

Eve O'Sullivan

Subject: H0176-01 - Tullyvogheen Historic Landfill
Attachments: EPA post.pdf; COA Application Tullvogheen LF EPA FI Report.26.02.2021..pdf

From: Colin Ryder <cryder@galwaycoco.ie>
Sent: 26 February 2021 15:43
To: Licensing Staff <licensing@epa.ie>
Subject: H0176-01 - Tullyvogheen Historic Landfill

Ewa,

I refer to the attached letter which was received by Galway County Council on 2nd February 2021 regarding H0176-01 - Tullyvogheen Historic Landfill.
Thank you for taking my call last week to discuss the matter further.

Please find attached a response to the nine items of information requested in the letter as per Regulation 7(2) compliance requirements.
The response was prepared by Mulroy Environmental in conjunction with Galway County Council.

Do not hesitate to contact me if you have any related queries.

Thank You.

Regards

Colin Ryder
Galway County Council
Landfill Manager
East Galway Landfill
Tel: +353 9096 86023
Mob: +353 86 8586335

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MULROY
environmental

Ewa Babiarczyk,
Inspector,
Environmental Licensing Programme,
Office of Environmental Sustainability,
EPA Headquarters, PO Box 3000,
Johnstown Castle Estate, Co Wexford, Y35 W821

26th February, 2021

Re: H0176-01 - Tullyvogheen Historic Landfill – Notification in accordance with Regulation 7(4) of the Waste Management (Certification of Historic Unlicensed Waste Disposal and Recovery Activity) Regulations 2008

Dear Mrs. Babiarczyk,

Following on from your request for further information from Galway County Council on the 29th January, 2021, please note that Mulroy Environmental Ltd. have been appointed by Galway County Council as their agent to carry out field works and process the further information that the EPA have requested in the afore-mentioned letter. Please find below the requested information and note that for ease of reference we have highlighted the EPA's text from the afore-mentioned letter in blue italics.

Paragraph 1 of the request for information states the following:

'1. The name of the site stated in Section C.1 of the Application Form is "Galway C.C. Roads Depot". The cover page of 'Tier 2 Site Investigation & Tier 3 GQRA Assessment' Report refers to the site as "Tullyvogheen historic landfill". State the name of the closed landfill.'

With regard to the above, please note that the name of the closed historic landfill is Tullyvogheen Historic Landfill.

DIRECTORS: P. Mulroy, BSc., MSc., MIPSS, MIEI, CSc., GSAS-CGP
E. McEvaddy, BA., Dip. PR, H.Dip.Ed.

VAT NO. IE 3515664EH

Page 1 of 5

Paragraph 2 of the request for information states the following:

'2. Provide two documents that relate to the Qualified Person as required under Section 2.3 of the EPA Code of Practice-Environmental Risk Assessment for Unregulated Waste Disposal Sites.'

With regard to the above, please find enclosed in Appendix 1 a letter from the Institute of Professional Soil Scientists (IPSS) stating conformance with Section 2.3 and a letter to Galway County Council regarding my qualifications with regard to the site investigation and risk assessment of historic landfills. This is included as part of a Statement of Capabilities prepared for Mulroy Environmental Ltd.

Paragraph 3 of the request for information states the following:

'3. Referring to Section 4.4: Stormwater and Drainage Infrastructure in the said report above, submit a drawing showing an overview of the land drains and manholes referred to in this Section. Include arrows showing water flow direction and indicate culverted stretches of the stormwater and drainage infrastructure.'

With regard to the above, please find attached Figures 8, 9 and 10 which illustrate the existing surface water drainage and stormwater infrastructure of the site. These drawings show the position of a single manhole located offsite, east of the site's boundary. Please note that there are no other manholes or stormwater pipes within the site boundary. Open streams are indicated with cyan colour and culverted pipes are indicated with a navy colour and dashed line.

Paragraph 4 of the request for information states the following:

'4. It is noted that two leachate monitoring wells (LC1 and LC2) located within the waste body and three groundwater monitoring wells (BH101, BH102 and BH103), also located within the waste body, were monitored for the same set of parameters in 2014. Please repeat the monitoring carried out at all of these monitoring wells.'

With regard to the above, Mulroy Environmental Ltd. propose to sample all 5 wells in May, 2021 on behalf of Galway C.C. when the groundwater table should be seasonally low. A 2nd Further Information report following on from this report will be submitted to the EPA in late June, 2021.

