats not covered by seawater at low tide [1140]	Habitats Directive Annex 1	no	None This habitat occurs in the tidal lower stretches of the River Blackwater 10s of kilometres downstream, None of the Clyda River is tidal.	N/A

Qualifying Interest	Level of Protection	Relevant	Likelihood of Impact	Cause of Impact
Atlantic salt meadows (code: 1330)	Habitats Directive Annex 1	no	None This habitat occurs in the tidal lower stretches of the River Blackwater 10s of kilometres downstream, None of the Clyda River is tidal.	N/A
Mediterranean salt meadows (code: 1410)	Habitats Directive Annex 1	no	None This habitat occurs in the tidal lower stretches of the River Blackwater 10s of kilometres downstream, None of the Clyda River is tidal.	N/A
Killarney Fern (<i>Trichomanes speciosum</i>)	Habitats Directive Annex 2 and 4 and Flora protection Order 1999	no	None This species has not been recorded in the Clyda River Valley.	N/A

Qualifying Interest	Level of Protection	Relevant	Likelihood of Impact	Cause of Impact
Freshwater pearl mussel (<i>Margaritifera margaritifera</i>) [1029]	Habitats Directive Annex 2	yes	The Clyda itself is not considered to be a Freshwater Pearl Mussel river but the river is within the catchment of the main channel of the Blackwater River which is designated for <i>M. margaritifera</i> even though the active mussel bed all are located to the west of Mallow Upstream of Developmet	Possible Impairment of Water Quality
White-clawed crayfish (<i>Austropotamobius pallipes</i>) [1092]	Habitats Directive Annex 2 and 5	no	The species is not Present in this area of Catchment	N/A
Sea lamprey (<i>Petromyzon marinus</i>) [1095]	Habitats Directive Annex 2	yes	Possible	Possible Impairment of Water Quality Potential run-off of fines Disturbance to River Bed

Qualifying Interest	Level of Protection	Relevant	Likelihood of Impact	Cause of Impact
Brook lamprey (<i>Lampetra planeri</i>) [1096]	Habitats Directive Annex 2	yes	Possible	Possible Impairment of Water Quality Potential run-off of fines Disturbance of River Bed habitat
River lamprey (<i>Lampetra fluviatilis</i>) [1099]	Habitats Directive Annex 2 and 5	yes	Possible	Possible Impairment of Water Quality Potential run-off of fines Disturbance to River Bed
Allis shad (<i>Alosa alosa</i>) [1102]	Habitats Directive Annex 2 and 5	no	None this species does not occur in Clyda.	N/A
Twaite shad (<i>Alosa fallax fallax</i>) [1103]	Habitats Directive Annex 2 and 5	no	None this species does not occur in Clyda	N/A
Salmon (<i>Salmo salar</i>) [1106]	Habitats Directive Annex 2 and 5	yes	Possible	Possible Impairment of Water Quality Potential run-off of fines Disturbance River Bed of habitat

Qualifying Interest	Level of Protection	Relevant	Likelihood of Impact	Cause of Impact
Otter (<i>Lutra lutra</i>) [1355]	Habitats Directive Annex 4	yes	Unlikely due to no known populations occurring in the development area or its immediate vicinity	Disturbance of habitat

Table 2 Qualifying interest of the SAC i.e. qualifying habitat or species which may be impacted by the proposed development and the reasons why.

Annexed Habitats

Floating river vegetation (code: 3260)

In the main channel of the Clyda downstream from the development site the annexed habitat Floating river vegetation (code: 3260) occurs. The principal species of this habitat type in the catchment is *Ranunculus pencillatus var pencillatus*. This habitat is widespread along the main channel of the Clyda and Blackwater Rivers. In the Peastinagh River adjacent to the proposed development site this habitat type is absent as the habitat conditions are not favourable. This habitat is considered to have an A ranked conservation status in the overall SAC i.e. an excellent conservation status (Natura 2000 Form for SAC).

The main channel; of the Peastinagh at the site does provide suitable conditions for this habitat type i.e. a swift to moderately flowing river over a stable substrate of sand, gravel and cobble with silt deposition at the macrophytic beds (Hatton and Grieve, 2003). In an Irish context and in the greater Blackwater Catchment this vegetation type is poorly studied and a definitive classification any sub-types of the vegetation type or the occurrence of same for the site has not yet been formulated (NPWs Conservation Objectives for the Site).

According to the conservation objectives for this habitat type in the SAC the concentration of nutrients in the water column should be sufficiently low to prevent changes in species composition or habitat condition Phosphorus (MRP) is typically the limiting nutrient, however increased nitrogen (NO₃⁻) negatively impacts upon some aquatic plant communities. Nutrient enrichment typically leads to increased filamentous-green-algal biomass, and consequent changes in other algae, bryophyte and macrophyte species composition and abundance. Mayes (2008) further lists the main pressures and threats to this river habitat type 3260 as arising from eutrophication from point and diffuse sources, forestry related pressures, and

hydrological change. Suspended solids have not been determined as a significant negative pressure, although this pollutant has not been subject to the same level of investigation as other parameters of water quality and has tended to be under-reported.

Table 3 Sampling of the water leaving the northward flowing Peastinagh

River and Code: **CLYDA** **18C02**
 Tributary Of: 18B02 BLACKWATER (MUNSTER) OS Catchment No: 190
 OS Grid Ref of confluence: W 533 977
 Date(s) Surveyed: 31/12/1981, 31/12/1986, 31/12/1990, 31/12/1994, 31/12/1997, 13/7/2000, 14/7/2000, 9/7/2003, 25/5/2006, 3/6/2009, 12/7/2012

Station Nos.	Biological Quality Ratings (Q Values)									
	1981	1986	1990	1994	1997	2000	2003	2006	2009	2012
0050	-	-	-	4	4	4	4	4-5	-	-
0060	-	-	4-5	-	-	-	-	-	-	-
0070	-	-	-	3-4	4	4	4-5	4-5	4-5	4-5
0080	-	-	4	-	-	-	-	-	-	-
0090	-	-	-	4-5	4	3-4	4	4	4-5	4-5
0100	4-5	4-5	-	-	-	-	-	-	-	-
0110	-	-	5	-	-	-	-	-	-	-
0190	-	-	5	-	-	-	-	-	-	-
0200	4-5	4-5	-	4-5	4-5	3-4	-	-	-	-
0300	4	4	3	4	3-4	3-4	4	4	4	4

Assessment: Continuing satisfactory with High and Good ecological quality. . .

Station No.	Station Location	National X	Grid Ref. Y	Discovery Series No.	County Code
0050	Br u/s Ahadallane Br	151116	86874	80	CK
0060	Ahadallane Br	0	0	0	CK
0070	Athnalacka Br	153498	88800	80	CK
0080	50m d/s Millford Br	0	0	0	CK
0090	Athnaleenta Br	155583	90492	80	CK
0100	Jordan's Br	0	0	0	CK
0110	Br 0.2km d/s Jordan's Br	0	0	0	CK
0190	0.3km u/s Clyda Br (Upr)	0	0	0	CK
0200	Clyda Br (Upper)	154285	95906	80	CK
0300	Clyda Br (Lower)	153962	97505	80	CK

Site Altitude and Upstream Catchment Characteristics (where available):

Station No.	Alt	Area	Sil	Cal	Pasture	Forestry	Bogs	Urban	Misc Ag.	Water	Other
0050	177	7	100	0	84	15	0	0	0	0	1
0060	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
0070	145	24	100	0	77	11	0	0	7	0	6
0080	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
0090	111	33	100	0	70	10	0	0	13	0	8
0100	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
0110	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
0190	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
0200	58	109	100	0	69	5	0	0	18	0	8
0300	48	112	99	1	68	5	0	0	19	0	7

Alt is in metres Area is km2 and Sil, Cal are % siliceous and calcareous bedrock and Pasture, Forestry, etc., are % of catchment area.

Table 4 Water Quality Leaving Site to the North (see sample location points Appendix 3)

Test	Results	Salmonid Water Quality
pH	6.54	≥ 6 ≤ 9
BOD	<2	<3
COD	<1	
Suspended solids	2.1	<25
Total Ammonia-N	0.14	<0.1
Conductivity	294	
Phosphorous MRP	0.05	
Nitrate as N	3.2	
Total Phosphorous-P	0.07	
Oils Fats Grease	<1	
Sulphates as N	25	
Chlorides as (Cl)	28.4	
Phenols	<0.002	
Detergents as Lauryl Sulphate	0.156	
Arsenic	0.000656	
Chromium	0.0105	
Copper	0.00295	< 0.005
Cyanide	<0.05	
Fluoride	<0.05	
Lead	0.000079	
Nickel	0.0012	
Zinc	0.00245	< 0.03

Results expressed in milligrams per Litre

Impact

During the operational phase maintaining the water quality at Q4 or better as required for salmonids will ensure that this habitat will not be adversely impacted during the operational phase of the site works. Water quality should reach a minimum of Water Framework Directive good status, in terms of nutrient and oxygenation standards and EQRs (ecological quality ratios) for macro invertebrates. EPA records for Clyda Bridge Lower, for which records exist up to 2012, show of Q4 values persisting downstream of the site in both 2009 and 2012. This is during the operational period of the soil spreading activities at the Ivybridge site. The Floating river vegetation (code: 3260) habitat also persists in the suitable lower reaches of the Clyda and this indicates that there is no deleterious impact to the habitat as a result of the operation at Ivybridge.

See Section Stage 3E below for discussion of mitigation for site.

Annexed Species (Fauna)

The proposed development may have an impact on the following annexed species which are of qualifying interest for the Natura 2000 and must be considered.

Freshwater Pearl Mussel (*Margaritifera margaritifera*)

River Lamprey (*Lampetra fluviatilis*)

Sea Lamprey (*Petromyzon marinus*)

Brook Lamprey (*Lampetra planeri*)

Atlantic Salmon (*Salmo salar*)

Otter (*Lutra lutra*)

Freshwater Pearl Mussel (*Margaritifera margaritifera*)

Mayes (2008) highlights that the freshwater pearl mussel *M. margaritifera* lives in oligotrophic, acid to neutral waters of rivers flowing over granite or sandstone rock. The ecology of the species is particularly notable in that individuals can grow to very large sizes relative to other freshwater molluscs, building up thick calcareous valves, in rivers that have soft water with low levels of calcium. Their shell building is consequently very slow, and individuals in natural conditions live to over a hundred years of age. *M. margaritifera* requires stable cobble and gravel substrate with very little fine material below pea-sized gravel. Adult mussels are two-thirds buried and juveniles up to 5-10 years old are totally buried within the substrate. The lack of fine material in the river bed substrate allows for free water exchange between the open river and the water within the substrate. The free exchange of water means that oxygen levels within the substrate do not fall below those of the open water. This is essential for juvenile recruitment, as this species requires continuous high oxygen levels.

Improving the conservation status of *M. margaritifera* is a stated conservation objective for the Blackwater River SAC. It is acknowledged that improving the conservation status of the fresh water pearl mussel species represents a considerable challenge, as both species are critically dependent on extremely high water status see Table 5 below.