Paragraph 5 of the request for information states the following:

'5. It is noted that gas monitoring was carried out at five locations within the waste body in 2014. Please repeat gas monitoring at these five locations.'

With regard to the above, Mulroy Environmental Ltd. propose to carry out landfill gas monitoring along with the groundwater monitoring in May 2021.

Paragraph 6 of the request for information states the following:

'6. Please provide a drawing showing the extent of the waste body within the closed landfill site and all of the monitoring locations referred to in points 4 and 5 above.'

With regard to the above, please find attached Figure 11, which illustrates the approximate extent of the waste within Tullyvogheen Historic Landfill.

Paragraph 7 of the request for information states the following:

'7. Considering the fact that municipal waste, including domestic, commercial and C&D waste, was deposited within the site and leachate is being generated, state the reason for not proposing an engineered cap for the closed landfill and a leachate management system.'

With regard to the above, a cap consisting of 0.3m of Dark brown gravelly sandy silty PEAT with fibrous roots was placed on top of the waste in 1999 after landfilling ceased. Three samples of the cap were taken in 2014 and submitted for geotechnical laboratory testing. All 3 soil samples were described as Dark brown gravelly sandy silty PEAT with fibrous roots. As can be seen from Table 3 in the 2014 report, all 3 soil samples conformed to the criteria for Plasticity Index and Liquid Limit. However, each of the soil samples was found to be under the recommended minimum % Fines Content of 30% (i.e. silt and clay).

Given the age of the waste (i.e. 20+ years) and the low levels of methane observed, it is likely that the 'potency' of the site's waste (i.e. the waste's ability to generate leachate) has dissipated significantly. It is likely that the position of the culverted stream in the middle of the waste body (and lowest point) provided a pathway of least resistance to leachate migrating vertically from the overlying waste and then laterally along the top of the weathered bedrock towards the stream. It should be noted that the stream would have accepted run-off from the surrounding area i.e. prior to the construction of the landfill and its routing through the culvert.

It is our opinion that the construction of an engineered cap by way of improving the existing cap would not have represented a significant benefit to the groundwater and surface quality in the area as a significant portion of the contamination within the waste had most likely already leached out of the waste by the time of the original site investigation in 2014. The installation of a leachate management system at Tullyvogheen would have been very difficult given the unlined nature of the landfill waste. Extensive and complex civil works would be required to install a cut-off wall around the perimeter of the waste. In order to contain the leachate and prevent leachate entering the culverted stream, the overlying waste (which is 5 to 7m deep) would need to be separated/segreated from the stream to allow an impermeable culvert to be installed. A leachate collection and on-site treatment system (or off-site long-term tankering to Clifden WWTP) would also be required. This would require very extensive and expensive civil engineering works to achieve. The benefits of these civil works from a long-term perspective (i.e. on the basis of cost benefit analysis) are questionable.

The results of the surface water monitoring carried out in 2020 indicate that significant improvements in surface water quality have been observed since the original round in 2014. These results indicate that the decision not to carry out cap improvement works in 2014 was the correct decision.

Paragraph 8 of the request for information states the following:

'8. State whether hazardous waste was deposited within the landfill. Classify any such waste in accordance with EPA Waste Classification, List of Waste & Determining if Waste is Hazardous or Non-hazardous, applicable from 5th July 2018.'

With regard to the above, no evidence of hazardous waste was observed within the waste spoil by Mulroy Environmental Ltd. while carrying out the trial pitting and/or borehole drilling in 2014.

The waste encountered was a mixture of municipal/domestic, Construction & Demolition Waste and commercial waste. This waste can be classified using the 2018 guidance as a mixture of the following waste codes:

- 20 03 01 mixed municipal waste;
- 17 01 07 mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06;
- 15 01 01 paper and cardboard packaging
- 15 01 02 plastic packaging
- 15 01 03 wooden packaging

Paragraph 9 of the request for information states the following:

'9. As stated in Section 1.2 of the said report, the site is currently used by Galway County Council as a road depot and storage and heating of road bitumen. State whether the site is intended, by either the local authority or the private owners, to be used for other purposes.'

With regard to the above, Galway County Council will continue to use the site as a road depot. There is no intention to use the site for other purposes.

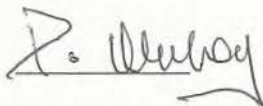
Following paragraph 9, the following is requested in the immediate paragraph:

'Your reply to this notice should include a revised non-technical summary, which reflects the information you supply in compliance with the notice, insofar as that information impinges on the nontechnical summary.'

Following a review of the Non-technical Summary (NTS) that was included in Appendix 1 of the original Certification of Authorisation application submitted in July 2020, it was concluded at this juncture that no changes were necessary and as such, no Non-technical Summary (NTS) is included with this further information report. On conclusion of the proposed field work in May 2021, the NTS will be reviewed again to determine if a revised version is necessary.

If you have any queries or if we can be of any assistance to you in this matter, please do not hesitate to contact me at 086-8770380.

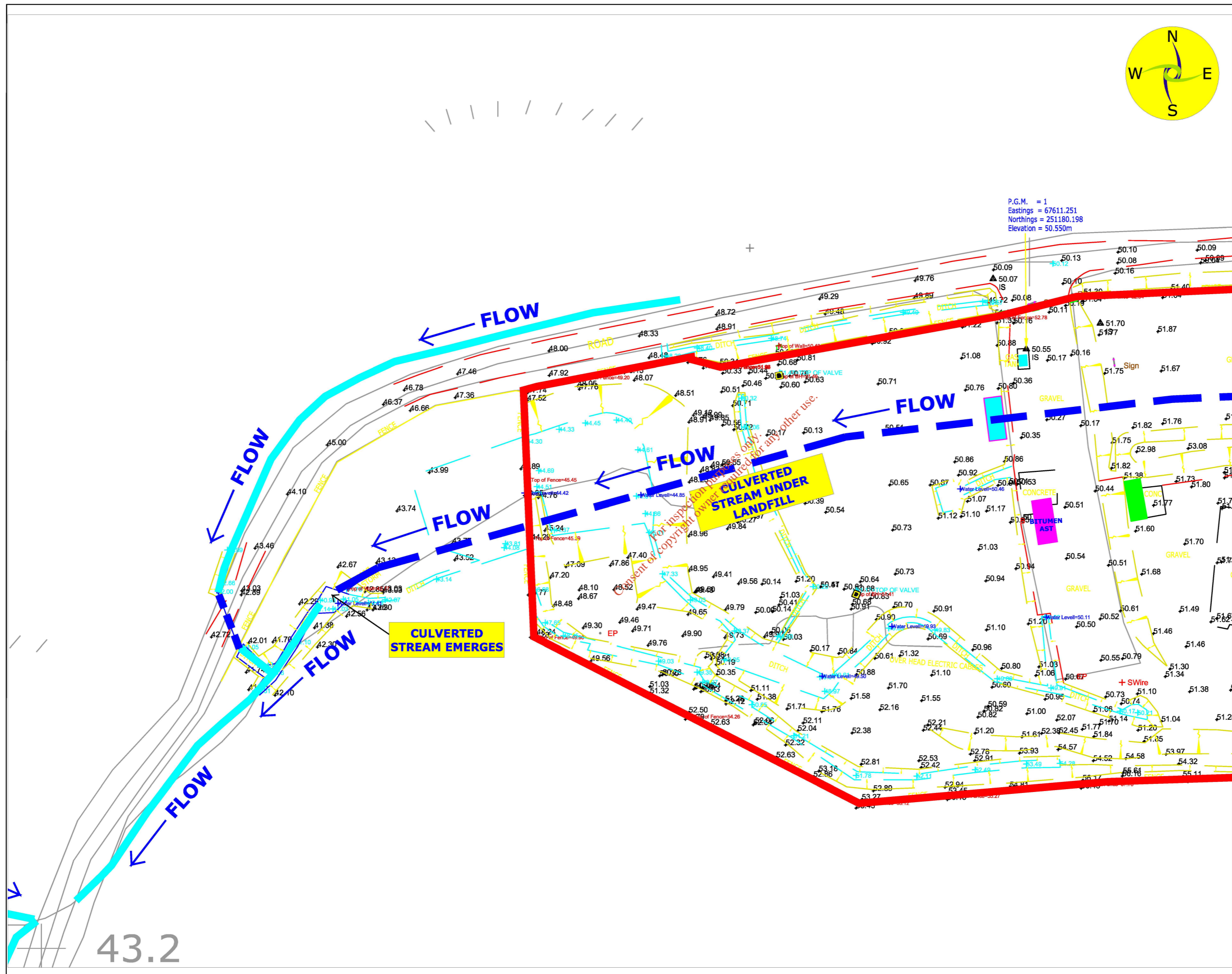
Yours sincerely,






Padraic Mulroy

Managing Director

Mulroy Environmental Ltd.