Table 5 Habitat Quality Requirements for Freshwater Pearl Mussel

Rivers	Quality Element	Parameter ranges if applicable to Juveniles	Parameter ranges if applicable to adults
Biological quality elements:	Composition and abundance of aquatic flora	Nil	Nil
	Composition and abundance of benthic invertebrate fauna.	Very few are found with <i>Margaritifera</i> due to the associate waters being Ultra-Oligotrophic	Very few are found with <i>Margaritifera</i> due to the associate waters being Ultra-Oligotrophic
	Composition, abundance and age structure of Fish Fauna	Density of 1-2 year old salmonids should be sufficient to allow for juvenile infestation however it is not a case of the more fish the better.	
Hydromorphological:			
Hydrological regime	Quantity & dynamics of water flow	As long as it is kept natural	As long as it is kept natural
	Connection to groundwater bodies	Not considered to be an issue due to its non reliance on nutrients.	Not considered to be an issue due to its non reliance on nutrients.
River continuity	River depth and width variation	It needs a good variation in depth & width	It needs a good variation in depth & width

Rivers	Quality Element	Parameter ranges if applicable to Juveniles	Parameter ranges if applicable to adults
Morphological condition	River depth and width variation	No removal of boulders, gravel, cobbles or bedrock	No removal of boulders, gravel, cobbles or bedrock
	Structure and substrate of the river bed	Naturalness to be retained or restored	Naturalness to be retained or restored
	Structure of the riparian zone	Needs to be stable, no poaching from cattle and sheep which can lead to siltation which has a very negative effect.	Needs to be stable, no poaching from cattle and sheep which can lead to siltation which has a very negative effect.
General Physico-chemical requirements: Transparency, Thermal conditions, Oxygenation conditions, Salinity, Acidification status, Nutrient Conditions	Calcium	A baseline Ca level of each river should first be taken & maintained as the only Ca input would be a once off event such as from liming.	<10 mg/l Ca CO ₃ (Oliver 2000), 2 mg/l (Bauer 1988). Minimum level to be applied
	Transparency	This is a very important factor as it measures the amount of suspended solids in the water. If insufficient transparency the mussels will not open and fail to filter.	This is a very important factor as it measures the amount of suspended solids in the water. If insufficient transparency the mussels will not open and fail to filter.

Rivers	Quality Element	Parameter ranges if applicable to Juveniles	Parameter ranges if applicable to adults
General Physico-chemical requirements	Temperature	5-19 °C	5-19 °C
	Dissolved oxygen	Juvenile mussels live interstitially, but no monitoring of substrate oxygen levels is currently undertaken.	>9 mg/l (Moorkens 2000). Minimum level to be applied
	Salinity	Only estuarine salinity, no evidence of reproduction in saline influenced estuaries.	Only estuarine salinity, no evidence of reproduction in saline influenced estuaries.
	Electrical conductivity	No artificial changes in conductivity (79-90 µs/cm)	<100 µs/cm (Oliver 2000), <70 µs/cm (Bauer 1988), <200 µs/cm (Moorkens (included <i>Durrovensis</i>) 2000), <100 µs/cm (Life Report 2000) Minimum level to be applied
	pH	Depends on what they are naturally found on.	6.5-7.2 (Oliver 2000), 7.5 or less (Life Report 2000), <7.1 - >6.3 (Moorkens 2000) Minimum level to be applied
	Alkalinity		

Rivers	Quality Element	Parameter ranges if applicable to Juveniles	Parameter ranges if applicable to adults
General Physico-chemical requirements	Ortho-Phosphate	0.005 mg/l (Moorkens In press) Note: Oliver & Bauers values are double the EPA Q5 values	<0.03 mg/l (Oliver 2000), <0.03 mg/l (Bauer, 1988), 0.005 mg/l (Moorkens 2006 In press) <0.03 mg/l (Life Report 2000) Minimum level to be applied.
	Total phosphorus	N/A	
	Soluble reactive phosphorus	N/A	
	Total nitrogen	N/A	
	Oxidised Nitrogen	0.125 mg /l (Moorkens In press)	<1.0 mg/l (Oliver 2000), <0.5 mg/l (Bauer 1988), 0.125 mg/l (Moorkens In press), 1.0 mg/l (Life Report 2000) Minimum level to be applied
	Ammonium	0.01 mg /l	0.01mg/l
	Suspended solids	The quantity is not as significant as the exposure time.	The quantity is not as significant as the exposure time.
	Turbidity	The quantity is not as significant as the exposure time.	The quantity is not as significant as the exposure time.
	Total organic carbon (TOC)	Negligible	Negligible

Rivers	Quality Element	Parameter ranges if applicable to Juveniles	Parameter ranges if applicable to adults
General Physico-chemical requirements	Biochemical oxygen demand (BOD)	Negligible	<1.3 mg/l (Oliver 2000), 1.4 mg/l (Bauer 1988), <3 mg/l (Moorkens 2000) Minimum level to be applied
	Chemical oxygen demand (COD)		
Specific pollutants	Pollution by all priority substances identified as being discharged into the body of water	Anything with Copper is highly toxic together with Cu, Cadmium, Zinc, Nickel	Anything with Copper is highly toxic together with Cu, Cadmium, Zinc, Nickel
	Pollution by other substances identified as being discharged in significant quantities into the body of water.		Indirect effect from Pyrethroid sheep or any of the sheep dips on Salmonid fish.

Note: All values provided in the above table by Oliver and Bauer are a median/mean not a minimum or maximum. Values provided by Moorkens 2000 were maxima. Those from Moorkens which are in press or post 2000 are medians

Table 5 Habitat Quality Requirements for Freshwater Pearl Mussel

Impact

As the freshwater pearl mussel is not a species associated with the Clyda river no direct disturbance to riverbed habitat and its associated biota will occur. Similarly there will be no direct impact to the hydrological regime of any area of the river catchment associated with freshwater pearl mussel as a result of the proposed development works.

The nearest known area of suitable habitat for pearl mussel is on the main channel of the Blackwater River *circa* 10 Km down-stream of the proposed development site.

Amy impact to this species is most critically dependent on suspended solids leaving the site to the Peastinagh River. All effort to minimise any input of fines from the site during development and operation of the site is carried out and input of fines during the operational phase is expected to be low due to the engineering solutions at place at the site i.e. dirty water containment tanks both north and south of the site to intercept and settle soiled water from the site, see Diagram 1 the rapid revegetation of any bare soil areas is to be carried out by grassing, also vegetated buffer zones are maintained to water courses and animals are fenced off from any water courses on site . The suspended solids in the drain flowing northward to the Peastinagh River at the site has been recorded at meeting Salmonid water requirements of <25mg/l, and is low at 2.2mg/l, which at a remove of over 10km downstream of the site is unlikely to cause any siltation problem to Pearl Mussel Beds. As stated in Table 3 above the quantity of suspended solids is not as important as the length of exposure of any pearl mussel site to these solids, which in this instance will be of short duration i.e. temporary and reversible.

It is therefore unlikely that any significant adverse impact will occur to this species as a result of site works or operation.

See Section 3.E below for discussion of general impact to water quality.

Lamprey Species

Life History Sea and River Lamprey

River Lamprey (*L. fluviatilis*) and Sea lampreys (*P. marinus*) are anadromous (sea-going) and belong to a primitive group of fish that resemble eels in form but do not have jaws and paired fins as eels do. The river lamprey has a round, sucker-like mouth, has no scales, and has openings over its gills instead of an operculum like true eels. These species begin life in freshwater, travel to the ocean, and then returns to freshwater to spawn. Young are hatched, and then the young larvae drift downstream to areas of low velocity with a sand or silt substrate. There they burrow and live as filter feeders for some years, feeding on algae and detritus. As the larvae mature, they develop eyes and teeth and become free swimming. After becoming adults, they swim to the ocean.

Adults are parasitic and feed on a variety of marine and anadromous fish. Adults typically attach to the body of the host fish and feed on blood and other body fluids. Prey may survive an attack from a river lamprey, but feeding may continue even after the death of the host fish.

After some time in the open ocean, adults begin to migrate back to spawning areas for Sea Lampreys that is usually in April and May and spawning usually occurs in June, for River Lampreys return to spawning beds usually occurs in autumn/winter and spawning in spring.

Typical spawning areas are gravel bottoms at the upstream end of riffle habitat, typically upstream of larvae habitat. After eggs are laid and fertilized, adult lampreys die within days

In the Blackwater River catchment the conservation status of the Sea Lamprey is considered to be excellent and for the River Lamprey considered to be good (Natura 2000 Form for SAC).

Habitat Requirements for Sea and River Lamprey Species

SACs that are selected for Lamprey species are generally extensive river systems, including important tributaries, to provide conservation of habitat features required by the various life stages of lampreys (Brown et al. 1997).

SACs for lampreys must be characterised by good water quality, clean substrate at spawning grounds and the presence of silt beds downstream of spawning areas. For *P. marinus* and *L. fluviatilis*, access to spawning areas from the sea must also be ensured (Kurz and Costello 1999). River and Brook Lamprey utilise the suitable lower stretches of the Clyda River for spawning where suitable river-bed habitat occurs.

This habitat does not occur in the vicinity of the proposed development site. This species has been recorded

Impact

The physico-chemical status of the river is not as important for the continued success of lamprey species as the hydromorphological regime of the river, see table (5) below, which will not be impacted by the current development at Ivybridge.

Sea Lamprey have not been found in the Clyda River system. River lamprey have been recorded.

The upper reaches of the Peastinagh River near the site does not have suitable spawning habitats for the species.

The operational phase of this project will not directly impact the river-bed of the SAC river channel (the Clyda) and so suitable spawning habitat e.g. gravel bottoms and natural flow will be retained.

No impact to river-water temperature is envisaged.

The water downstream of the development site is of good quality measured as Q4 by the EPA at Clyda Bridge Lower in both 2009 and 2012 during the operational phase of the development site. The water quality measured flowing north from the site in May 2014 meets Salmonid water quality, with only N levels only slightly elevated at 0.14mg/l, which is well below the sensitivity of the most sensitive salmonid the Rainbow trout at 0.2mg/l.

The risk of water of unacceptable nutrient status will be further reduced by the nutrient assimilative capacity of the Peastinagh River

Brook Lamprey

This lamprey is the most common Irish species of lamprey and is also the smallest. Adult brook lamprey (*Lampetra planeri*) measure from 10-15cm and spawn in gravels during the springtime. They have a wide distribution in Ireland. Although they are found in small streams, as their name suggests, they are also found in larger rivers. Brook lamprey ammocoetes (larvae) live in soft sandy/mud for a number of years before maturing. These young lampreys are blind and are filter feeders, eating detritus and other organic matter.

In the Blackwater River catchment the conservation status the Brook Lamprey is considered to be excellent (Natura 2000 Form for SAC).

Unlike the majority of River and Sea lamprey, the adults do not migrate to sea nor do they have a parasitic phase. Adult brook lamprey are resident in watercourses year round and spawn in gravel bottoms similar to River and Sea Lamprey.

Brook Lamprey have been recorded in the Clyda River.

Impact

The physico-chemical status of the river is not as important for the continued success of lamprey species as the hydromorphological regime of the river, see table (5) below, which will not be impacted by the current development at Ivybridge.

The Peastinagh River near the site does not have suitable spawning habitats.

The operational phase of this project will not directly impact the river-bed of the SAC river channel (the Clyda) and so suitable spawning habitat e.g. gravel bottoms and natural flow will be retained.

No impact to river-water temperature is envisaged.

The water downstream of the development site is of good quality measured as Q4 by the EPA at Clyda Bridge Lower in both 2009 and 2012 during the operational phase of the development site. The water quality measured flowing north from the site in May 2014 meets Salmonid water quality, with only N levels only slightly elevated at 0.14mg/l, which is well below the sensitivity of the most sensitive salmonid the Rainbow trout at 0.2mg/l.

The risk of water of unacceptable nutrient status will be further reduced by the nutrient assimilative capacity of the Peastinagh River

See Section Stage 3E below for discussion of general impact to water quality.

Rivers	Quality Element	Parameter ranges if applicable
Biological quality elements:	Composition and abundance of aquatic flora	Relevant
	Composition and abundance of benthic invertebrate flora	
	Composition, abundance and age structure of Fish Fauna	
Hydromorphological:		
Hydrological regime	Quantity & dynamics of water flow	River lamprey 1.9-5.7km-1 (Maitland 2003) Sea lamprey <0.03m3s-1 (Maitland 2003) Brook lamprey larval nursery beds have speeds of 8-10cm s-1 recorded over them. Speeds of 30-50cm s-1 for adults
	Connection to groundwater bodies	
River continuity	River depth and width variation	
Morphological condition	River depth and width variation	Up to 30cm gravel for spawning
	Structure and substrate of the river bed	Brook & Sea Lamprey larvae need beds where particles finer than 0.5mm occur. Gravels of 9.5-50.8mm must be present for nest construction.
	Structure of the riparian zone	Relevant
General Physico-chemical requirements: Transparency, Thermal conditions, Oxygenation conditions, Salinity, Acidification status, Nutrient Conditions	Transparency	
	Temperature	Ammocoetes of all 3 species active between 10-14 C. Critical period for spawning for River Lamprey 8.5-12C. Thermal niche for Sea Lamprey 17.8-21.8C Adults survive 4-20C. Peak migration 10-18C . Spawning 11-25C.
	Dissolved oxygen	
	Salinity	
	Electrical conductivity	
	pH	
	Alkalinity	
	Total phosphorus	
	Soluble reactive phosphorus	
	Total nitrogen	

Table 6 Habitat Quality Requirements for Lamprey Species

Atlantic Salmon

The conservation of Atlantic Salmon in the Blackwater catchment is considered to be of excellent status, A rating (Natura 2000 form for Blackwater SAC). The conservation limits for sustainability fisheries set by the North Atlantic Salmon Conservation Organisation, have been exceeded in the Blackwater catchment and therefore the population of salmon can be regarded as relatively healthy.

Habitat Requirements

Atlantic Salmon need unpolluted water and abundant food in a habitat that provides spawning areas, shelter and freedom of movement. The bed and soil of a natural river and the associated aquatic and riparian vegetation combine to provide the food chain on which fish depend. A natural river channel is characterised by the morphological features which are vital for the life cycle of fish: gravel shoals or reed beds for spawning, pools and riffles where fish rest and feed, and turbulent reaches which enhance oxygenation (Inland Fisheries Guidelines). Varying stages of the fishes life-cycle require different habitat conditions.

Eggs: Bottom habitats with a gravel or cobble riffle (redd) above or below a pool in rivers. Generally, the following conditions exist in the egg pits (redds): water temperatures below 10° C, and clean, well-oxygenated fresh water.

Larvae: Bottom habitats with a gravel or cobble riffle (redd) above or below a pool in rivers. Generally, the following conditions exist where Atlantic salmon larvae, or alevins/fry, are found: water temperatures below 10° C, and clean, well-oxygenated freshwater.

Juveniles: Bottom habitats of shallow gravel / cobble riffles interspersed with deeper riffles and pools in rivers and estuaries. Generally, the following conditions exist where Atlantic salmon parr are found: clean, well-oxygenated fresh water, water temperatures below 25° C, water depths between 10 cm and 61 cm, and water velocities between 30 and 92 cm per second. As they grow, parr transform into smolts. Atlantic salmon smolts require access downstream to make their way to the ocean. Upon entering the sea, "post-smolts" become pelagic.

Adults: For adult Atlantic salmon returning to spawn, habitats require resting and holding pools in rivers and estuaries. Returning Atlantic salmon require access to their natal streams and access to the spawning grounds. Generally, the following conditions exist where returning Atlantic salmon adults are found migrating to the spawning grounds: water temperatures below 22.8° C, and dissolved oxygen above 5 ppm. Oceanic adult Atlantic salmon are primarily pelagic.

Spawning Adults: Bottom habitats with a gravel or cobble riffle (redd) above or below a pool in rivers. Generally, the following conditions exist where spawning Atlantic salmon adults are found: water temperatures below 10° C, water depths between 30 cm and 61 cm, water velocities around 61 cm per second, and clean, well-oxygenated fresh water.

Atlantic salmon range through of the Blackwater and Clyda, including all tributaries, to the extent that they are currently or were historically accessible for salmon migration.

Predicted Impact to Atlantic Salmon

The Peastinagh River near the site does not have suitable spawning habitats for Atlantic Salmon.

The operational phase of this project will not directly impact the river-bed of the SAC river channel (the Clyda) and so suitable spawning habitat e.g. gravel bottoms and natural flow will be retained.

The water downstream of the development site is of good quality measured as Q4 by the EPA at Clyda Bridge Lower in both 2009 and 2012 during the operational phase of the development site. The water quality measured flowing north from the site in May 2014 meets Salmonid water quality, with only N levels only slightly elevated at 0.14mg/l, which is well below the sensitivity of the most sensitive salmonid the Rainbow trout at 0.2mg/l.

The risk of water of unacceptable nutrient status will be further reduced by the nutrient assimilative capacity of the Peastinagh River

Input of fines to a river may increase nutrient load and as salmonids are more sensitive to increased nutrient load than water turbidity or suspended solids all effort to minimise any input of fines from the site during the construction phase will be carried out.

Otters (*L. Lutra*)

Otters (*L. Lutra*) have not been found to utilise this site. No breeding holt, spraints or indication of otter usage is present in the vicinity of the works.

Impact to Otters

There will be no direct loss of habitat to otters occurring a result of the proposed development. There will be no severance or loss of connectivity of habitat for otters which will occur as a result of the development.

There will be no permanent impact to otters at the site as a result of the development.

See Section Stage 3E below for discussion of general impact to water quality.

Rivers	Quality Element	Parameter ranges if applicable
Biological quality elements:	Composition and abundance of aquatic flora	
	Composition and abundance of benthic invertebrate flora	
	Composition, abundance and age structure of Fish Fauna	Indirect effects on otter populations as if water quality is low then prey numbers low
Hydromorphological:		
Hydrological regime	Quantity & dynamics of water flow	
	Connection to groundwater bodies	
River continuity	River depth and width variation	
Morphological condition	River depth and width variation	
	Structure and substrate of the river bed	
	Structure of the riparian zone	
General Physico-chemical requirements: Transparency, Thermal conditions, Oxygenation conditions, Salinity, Acidification status, Nutrient Conditions	Transparency	
	Temperature	
	Dissolved oxygen	
	Salinity	
	Electrical conductivity	
	pH	
	Alkalinity	
	Total phosphorus	
	Soluble reactive phosphorus	
	Total nitrogen	
	Nitrate	
	Nitrite	
	Ammonium	
	Suspended solids	
	Turbidity	
	Total organic carbon (TOC)	
	Biochemical oxygen demand (BOD)	
Chemical oxygen demand (COD)		
Specific pollutants	Pollution by all priority substances identified as being discharged into the body of water	PCBs >16mg kg-1
	Pollution by other substances identified as being discharged in significant quantities into the body of water.	

Table 7 Habitat Quality Requirements Otters

Stage 3D – Analysis of “in combination” effects –i.e Nature and significance of any potential impacts on the qualifying interests of the Natura Site arising from the implementation of the project *in combination* with other plans & projects

The consideration of in combination effects has been limited to the geographical extent of the environs in the of the proposed scheme (approx 10km radius), with focus on known contributors to water quality impact.

Culmulative Impact Pressures

Drainage

Only small parts of the Blackwater catchment have been previously drained. This area of the catchment is 10s of kilometres from the Clyda, in the Awbeg catchment and even here, the extent is below the national risk assessment threshold of 50% of river length within the water body. No significant arterial drainage of the Clyda River valley has been conducted and the river channel follows a natural course for its length.

It is not expected that any cumulative effect will arise from the proposed development in association with drainage activities in the Clyda valley.

Barriers

No additional barrier to fish passage will be developed as a result of the development as proposed, so no cumulative impact is expected as a result of the proposed development.

Agriculture practices

Catchment land-use has a major effect on freshwater biodiversity and the maintenance of viable populations of native freshwater fish and macroinvertebrate species of rivers are dependent on appropriate catchment land management.

The principal agricultural land use of the Clyda Valley is grassland agriculture (Corine). The NS2 (2010) report however stated that higher resolution maps of agricultural land-use, including livestock density, fertiliser use, slurry spread grounds and application rates are required in order to assist the accurate identification of actual detailed catchment agricultural land use activities.

Carton *et al* (2008) highlighted that agricultural input of N and P are the principal drivers of eutrophication in Irish inland waterways, which impact on the species of conservation significance of the SAC. Nutrient sources in the landscape occur naturally from nutrient cycling in soils and from atmospheric deposition. However, in

terms of grassland agriculture the more important sources from both agronomic and environmental perspectives are those derived from inputs of fertiliser, N fixation, feed, minerals, manure and plant residues (Bundy et al., 2005). It is generally accepted that increasing nutrient inputs to agriculturally managed grassland soils create an increased potential source for nutrient loss and transfer to water. Carton et al (2008) provided evidence of the potential nutrient contributions from grassland soils to water such as those arising from elevated STP levels, grazing animals and both fertiliser and slurry spreading. It highlighted the importance of the physical and chemical properties of soils, which are characteristics of soil type, as determinants of the potential for nutrient loss and transfer to water.

As summarised in the Natura Impact Statement for RIVER BLACKWATER WWTP DISCHARGES –CERTIFICATES OF AUTHORISATION in County Cork (Ryan-Hanly 2011) There has been significant change in agricultural infrastructure and practices in recent years which should have the effect of dramatically reducing the agriculturally derived nutrient pressures on the Blackwater catchment including the Clyda catchment. In recent years much of the agricultural point source problem has been addressed through the investment of €2bn through the Farm Waste Management Scheme in on farm storage and management facilities. The Nitrates Action Plans (1 and 2) have led to a significant reduction in the level of chemical fertiliser usage, in particular phosphorus. In addition, restrictions on applications at vulnerable times of year have reduced losses to surface water. Similar improvements have occurred in the usage of organic manures. These improvements will continue to have a positive impact on water quality over many years as the nutrient to slow moving groundwater reduce and the proportion of soils which contain high levels of nutrient reduce. The level of awareness of farmers of best practice in nutrient management has improved dramatically due to participation in the Nitrates Action Programme.

Other deleterious impacts of agriculture to watercourses include chemical input from liming, and organic pesticides and herbicides which also have implications for the health of freshwater systems and the freshwater species of conservation interest.

Physical disturbance of soil may also lead to increased siltation and loss of fines to the river system, this can occur as the result of, overgrazing or poaching of soils by animal use adjacent to the watercourse, digging, ploughing or building activities.

The NS2 Report (2010) identified the following as main issues in relation to the Blackwater catchment:

- Insufficient or lack of fencing of agricultural land – within the Blackwater catchment this has resulted in increased erosion from the use of fords by both vehicles and animals, with subsequent increased siltation as trampled patches of bare sediment leads to the washing of silt into the river. Animals being allowed in or near the river channel may also lead to increased nutrient enrichment of the watercourse. Cummins et al (2010) highlight grazing pressure as a particular threat to the Blackwater with 'intensive cattle grazing' recorded in 57% of sections

surveyed and specifically, the risk posed by animals being allowed direct access to riparian areas and the water channel itself.