LEGEND

-  Site Boundary
-  Surface Water Body (open) (Cyan)
-  Stream culverted by 900mm pipe through landfill (navy dashed)

- NOTES**
- FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
 - ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Issue	Date	Description	By	Chkd.

Client:
Galway County Council


Project:
Tier 2 Site Investigation & Tier 3 GQRA Assessment of Former Tullyvogheen Landfill

Title:
Site Drainage (Western Half)

Scale:
1:500@A3

Prepared by: G.F. Checked: P.M. Date: 25-02-21

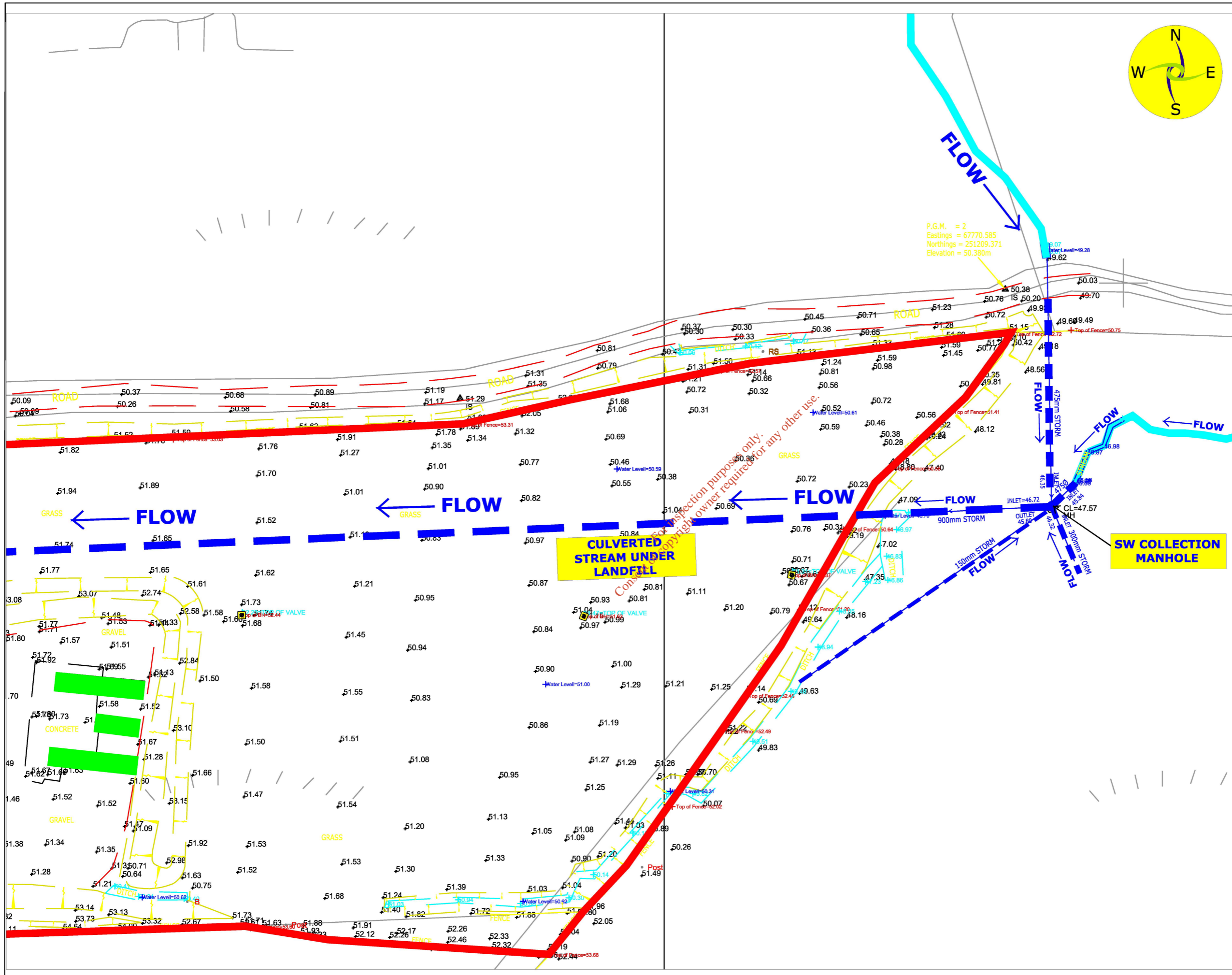
Project Director: P.MULROY






Issue:
0

Drawing No.: **Figure 8**

43.2



LEGEND

-  Site Boundary
-  Surface Water Body (open) (Cyan)
-  Streams & land drains culverted (navy dashed)

- NOTES**
1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
 2. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Issue	Date	Description	By	Chkd.

Client:
Galway County Council


Project:
Tier 2 Site Investigation & Tier 3 GQRA Assessment of Former Tullyvogheen Landfill

Title:
Site Drainage (Eastern Half)

Scale:
1:500@A3

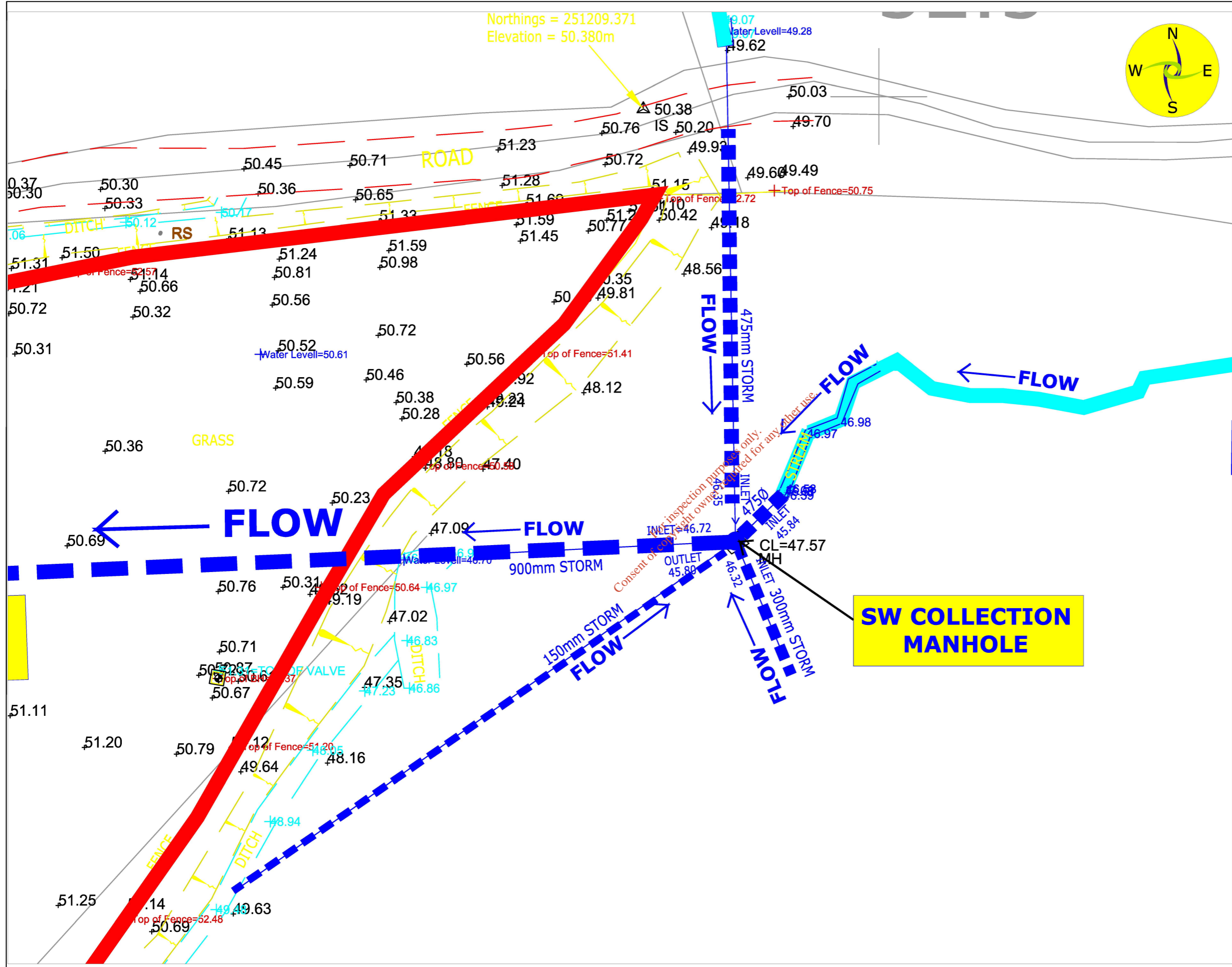
Prepared by: G.F. Checked: P.M. Date: 25-02-21