- Inadequate or no buffer or tree line in areas where the river channel is in close proximity to agriculture or forestry. This may result in nutrients or silt being washed directly into the channel from agricultural land or forestry (e.g. following ploughing or felling of trees).

Agriculture is the main source of total phosphorous inputs, mostly diffuse, to the Blackwater catchment (SWRBD, 2010b).

- Unmanaged ditches and drainage may also result in run-off of fines to the main channel. In relation to the above points, the effluent recorded from the Dromahane WWTP does not initially appear to be having an extended impact.

No significant discharges in relation to agricultural use occur in the Peastinagh/Clyda sub-catchment.

There will be no change to the agricultural usage of the fields surrounding the development. The site will be returned to agricultural pastureland on an ongoing phased basis throughout the operational phase of development.

Fencing will stop any animal usage or disturbance of the channels and thus it is unlikely that any additional cumulative effect will occur as a result of the proposed development. All tree lines vegetative buffers will be retained in the vicinity of the proposed development.

Fords

NS2 (2010) described six fords within the Blackwater catchment that have vehicular and animal access and could therefore cause siltation none of these is located in the vicinity of the proposed development.

No fords are located in the development area. Therefore no cumulative impact will occur as a result of ford usage in combination with the site

Abstractions

Abstraction is the permanent or temporary removal of water from a waterbody. As biological communities are adapted to natural flow regimes, unnaturally low or altered flows caused by water abstraction can have damaging impacts on river systems and their ecology.

For the Blackwater catchment, NS2 (2010) assigned a risk classification to each waterbody in terms of abstractions. One water body was classified a '1a' (at risk). Three waterbodies were assigned '1b' (probably at risk) one waterbody was assigned a '2a' (probably not at risk). A remaining ninety-three water bodies were classified as '2b' (not at risk).

The Clyda River is not considered to be at significant risk from water abstraction categorised as 1b (probably at risk). Some small scale local abstractions for water supply do occur along the river but these are tiny in comparison to the volume of water flowing in the river's main channel. The small scale of these abstractions has not historically caused systemic impact to the catchment, EPA water quality values remain good Q4 for the river.

It is not envisaged that this abstraction will cause a cumulative impact on the river ecology in tandem with other very small local abstractions from the Clyda River.

Forestry

Coniferous Forestry plantation can affect adjacent water quality through acidification of adjacent watercourses through needle fall, the physical effects of plantations (including drainage and ground preparation) and many other forest management practices such as thinning, felling, re-planting and creation of stream crossings (Lehane *et al* 2004).

However, forest stands in the Munster Blackwater Catchment are located mainly in the upper tributary catchments and many kilometres above the Freshwater Pearl Mussel populations (NS2, 2010). Pat Roche Coillte *pers comm.* noted that coniferous forestry plantation in this area of the Clyda catchment is located in the Bottle Hill uplands several kilometres from the proposed development site. No clear fell of these areas is planned to occur in the lifetime of the operation of this waste soil spreading activities at Ivybridge.

These Coillte forests are managed strictly within the forest fisheries guidelines to minimise any run-off or needle fall to watercourses and natural buffering of the watercourse ensures water quality is good on the proposed development site.

No cumulative impact is expected to occur as a result of the proposed development in association with forestry.

On-site waste water treatment systems

There is a wastewater treatment plant at Dromahane downstream of the proposed development and there are no significant wastewater treatment plants upstream of the proposed development.

No cumulative impact is expected to occur as a result of the proposed development in association with wastewater treatment plants.

Ongoing monitoring of water quality downstream of the Dromahane WWTP shows in EPA records that water quality remains good at Clyda Bridge Lower Q4, in 2009 and 2012 during the operation of both the WWTP and the Ivybridge soil spreading site.

Stage 3E – Impact Mitigation

Water Quality in relation to aquatic habitats and species

The current water quality of the Clyda River is recorded at Q4 by the EPA. High ecological quality is indicated by Q5, Q4-5 and Q1 indicates bad quality, Q4 equates to good quality.

Whilst some impairment is evident at Q4, primarily as a consequence of eutrophication, the ecological conditions at such locations are considered to be acceptable for salmonids, lamprey species, otters, and the habitat floating river vegetation. The status Q4 is marginal for freshwater pearl mussels, which favour highly oligotrophic systems.

Given that the Clyda River is assigned EPA good status based on monitoring at Clyda Bridge Lower (Q4 rated in 2009 and 2010) which is downstream of site the discharge the Mallow Contracts Site does not appear to be affecting the receiving water.

Mitigation measures proposed for incorporation into the project, to avoid the risk of the potential impacts

3E.1 Mitigation through avoidance

General mitigation

No machinery will operate in-stream.

The Wildlife Act (1976) and the Wildlife Amendment Act 2000 states that the removal of hedgerows or marginal vegetation should not occur from 1st of March 1st through August 31st. No bankside vegetation will be cut back during this time period. No hedgerows or treelines adjacent to watercourse will be impacted during the course of these works.

Mature trees within the river corridor will be retained.

Silt protection measures will be put in place to prior to site works (see details below).

No annexed habitats will be directly impacted by these works and the river-bed will remain intact.

No chemicals containing heavy metals toxic to aquatic life forms will be utilised during construction or operation periods.

3E.2 Mitigation during Site Works

Site Works Stage

Rainfall and associated surface water run-off during initial development of site infrastructure (track ways and hard stands) can mobilize and transport pollutants such as sediment, oils, chemicals and other building materials into the water environment causing harm to plants and animals. Heavy rainfall can also flood excavations and other work areas which subsequently require draining or de-watering.

When working in or near rivers, sites are more at risk of flooding from rising river levels.

Pollution from sediment and other pollutants can come from a number of sources (see below).

Impacts of pollution can include the following.

Sediment pollution can smother important river habitats such as fish spawning habitats

Pollution from fuels and other chemicals can have a variety of effects on fresh water ecology and can lead to fish and invertebrates being killed along long lengths of river.

Even very small amounts of material can be a pollutant. For example, five litres of oil can disperse to cover an area of water the size of four football pitches.

Potential sources of pollution on site

De-watering of excavations

Run-off from exposed ground and material stockpiles

Run-off from roads and haul routes

Plant washings/washing areas

Leaking/vandalised equipment

Limiting Silt or Fines deposition

See **Drawing 1 and 2**

Silt deposition down stream is of potential concern as a result of on site disturbance to land adjacent to the Peastinagh River and Martin during the initial development/operational phase of the project. Such release of silt into the river system may impact water quality and spawning beds down stream and all effort must be made to prevent such an eventuality. Any potential input of fines into the system may have an impact on spawning of Salmon and Lamprey species. It is therefore very important to keep any potential silt or fines loss form the site to a minimum, see details below.

Oil spill from machinery during construction is also a concern which must be mitigated against, see details below.

Minimising impact of Construction Stage:

Site Layout and Organisation General Fisheries Guidelines

The following measures are critical for preserving water quality and aquatic habitats.

1. Fuels, oils, greases and hydraulic fluids will not be stored on site. Refuelling of machinery, etc., should be carried out in bunded areas or off site.
2. Runoff from machine service must not enter the watercourse.
3. Stockpile areas for earth sands and gravel should be kept to minimum size in bunded areas, well away from the watercourse.
4. Runoff from the above should only be routed to the watercourse via suitably designed and sited settlement/containment ponds/filter channels (See Drawing 1 attached).
5. Settlement/containment ponds should be inspected and maintained regularly.
7. Watercourse banks should be left intact in every area possible. If they have to be disturbed, all practicable measures should be taken to prevent soils from entering the watercourse.

The natural riparian woodland and bankside vegetation which is adjacent to the watercourses on site must be retained wherever possible and retained during the course of the operational period of the soil spreading operation. This provides a natural buffer to run-off of fines from the site.

All drainage and sediment/silt traps should be in place before any works occur on site.

All works must be carried out in favourably dry weather conditions.

Surface Water Protection measures

It is acknowledged that ground preparation and associated works, (as proposed), have a potential to cause the release of sediments and various pollutants into the surrounding watercourses. Pollution of the adjacent freshwaters from poor on-site

practices could have a temporary negative impact on the fauna and flora of this surface water system.

A comprehensive and integrated approach for achieving watercourse protection during construction will be carried out. The guidelines outlined in the publication "Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites" are adopted for this development (<http://www.fishingireland.net/environment/fullconstructionanddevelopment.htm>).

The system of mitigation is devised based on these best practice fisheries guidelines and designed by Mescal & Associates.

Operational Phase minimising impact:

Site Layout and Organisation

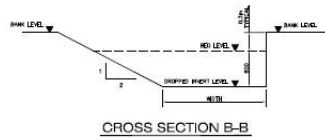
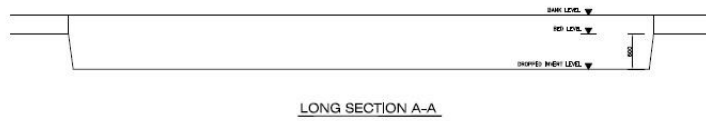
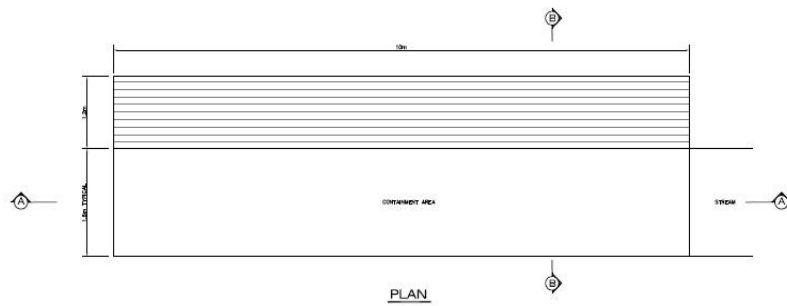
See **Drawing 1 and 2**

The following measures are critical for preserving water quality and aquatic habitats and will be implemented on the site during the construction phase

1. Fuels, oils, greases and hydraulic fluids will not be stored on site. No refuelling of machinery, etc., will be carried out on site.
2. Runoff from hardstand areas is directed to main drainage and intercepted by soil water containments at both north and south of the site. Filled drainage channels are protected from contamination by use of terram see Drawing 2.
3. Stockpile areas for soils, sands and gravel (waste earths) will be kept in bunded areas, well away from the watercourse see Drawing 1.
4. Runoff from the above will only be routed to the watercourse via suitably designed and sited drainage, filter channels and settlement/containment ponds. To this end silt traps will be provided. These will be located on the line of the site drainage channel— one at the northern end and one at the southern end, controlling silt returning to the adjacent watercourses and in relation to the Blackwater SAC the Peastinagh River (see Drawing 1).
5. Guidelines recommend that settlement ponds will be inspected and maintained regularly. Silt will thus accumulate in the containment area a safe distance away from any watercourse to ensure that no silt runs off to the adjacent watercourses/rivers. On drying and completion the pit will be filled in, top-soiled and re-seeded with an appropriate agricultural grass mix as advocated for general re-vegetation of the site
6. The principal watercourse banks of the Peastinagh River will be left intact at the site.
7. The entrance at the north end of the site is equipped with a wheelwash and spray. This is for vehicles exiting the site to ensure cleanliness upon re-entering the public road, soiled water from this activity is directed to the northern soil water containments.