Project Director: P.MULROY



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Drawing No.: **Figure 9** ISSUE: **0**



LEGEND

- Site Boundary
- Surface Water Body (open) (Cyan)
- Streams & land drains culverted (navy dashed)

- NOTES**
- FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
 - ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Issue	Date	Description	By	Chkd.

Client: Galway County Council

Project: Tier 2 Site Investigation & Tier 3 GQRA Assessment of Former Tullyvogheen Landfill

Title: Site Drainage (Eastern Half/Stormwater Drainage Layout)

Scale: 1:250@A3

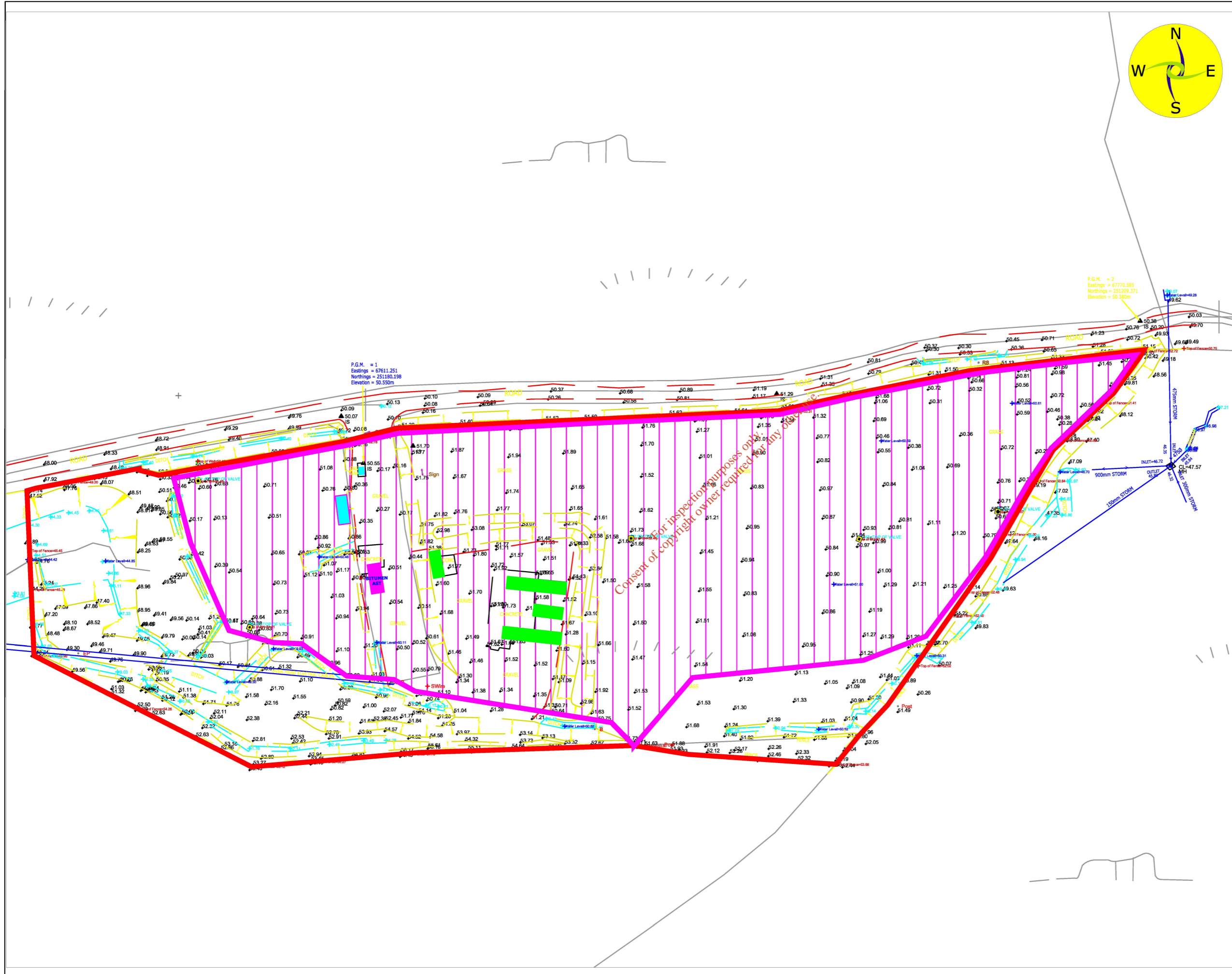
Prepared by: G.F. Checked: P.M. Date: 25-02-21