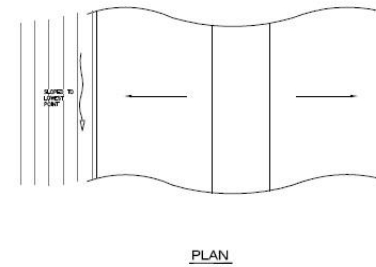
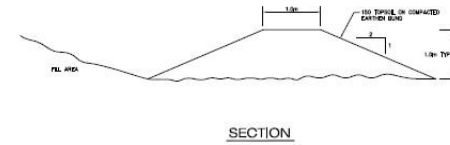
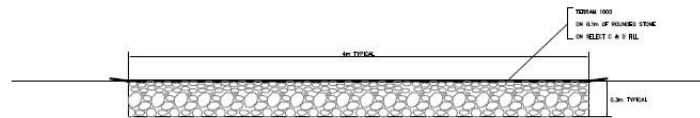
8. Re-vegetation of the site will occur as soon as possible after soil spreading as detailed below rapid re-vegetation is the best mechanism to ensure control of runoff from the soil spread areas, see details outlined below.

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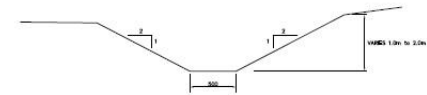


- NOTE-
- DETAILS MATERIAL EXCAVATED OUT AND REPOSED IN FILL AREA EXCEPTED (MATERIAL TO BE FILL CONSTRUCTION EXCEPTED AT INTERVALS)
 - 1 NO. AT OUTFALL TO RIVER BANKS
 - 1 NO. AT OUTFALL TO RIVER FEATHERSIDE

DETAILS OF SOILED WATER CONTAINMENT MEASURES



BUND AT SOUTHERN END



NEW DRAINAGE DITCH LINKING TO EXISTING STREAM (HEAD OF PEASTINGAGH RIVER) BESIDE N20

Drawing 2 Details of soiled water infrastructure

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Trackway run-off

All surface water collected from the access track drainage will be treated in a sustainable manner to minimize the impact on water quality and prevent habitat degradation, and surface water drained via dedicated drainage channels to the soil water containment ponds on site (see Drawing.1 and 2)

Re-vegetation On Site Restoration Measures

As part of the waste licence agreement for the site a re-vegetation programme was put in place. Re-vegetation is the best way to ensure the prevention and ongoing control of any run-off of fines from the earth spreading areas to the adjacent water courses.

As soon as is practicable following completion of the waste soil spreading activities, the site is re-seeded with grass and the land returned to beneficial agricultural use. Prior to seeding, topsoil is spread evenly over the site to a minimum depth, after compaction and firming, of 225 mm. The topsoil is good quality medium loam, and complies with BS882: 1991. The topsoil is not spread in wet conditions. The topsoil is always adequately prepared for seeding by raking or harrowing, and by rolling. Only certified quality grass seed is used. Seed is spread at a minimum rate of 40 grams per square meter. Seeding takes place only during appropriate weather conditions.

Conclusion

Finding of No Significant Effect

Considering the scale of the proposed development, the temporary nature of the site works and the fact that no instream works will occur and the mitigations proposed for limiting any impact during works and operational it is highly unlikely that any significant negative effect will accrue to habitats or species for which the Blackwater SAC is selected as a result of this development.

It is envisaged that there will be no loss of habitat or species as a result of the proposed development. No fragmentation of species or habitats will accrue. There will be no disruption or any significant disturbance to species life cycle. There will be no significant change to any key element of the natura site as a result of this development.

It is therefore concluded that no significant effect will result to this protected site as a result of the proposed development at the site.

Contributing Experts

+

Mary O'Connor

Ecologist

Michael Mescal

Engineer

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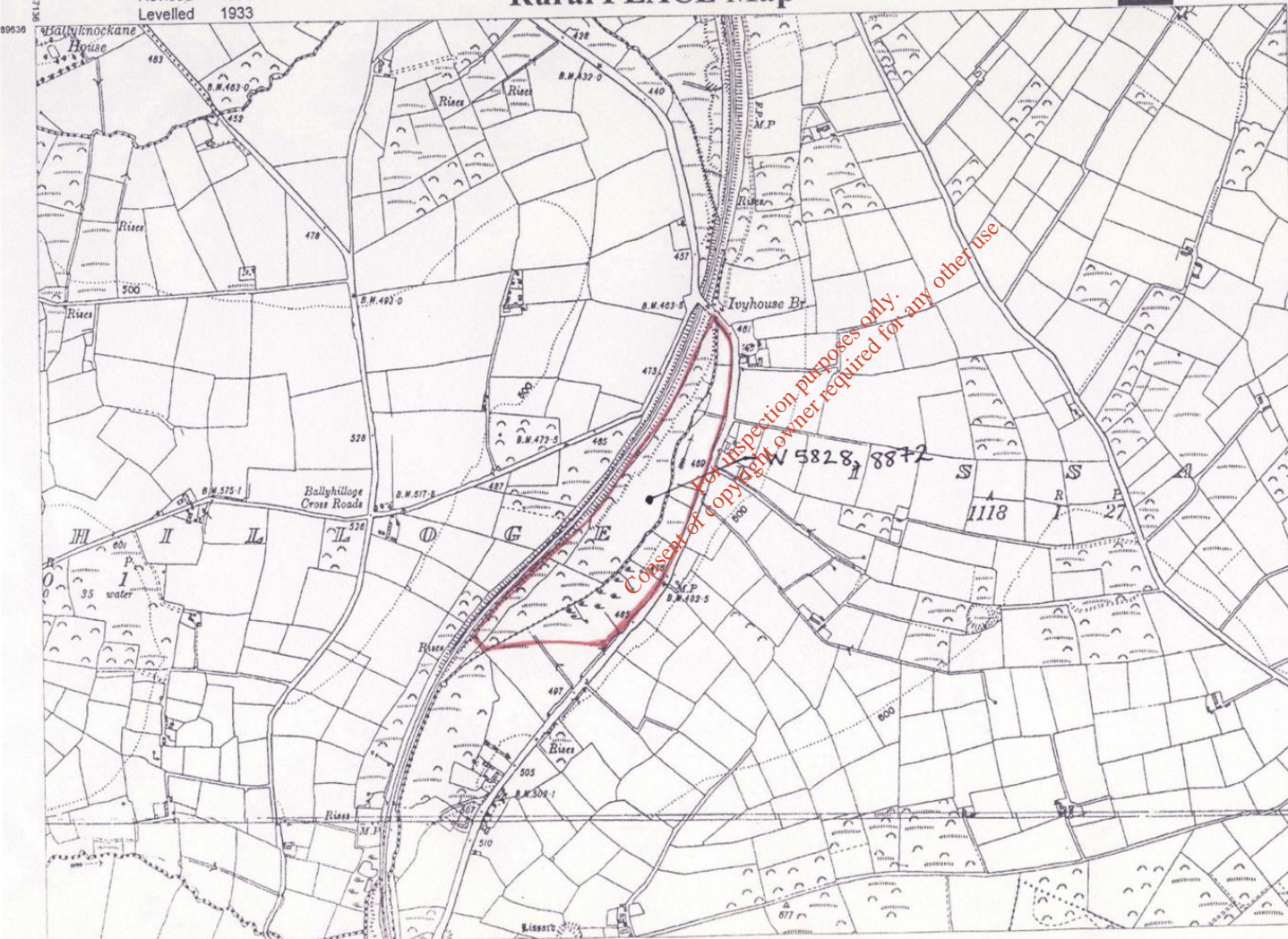
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Surveyed 1842
 Revised 1932-1933
 Levelled 1933

Rural PLACE Map



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ITM CENTRE PT COORDS
 558326,588787

DESCRIPTION

MAP SHEETS

6 inch
 CK042 CK051



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 Cork City, Co. Cork
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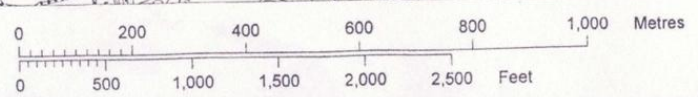
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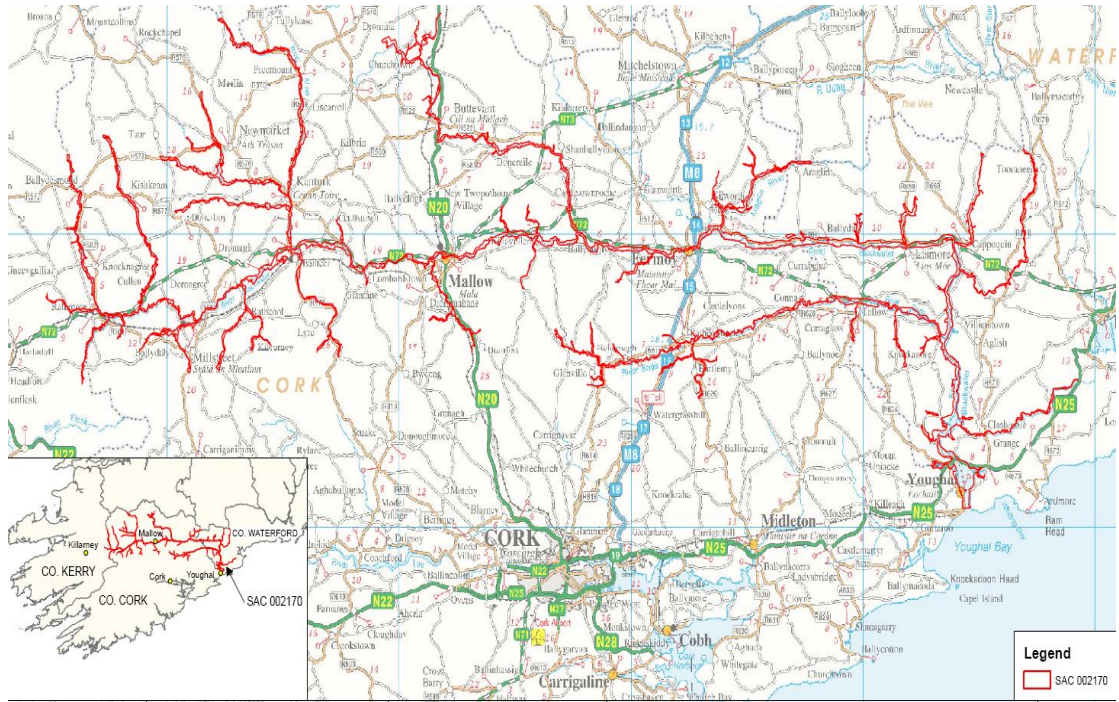
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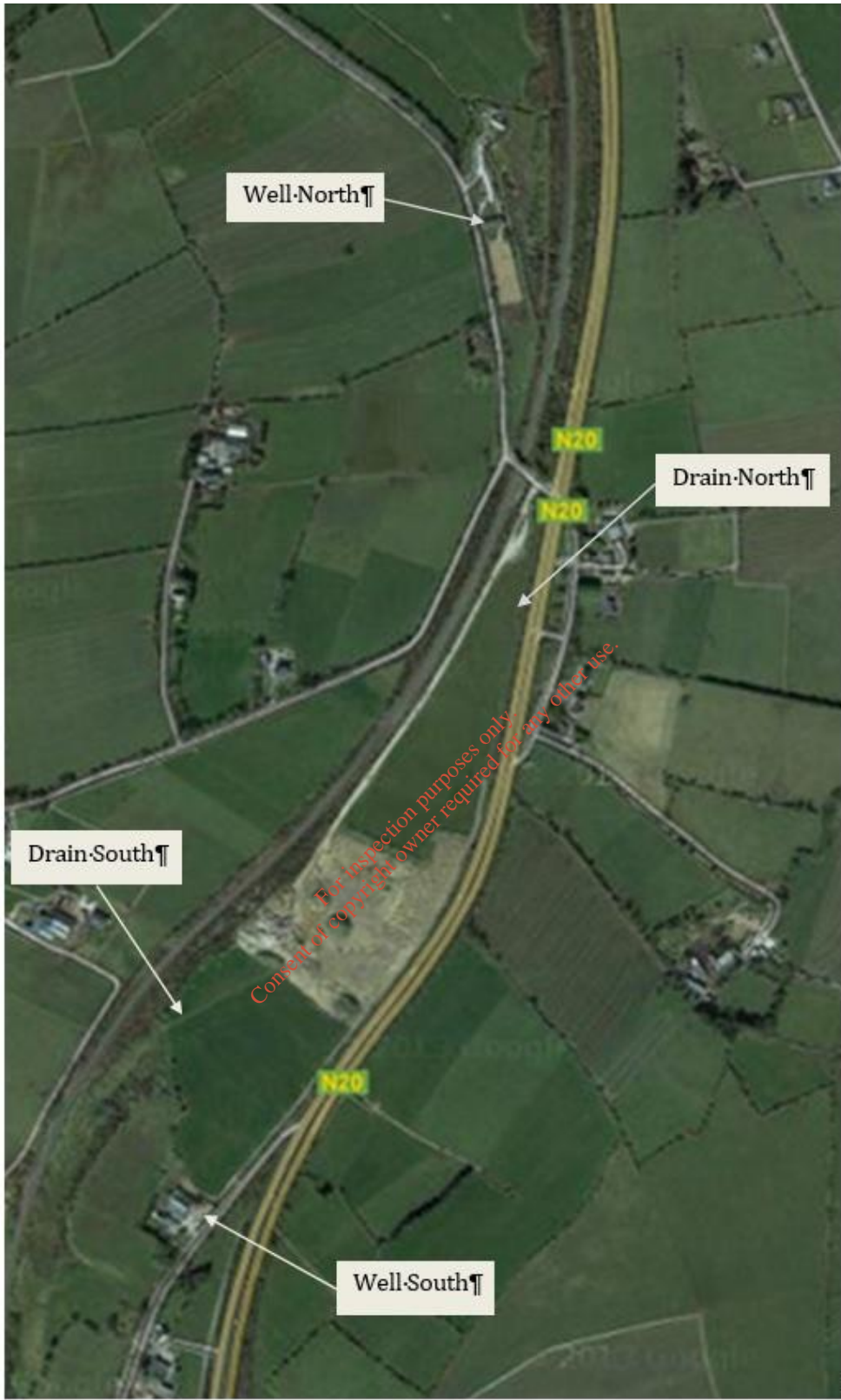