Project Director: P.MULROY





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Drawing No.: Figure 10 ISSUE: 0



LEGEND

-  Site Boundary
-  Extent of waste within site (magenta boundary & hatch)

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
2. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Issue	Date	Description	By	Chkd.

Client:
Galway County Council

Project:
Tier 2 Site Investigation & Tier 3 GQRA Assessment of Former Tullyvogheen Landfill

Title:
Approximate Extent of Waste within Tullyvogheen Landfill

Scale:
1:750@A3

Prepared by: G.F. Checked: P.M. Date: 25-02-21

Project Director: P.MULROY



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Drawing No.: **Figure 11**

ISSUE:
0

APPENDIX 1

**SECTION 2.3 LETTER FROM INSTITUTE OF PROFESSIONAL SOIL
SCIENTISTS**

**LETTER TO GALWAY C.C. RE QUALIFICATIONS IN HISTORIC
LANDFILL SITE INVESTIGATION & RISK ASSESSMENT**

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*promoting professional
standards in the study and
management of soil*

Padraic Mulroy, MI Soil Sci., C Sci.
Managing Director
Mulroy Environmental,
30 Lisroland View,
Knockbridge,
Dundalk,
County Louth

To: Padraic Mulroy

7th December 2012

Re: Credentials in accordance with section 2.3 of Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites (EPA, 2007)

Dear Padraic

The Institute of Professional Soil Scientists can confirm that you are a member of the Institute and have achieved Chartered Scientist status.

The Professional Matters Committee has reviewed your CV. It indicates you have undertaken the training and have the experience as required by the standard set out in section 2.3 of Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites (EPA, 2007).

Signed

A handwritten signature in black ink, appearing to read 'Bruce Lascelles'.

Bruce Lascelles
Chairman - Institute of Professional Soil Scientists
01453 423135
ipsschair@soils.org.uk

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Colin Ryder,
Landfill Manager,
Environmental Section,
Galway County Council,
Áras an Chontae,
Prospect Hill,
Galway.

25th February 2021

Re: Qualified Person for
Environmental Risk Assessment of Unregulated Waste Disposal Sites

Dear Mr. Ryder,

I am sending you this letter to inform you about the services Mulroy Environmental Ltd. provide to the public sector with regard to the risk assessment of historic waste landfills.

Please find attached:

- Statement of Capabilities for Mulroy Environmental Ltd. Our SOC contains the following items among others:
 - My curriculum vitae;
 - My Project reference list; and
 - Chartered Scientist certificate obtained through the UK Science Council; and
 - Letter from the EPA OEE regarding presentation given on Risk Assessment Methodology (RAM) in 2006. I project managed the production of the IPPC and Waste Licence RAM from 2004 to 2006 and it is in use now for 20 years.

I have worked continuously in contaminated land and landfill site investigation and risk assessment for 24 years and have given public presentations to various forums.

DIRECTORS: P. Mulroy, BSc., MSc., MIPSS, MIEI, CSc., GSAS-CGP
E. McEvaddy, BA., Dip. PR, H.Dip.Ed.

VAT NO. IE 3515664EH

Page 1 of 2



MULROY
environmental

I am a Chartered Scientist and a professional member of the Institute of Professional Soil Scientists and Engineers Ireland. I am a member of the International Society of Sustainability Professionals, International Association of Hydrogeologists and Society of Brownfield Risk Assessment. I am a registered BREEAM Accredited Professional and a CEEQUAL Assessor with BRE Global and a Global Sustainability Assessment System (GSAS) Certified Green Practitioner (CGP) registered in Qatar. I am also an accredited LEED Green Associate with the US Green Building Council.