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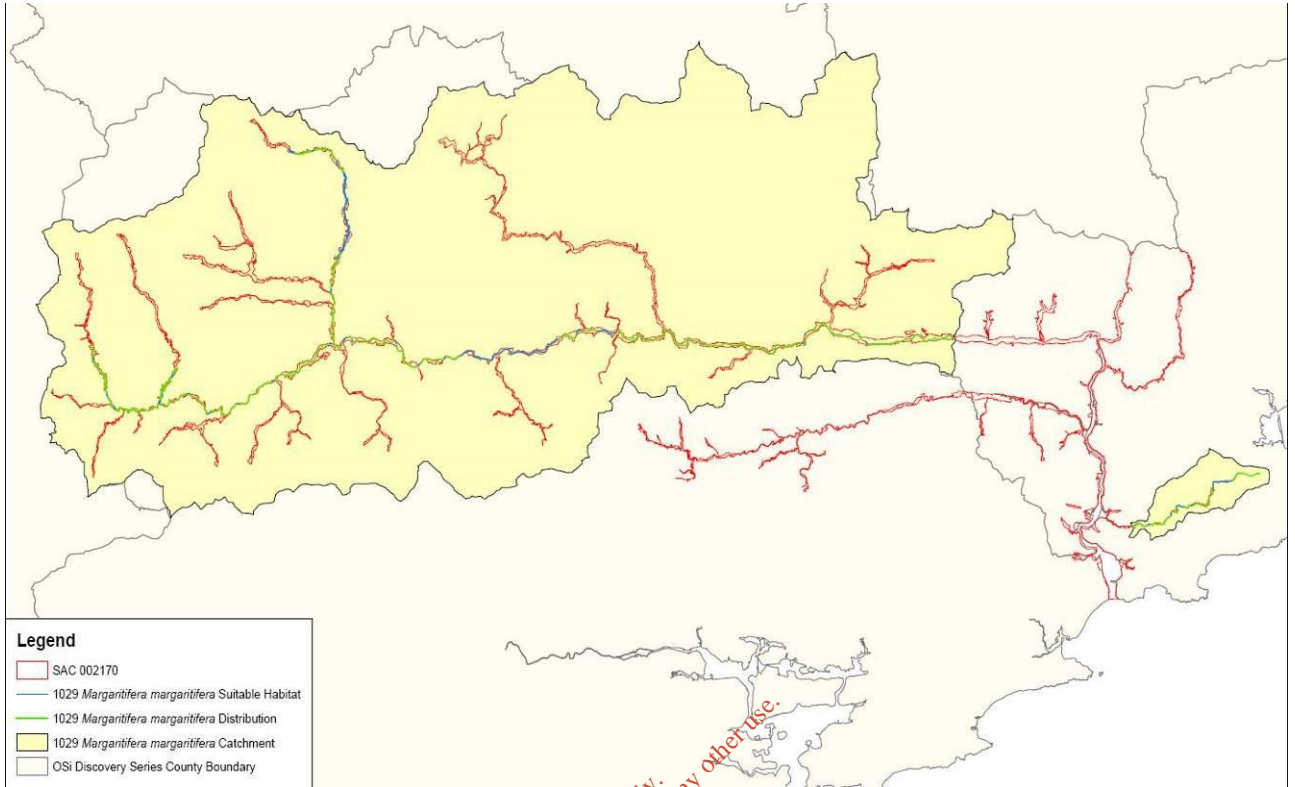
Appendix 2 Extent of Blackwater SAC 002170

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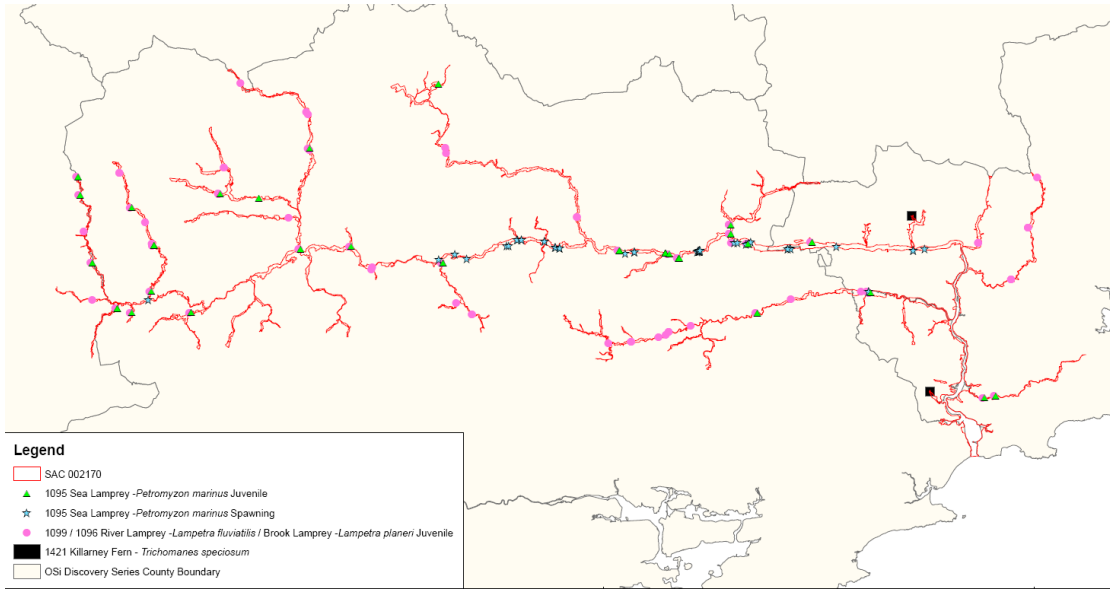
SAMPLE-LOCATIONS

Appendix 3 Water Chemistry Sample locations Ivybridge



Appendix 4 Distribution of Freshwater Pearl Mussel in the Blackwater SAC

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Appendix 5 Distribution of Lamprey species in the Blackwater SAC

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Guidance which has been followed in determining magnitude and significance of impacts as well as in proposing mitigation measures include:

Guidelines for Ecological Impact Assessment in the United Kingdom (Institute of Ecology and Environmental Assessment, 2006)

Environmental Construction Guidelines Series (National Roads Authority 2005-2009)

Approach to Assessing Impacts in this Natura Impact Statement

Impact assessment requires the identification of the type and magnitude of potential impacts. In this NIS impacts are characterized according to the criteria in Table 1 as per IEEM guidance (IEEM, 2006).

Table 1 Characterisation of impacts

Parameter	Categories
Type of impact	Positive/ Negative
Magnitude of impact	'Size' or 'amount' of impact e.g. number of Otters likely to be displaced or total area of particular habitat to be removed.
Extent	Area over which impact occurs (may be the same as magnitude if whole habitat impacted)
Duration & Reversibility	Time over which impact is expected to last, and the capacity of the receptor to recover to its baseline state. Duration is quantified as follows (EPA, 2002): Temporary: up to 1 year, Short-term: from 1-7 years, Medium-term: 7-15 years, Long-term: 15-60 years, Permanent: over 60 years
Timing and frequency	Timing of impacts in relation to relevant life-stages or seasons (e.g. Salmon spawning or migration periods), The frequency of an activity and hence the resulting impact should also be considered. E.g. a single person walking a

dog may have limited effect on nearby waders using wetland habitat, however, many walkers on repeated occasions are likely to subject the waders to a higher level of impact.

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Appendix 6 Photographic Record



Photo View of Mallow Contracts site showing Haul Road and Vegetated Riparian corridor of Peastinagh to the left of the Photo.

Appendix 7

SITE SYNOPSIS

SITE NAME: BLACKWATER RIVER (CORK/WATERFORD)

SITE CODE: 002170

The River Blackwater is one of the largest rivers in Ireland, draining a major part of Co. Cork and five ranges of mountains. In times of heavy rainfall the levels can fluctuate widely by more than 12 feet on the gauge at Careysville. The peaty nature of the terrain in the upper reaches and of some of the tributaries gives the water a pronounced dark colour. The site consists of the freshwater stretches of the River Blackwater as far upstream as Ballydesmond, the tidal stretches as far as Youghal Harbour and many tributaries, the larger of which includes the Licky, Bride, Flesk, Chimneyfield, Finisk, Clyda, Awbeg (Buttevant), Clyda, Glen, Allow, Dalua, Brogeen, Rathcool, Finnow, OwentClyda and Awnaskirtaun. The extent of the Blackwater and its tributaries in this site, flows through the counties of Kerry, Cork, Limerick, Tipperary and Waterford. Towns along, but not in the site, include Rathmore, Millstreet, Kanturk, Banteer, Mallow, Buttevant, Doneraile, Castletownroche, Fermoy, Ballyduff, Rathcormac, Tallow, Lismore, Cappoquin and Youghal.

The Blackwater rises in boggy land of east Kerry, where Namurian grits and shales build the low heather-covered plateaux. Near Kanturk the plateaux enclose a basin of

productive Coal Measures. On leaving the Namurian rocks the Blackwater turns eastwards along the northern slopes of the Boggeraghs before entering the narrow limestone strike vale at Mallow. The valley deepens as first the Nagles Mountains and then the Knockmealdowns impinge upon it. Interesting geological features along this stretch of the Blackwater Valley include limestone cliffs and caves near the villages and small towns of Killavullen and Ballyhooly; the Killavullen caves contain fossil material from the end of the glacial period. The associated basic soils in this area support the growth of plant communities which are rare in Cork because in general the county's rocks are acidic. At Cappoquin the river suddenly turns south and cuts through high ridges of Old Red Sandstone. The Clyda valley is predominantly underlain by sandstone, with limestone occurring in the lower reaches near Fermoy.

The site is a candidate SAC selected for alluvial wet woodlands and Yew wood, both priority habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected as a candidate SAC for floating river vegetation, estuaries, tidal mudflats, *Salicornia* mudflats, Atlantic salt meadows, Mediterranean salt meadows, perennial vegetation of stony banks and old Oak woodlands, all habitats listed on Annex I of the

E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive - Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Crayfish, Twaite Shad, Atlantic Salmon, Otter and the Killarney Fern.

Wet woodlands are found where river embankments, particularly on the River Bride, have broken down and where the channel edges in the steep-sided valley between

Cappoquin and Youghal are subject to daily inundation. The river side of the embankments was often used for willow growing in the past (most recently at Cappoquin) so that the channel is lined by narrow woods of White and Almondleaved

Willow (*Salix alba* and *S. triandra*) with isolated Crack Willow (*S. fragilis*) and Osier (*S. viminalis*). Grey Willow (*S. cinerea*) spreads naturally into the sites and occasionally, as at Villierstown on the Blackwater and Sapperton on the Bride, forms woods with a distinctive mix of woodland and marsh plants, including Gypsywort (*Lycopus europaeus*), Guelder Rose (*Viburnum opulus*), Bittersweet (*Solanum dulcamara*) and various mosses and algae. These wet woodlands form one of the most extensive tracts of the wet woodland habitat in the country.

A small stand of Yew (*Taxus baccata*) woodland, a rare habitat in Ireland and the EU, occurs within the site. This is on a limestone ridge at Dromana, near Villierstown.

While there are some patches of the wood with a canopy of Yew and some very old trees, the quality is generally poor due to the dominance of non-native and invasive species such as Sycamore, Beech and Douglas Fir (*Pseudotsuga menziesii*).

However, the future prospect for this Yew wood is good as the site is proposed for restoration under a Coillte EU Life Programme. Owing to its rarity, Yew woodland is listed with priority status on Annex I of the EU Habitats Directive.

Marshes and reedbeds cover most of the flat areas beside the rivers and often occur in

mosaic with the wet woodland. Common Reed (*Phragmites australis*) is ubiquitous and is harvested for thatching. There is also much Marsh Marigold (*Caltha palustris*) and, at the edges of the reeds, the Greater and Lesser Pond-sedge (*Carex riparia* and *C. acutiformis*). Hemlock Water-dropwort (*Oenanthe crocata*), Wild Angelica (*Angelica sylvestris*), Reed Canary-grass (*Phalaris arundinacea*), Meadowsweet (*Filipendula ulmaria*), Nettle (*Urtica dioica*), Purple Loosestrife (*Lythrum salicaria*), Marsh Valerian (*Valeriana officinalis*), Water Mint (*Mentha aquatica*) and Water Forget-me-not (*Myosotis scorpioides*).

At Banteer there are a number of hollows in the sediments of the floodplain where subsidence and subterranean drainage have created isolated wetlands, sunk below the

level of the surrounding fields. The water rises and falls in these holes depending on the watertable and several different communities have developed on the acidic or neutral sediments. Many of the ponds are ringed about with Grey Willows, rooted in the mineral soils but sometimes collapsed into the water. Beneath the densest stands

are woodland herbs like Yellow Pimpernel (*Lysimachia nemorum*) with locally abundant Starwort (*Callitriche stagnalis*) and Marsh Ragwort (*Senecio palustris*). One of the depressions has Silver Birch (*Betula pendula*), Ash (*Fraxinus excelsior*), Crab Apple (*Malus sylvestris*) and a little Oak (*Quercus robur*) in addition to the willows.

Floating river vegetation is found along much of the freshwater stretches within the site. The species list is quite extensive and includes Pond Water-crowfoot (*Ranunculus peltatus*), Water-crowfoot (*Ranunculus* spp.), Canadian Pondweed (*Elodea canadensis*), Broad-leaved Pondweed (*Potamogeton natans*), Pondweed (*Potamogeton* spp.), Water Milfoil (*Myriophyllum* spp.), Common Club-rush (*Scirpus*

lacustris), Water-starwort (*Callitriche* spp.), Lesser Water-parsnip (*Berula erecta*) particularly on the Awbeg, Water-cress (*Nasturtium officinale*), Hemlock Waterdropwort,

Fine-leaved Water-dropwort (*O. aquatica*), Common Duckweed (*Lemna minor*), Yellow Water-lily (*Nuphar lutea*), Unbranched Bur-reed (*Sparganium emersum*) and the moss *Fontinalis antipyretica*.

The grassland adjacent to the rivers of the site is generally heavily improved, although

liable to flooding in many places. However, fields of more species-rich wet grassland with species such as Yellow-flag (*Iris pseudacorus*), Meadow-sweet, Meadow Buttercup (*Ranunculus acris*) and rushes (*Juncus* spp.) occur occasionally.

Extensive fields of wet grassland also occur at Annagh Bog on the Awbeg. These fields are dominated by Tufted Hair-grass (*Deschampsia cespitosa*) and rushes.

The Blackwater Valley has a number of dry woodlands; these have mostly been managed by the estates in which they occur, frequently with the introduction of Beech

(*Fagus sylvatica*) and a few conifers, and sometimes of Rhododendron (*Rhododendron ponticum*) and Laurel. Oak woodland is well developed on sandstone about Ballinatray, with the acid Oak woodland community of Holly (*Ilex aquifolium*), Bilberry (*Vaccinium myrtillus*), Greater Woodrush (*Luzula sylvatica*) and Buckler Ferns (*Dryopteris affinis*, *D. aemula*) occurring in one place. Irish Spurge (*Euphorbia hyberna*) continues eastwards on acid rocks from its headquarters to the west but there are many plants of richer soils, for example Wood Violet (*Viola reichenbachiana*), Goldilocks (*Ranunculus auricomus*), Broad-leaved Helleborine (*Epipactis helleborine*) and Red Campion (*Silene dioica*). Oak woodland is also found in Rincrew, Carrigane, Glendine, Newport and Dromana. The spread of Rhododendron is locally a problem, as is over-grazing. A few limestone rocks stand over the river in places showing traces of a less acidic woodland type with Ash, False Brome (*Brachypodium sylvaticum*) and Early-purple Orchid (*Orchis mascula*).

In the vicinity of Lismore, two deep valleys cut in Old Red Sandstone join to form the Owenashad River before flowing into the Blackwater at Lismore. These valleys retain something close to their original cover of Oak with Downy Birch (*Betula pubescens*), Holly and Hazel (*Corylus avellana*) also occurring. There has been much planting of Beech (as well as some of coniferous species) among the Oak on the shallower slopes and here both Rhododendron and Cherry Laurel (*Prunus laurocerasus*) have invaded the woodland.

The Oak wood community in the Lismore and Glenmore valleys is of the classical upland type, in which some Rowan (*Sorbus aucuparia*) and Downy Birch occur. Honeysuckle (*Lonicera periclymenum*) and Ivy (*Hedera helix*) cover many of the trees while Greater Woodrush, Bluebell (*Hyacinthoides non-scripta*), Wood Sorrel (*Oxalis acetosella*) and, locally, Bilberry dominate the ground flora. Ferns present on the site include Hard Fern (*Blechnum spicant*), Male Fern (*Dryopteris filix-mas*), Buckler Ferns (*D. dilatata*, *D. aemula*) and Lady Fern (*Athyrium filix-femina*). There are many mosses present and large species such as *Rhytidiadelphus* spp., *Polytrichum*

formosum, *Mnium hornum* and *Dicranum* spp. are noticeable. The lichen flora is

important and includes 'old forest' species which imply a continuity of woodland here

since ancient times. Tree Lungwort (*Lobaria* spp.) is the most conspicuous and is widespread.

The Clyda valley consists predominantly of broadleaved woodland. Oak and Beech are joined by Hazel, Wild Cherry (*Prunus avium*) and Goat Willow (*Salix caprea*).

The ground flora is relatively rich with Pignut (*Conopodium majus*), Wild Garlic (*Allium ursinum*), Garlic Mustard (*Alliaria petiolata*) and Wild Strawberry (*Fragaria vesca*). The presence of Ivy Broomrape (*Orobanche hederaceae*), a local species within Ireland, suggests that the woodland, along with its attendant Ivy is long established.

Along the lower reaches of the Awbeg River, the valley sides are generally cloaked with mixed deciduous woodland of estate origin. The dominant species is Beech, although a range of other species are also present, e.g. Sycamore (*Acer pseudoplatanus*), Ash and Horse-chestnut (*Aesculus hippocastanum*). In places the alien invasive species, Cherry Laurel, dominates the understorey. Parts of the woodlands are more semi-natural in composition, being dominated by Ash with Hawthorn (*Crataegus monogyna*) and Spindle (*Euonymus europaea*) also present. However, the most natural areas of woodland appear to be the wet areas dominated by

Alder and willows (*Salix* spp.). The ground flora of the dry woodland areas features species such as Pignut, Wood Avens (*Geum urbanum*), Ivy and Soft Shield-fern (*Polystichum setiferum*), while the ground flora of the wet woodland areas contains characteristic species such as Remote Sedge (*Carex remota*) and Opposite-leaved Golden-saxifrage (*Chrysosplenium oppositifolium*).

In places along the upper Bride, scrubby, semi-natural deciduous woodland of Willow, Oak and Rowan occurs with abundant Great Woodrush in the ground flora. The Bunaglanna River passes down a very steep valley, flowing in a north-south direction to meet the Bride River. It flows through blanket bog to heath and then scattered woodland. The higher levels of moisture here enable a vigorous moss and fern community to flourish, along with a well-developed epiphyte community on the tree trunks and branches.

At Banteer a type of wetland occurs near the railway line which offers a complete contrast to the others. Old turf banks are colonised by Royal Fern (*Osmunda regalis*) and Eared Willow (*Salix aurita*) and between them there is a sheet of Bottle Sedge (*Carex rostrata*), Marsh Cinquefoil (*Potentilla palustris*), Bogbean (*Menyanthes trifoliata*), Marsh St. John's-wort (*Hypericum elodes*) and the mosses *Sphagnum auriculatum* and *Aulacomnium palustre*. The cover is a scraw with characteristic species like Marsh Willowherb (*Epilobium palustre*) and Marsh Orchid (*Dactylorhiza incarnata*).

The soil high up the Lismore valleys and in rocky places is poor in nutrients but it becomes richer where streams enter and also along the valley bottoms. In such sites Wood Speedwell (*Veronica montana*), Wood Anemone (*Anemone nemorosa*), Enchanter's Nightshade (*Circaea lutetiana*), Barren Strawberry (*Potentilla sterilis*) and Shield Fern occur. There is some Wild Garlic, Three-nerved Sandwort (*Moehringia trinervia*) and Early-purple Orchid (*Orchis mascula*) locally, with Opposite-leaved Golden-saxifrage, Meadowsweet and Bugle in wet places. A Hazel stand at the base of the Glenakeeffe valley shows this community well.

The area has been subject to much tree felling in the recent past and re-sprouting stumps have given rise to areas of bushy Hazel, Holly, Rusty Willow (*Salix cinerea* subsp. *oleifolia*) and Downy Birch. The ground in the clearings is heathy with Heather (*Calluna vulgaris*), Slender St John's-wort (*Hypericum pulchrum*) and the occasional Broom (*Cytisus scoparius*) occurring.

The estuary and the other Habitats Directive Annex I habitats within it form a large component of the site. Very extensive areas of intertidal flats, comprised of substrates ranging from fine, silty mud to coarse sand with pebbles/stones are present.

The main expanses occur at the southern end of the site with the best examples at Kinsalebeg in Co. Waterford and between Youghal and the main bridge north of it across the river in Co. Cork. Other areas occur along the tributaries of the Licky in east Co. Waterford and Glendine, Newport, Bride and Killahaly Rivers in Waterford west of the Blackwater and large tracts along the Tourig River in Co. Cork. There are narrow bands of intertidal flats along the main river as far north as Camphire Island. Patches of green algae (filamentous, *Ulva* species and *Enteromorpha* sp.) occur in places, while furoid algae are common on the more stony flats even as high upstream as Glenassy or Coneen.

The area of saltmarsh within the site is small. The best examples occur at the mouths of the tributaries and in the townlands of Foxhole and Blackbog. Those found are generally characteristic of Atlantic salt meadows. The species list at Foxhole consists of Common Saltmarsh-grass (*Puccinellia maritima*), small amounts of Greater Seaspurrey

(*Spergularia media*), Glasswort (*Salicornia* sp.), Sea Arrowgrass (*Triglochin maritima*), Annual Sea-blite (*Suaeda maritima*) and Sea Purslane (*Halimione portulacoides*) - the latter a very recent coloniser - at the edges. Some Sea Aster (*Aster tripolium*) occurs, generally with Creeping Bent (*Agrostis stolonifera*). Sea Couch-grass (*Elymus pycnanthus*) and small isolated clumps of Sea Club-rush (*Scirpus maritimus*) are also seen. On the Tourig River additional saltmarsh species found include Lavender (*Limonium* spp.), Sea Thrift (*Armeria maritima*), Red Fescue (*Festuca rubra*), Common Scurvy-grass (*Cochlearia officinalis*) and Sea Plantain (*Plantago maritima*). Oraches (*Atriplex* spp.) are found on channel edges.

The shingle spit at Ferrypoint supports a good example of perennial vegetation of stony banks. The spit is composed of small stones and cobbles and has a well developed and diverse flora. At the lowest part, Sea Beet (*Beta vulgaris*), Curled Dock (*Rumex crispus*) and Yellow-horned Poppy (*Glaucium flavum*) occur with at a slightly higher level Sea Mayweed (*Tripleurospermum maritimum*), Cleavers (*Galium aparine*), Rock Samphire (*Crithmum maritimum*), Sandwort (*Honkenya peploides*), Spear-leaved Orache (*Atriplex prostrata*) and Babington's Orache (*A. glabriuscula*). Other species present include Sea Rocket (*Cakile maritima*), Herb Robert (*Geranium robertianum*), Red Fescue (*Festuca rubra*) and Kidney Vetch (*Anthyllis vulneraria*). The top of the spit is more vegetated and includes lichens and bryophytes (including *Tortula ruraliformis* and *Rhytidiadelphus squarrosus*).

The site supports several Red Data Book plant species, i.e. Starved Wood Sedge (*Carex depauperata*), Killarney Fern (*Trichomanes speciosum*), Pennyroyal (*Mentha pulegium*), Bird's-nest Orchid (*Neottia nidus-avis*), Golden Dock (*Rumex maritimus*)

and Bird Cherry (*Prunus padus*). The first three of these are also protected under the Flora (Protection) Order 1999. The following plants, relatively rare nationally, are also found within the site: Toothwort (*Lathraea squamaria*) associated with woodlands on the Awbeg and Blackwater; Summer Snowflake (*Leucojum aestivum*) and Flowering Rush (*Butomus umbellatus*) on the Blackwater; Common Calamint (*Calamintha ascendens*), Red Campion (*Silene dioica*), Sand Leek (*Allium scorodoprasum*) and Wood Club-rush (*Scirpus sylvaticus*) on the Awbeg.

The site is also important for the presence of several Habitats Directive Annex II animal species, including Sea Lamprey (*Petromyzon marinus*), Brook Lamprey (*Lampetra planeri*), River Lamprey (*L. fluviatilis*), Twaite Shad (*Alosa fallax fallax*), Freshwater Pearl-mussel (*Margaritifera margaritifera*), Otter (*Lutra lutra*) and Salmon (*Salmo salar*). The Awbeg supports a population of White-clawed Crayfish (*Austropotamobius pallipes*). This threatened species has been recorded from a number of locations and its remains are also frequently found in Otter spraints, particularly in the lower reaches of the river. The freshwater stretches of the Blackwater and Bride Rivers are designated salmonid rivers.

The Blackwater is noted for its enormous run of salmon over the years. The river is characterised by mighty pools, lovely streams, glides and generally, a good push of water coming through except in very low water. Spring salmon fishing can be carried out as far upstream as Fermoy and is very highly regarded especially at Careysville. The Bride, main Blackwater upstream of Fermoy and some of the tributaries are more associated with grilse fishing.

The site supports many of the mammal species occurring in Ireland. Those which are listed in the Irish Red Data Book include Pine Marten, Badger and Irish Hare. The bat species Natterer's Bat, Daubenton's Bat, Whiskered Bat, Brown Long-eared Bat and Pipistrelle, are to be seen feeding along the river, roosting under the old bridges and in old buildings.

Common Frog, a Red Data Book species that is also legally protected (Wildlife Act, 1976), occurs throughout the site. The rare bush cricket, *Metrioptera rosellii* (Orthoptera: Tettigoniidae), has been recorded in the reed/willow vegetation of the river embankment on the Lower Blackwater River. The Swan Mussel (*Anodonta cygnea*), a scarce species nationally, occurs at a few sites along the freshwater stretches of the Blackwater.

Several bird species listed on Annex I of the E.U. Birds Directive are found on the site. Some use it as a staging area, others are vagrants, while others use it more regularly. Internationally important numbers of Whooper Swan (average peak 174, 1994/95-95/96) and nationally important numbers Bewick's Swan (average peak 5, 1996/97-2000/01) use the Blackwater Callows. Golden Plover occur in regionally important numbers on the Blackwater Estuary (average peak 885, 1984/85-86/87) and

on the River Bride (absolute max. 2141, 1994/95). Staging Terns visit the site annually (Sandwich Tern (>300) and Arctic/Common Tern (>200), average peak 1974-1994). The site also supports populations of the following: Red Throated Diver, Great Northern Diver, Barnacle Goose, Ruff, Wood Sandpiper and Greenland Whitefronted

Goose. Three breeding territories for Peregrine Falcon are known along the

Blackwater Valley. This, the Awbeg and the Bride River are also thought to support at least 30 pairs of Kingfisher. Little Egret now breed at the site (12 pairs in 1997, 19 pairs in 1998) and this represents about 90% of the breeding population in Ireland. The site holds important numbers of wintering waterfowl. Both the Blackwater Callows and the Blackwater Estuary Special Protection Areas (SPAs) hold internationally important numbers of Black-tailed Godwit (average peak 847, 1994/95-95/96 on the callows, average peak 845, 1974/75-93/94 in the estuary). The Blackwater Callows also hold Wigeon (average peak 2752), Teal (average peak 1316), Mallard (average peak 427), Shoveler (average peak 28), Lapwing (average peak 880), Curlew (average peak 416) and Black-headed Gull (average peak 396) (counts from 1994/95-95/96). Numbers of birds using the Blackwater Estuary, given as the mean of the highest monthly maxima over 20 years (1974-94), are Shelduck (137 +10 breeding pairs), Wigeon (780), Teal (280), Mallard (320 + 10 breeding pairs), Goldeneye (11-97), Oystercatcher (340), Ringed Plover (50 + 4 breeding pairs), Grey Plover (36), Lapwing (1680), Knot (150), Dunlin (2293), Snipe (272), Black-tailed Godwit (845), Bar-tailed Godwit (130), Curlew (920), Redshank (340), Turnstone (130), Black-headed Gull (4000) and Lesser Black-backed Gull (172). The greatest numbers (75%) of the wintering waterfowl of the estuary are located in the Kinsalebeg area on the east of the estuary in Co. Waterford. The remainder are concentrated along the Tourig Estuary on the Co. Cork side.

The river and river margins also support many Heron, non-breeding Cormorant and Mute Swan (average peak 53, 1994/95-95/96 in the Blackwater Callows). Heron occurs all along the Bride and Blackwater Rivers - 2 or 3 pairs at Dromana Rock; c. 25 pairs in the woodland opposite; 8 pairs at Ardsallagh Wood and c. 20 pairs at Rincrew Wood have been recorded. Some of these are quite large and significant heronries. Significant numbers of Cormorant are found north of the bridge at Youghal and there are some important roosts present at Ardsallagh Wood, downstream of Strancally Castle and at the mouth of the Newport River. Of note are the high numbers of wintering Pochard (e.g. 275 individuals in 1997) found at Ballyhay quarry on the Awbeg, the best site for Pochard in County Cork.

Other important species found within the site include Long-eared Owl, which occurs all along the Blackwater River, and Barn Owl, a Red Data Book species, which is found in some old buildings and in Castlehyde west of Fermoy. Reed Warbler, a scarce breeding species in Ireland, was found for the first time in the site in 1998 at two locations. It is not known whether or not this species breeds on the site, although

it is known to nearby to the south of Youghal. Dipper occurs on the rivers.

Landuse at the site is mainly centred on agricultural activities. The banks of much of the site and the callows, which extend almost from Fermoy to Cappoquin, are dominated by improved grasslands which are drained and heavily fertilised. These areas are grazed and used for silage production. Slurry is spread over much of this area. Arable crops are grown. The spreading of slurry and fertiliser poses a threat to the water quality of this salmonid river and to the populations of Habitats Directive Annex II animal species within it. Many of the woodlands along the rivers belong to old estates and support many non-native species. Little active woodland management

occurs. Fishing is a main tourist attraction along stretches of the Blackwater and its

tributaries and there are a number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. Both commercial and leisure fishing takes place on the rivers. Other recreational activities such as boating, golfing and walking are also popular. Water skiing is carried out at Villierstown. Parts of Doneraile Park and Anne's Grove are included in the site: both areas are primarily managed for amenity purposes. There is some hunting of game birds and Mink within the site. Ballyhay quarry is still actively quarried for sand and gravel. Several industrial developments, which discharge into the river, border the site.

The main threats to the site and current damaging activities include high inputs of nutrients into the river system from agricultural run-off and several sewage plants, dredging of the upper reaches of the Awbeg, overgrazing within the woodland areas, and invasion by non-native species, for example Cherry Laurel.

Overall, the River Blackwater is of considerable conservation significance for the occurrence of good examples of habitats and of populations of plant and animal species that are listed on Annexes I and II of the E.U. Habitats Directive respectively; furthermore it is of high conservation value for the populations of bird species that use it. Two Special Protection Areas, designated under the E.U. Birds Directive, are also located within the site - Blackwater Callows and Blackwater Estuary.

Additionally, the importance of the site is enhanced by the presence of a suite of uncommon plant species.

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