I have experience of working as an expert witness in court and at oral hearings. My most recent presentation was titled '*Contaminated Land & Soil Waste Management in the Construction Sector in Ireland*' and given to the National Construction Summit held in May 2019. In 2014, I set up a training wing Mulroy Environmental Training (MET). MET runs a 1-day '*MasterClass in Contaminated Land in the Construction Sector*'. MET is certified by Engineers Ireland as an Accredited CPD Trainer.

Please do not hesitate to call me at 086-8770380 if you have any questions.

Yours sincerely

Padraic Mulroy, BSc., MSc., MIPSS, MIEI, C.Sci.,
Managing Director



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STATEMENT OF CAPABILITIES

DOCUMENT ISSUE STATUS

REPORT ISSUE	REFERENCE NO.	DATE		
FINAL	SOC (19.1.2021)	19/01/21		
TITLE	NAME	POSITION	SIGNATURE	DATE
AUTHOR	Andrena Meegan	Project Manager	<i>A. Meegan</i>	19/01/21
PROJECT MANAGER	Padraic Mulroy	Project Director	<i>Padraic Mulroy</i>	19/01/21

MULROY ENVIRONMENTAL
STAFF STRUCTURE

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Address: 30 Lisroland View, Knockbridge,
 Dundalk, Co. Louth, Ireland
Mobile: 086-8770380
Phone: 042-9384750
Fax: 042-9384750
Email: ptmulroy@mulroyenvironmental.ie

Managing Director

Name: Padraic Mulroy
Qualifications: B.Sc., M.Sc., MIEI, MIPSS, CSc, GSAS-CGP, LEED Green Assoc.
Experience: Managing Director (see CV following).

Table A Core Project Staff

NAME	QUALIFICATIONS	EXPERIENCE	DUTIES
Padraic Mulroy	B.Sc., M.Sc., CSc, MIEI, MIPSS, LEED Green, BREEAM AP	Managing Director: 24 years' experience	Project Director
Andrena Meegan	B.Sc., M.Sc. LEED Green, BREEAM AP	Environmental monitoring, construction site management, waste permitting, contaminated land investigation/risk assessment, remedial action plan: 5 years	Project Manager

Table B Support Project Staff

NAME	QUALIFICATIONS	EXPERIENCE	DUTIES
Hannah Clerkin	B.Sc. , MSc.	Waste management, water quality assessment & construction site management	Staff Scientist
Sorcha Shanley	B.Sc., MSc.	Marine biology, ecology, water quality assessment & air quality/monitoring	Staff Scientist
Shannon Dixon	B.Sc.	Environmental monitoring, construction site management,	Staff Scientist

MULROY ENVIRONMENTAL
TECHNICAL & PROFESSIONAL ABILITY



Padraic Mulroy

BSc, MSc., MIPSS, MIEI, C.Sci.,
BREEAM AP, CEEQUAL, GSAS-CGP,
LEED Green Associate
Managing Director

Padraic Mulroy of Mulroy Environmental Ltd. has over 24 years' experience in environmental consulting and has considerable project management experience in contaminated land assessment, waste licensing, waste facility design, planning applications, environmental impact assessment, and permitting, extractive industry, infrastructural projects and energy generation facilities. He is a Chartered Scientist with the UK Science Council and a professional member of the Institute of Professional Soil Scientists (IPSS) and the Institute of Engineers of Ireland (IEI). He is also a member of the International Association of Hydrogeologists (IAH), Society of Brownfield Risk Assessors (SoBRA), the Association of Petroleum and Explosives Administration (APEA) and the British Land Reclamation Society (BLRS).

Padraic has experience of working as an expert witness in court and at oral hearings and is a member of the Round Hall **'Irish Bar and Expert Witness Register'**. Padraic is a registered BREEAM Accredited Professional and a CEEQUAL Assessor with BRE Global and a Global Sustainability Assessment System (GSAS) Certified Green Practitioner (CGP) practising in Qatar. He is also an accredited LEED Green Associate with the US Green Building Council. Mulroy Environmental Ltd. is a corporate member of the Irish Green Building Council and US Green Building Council.

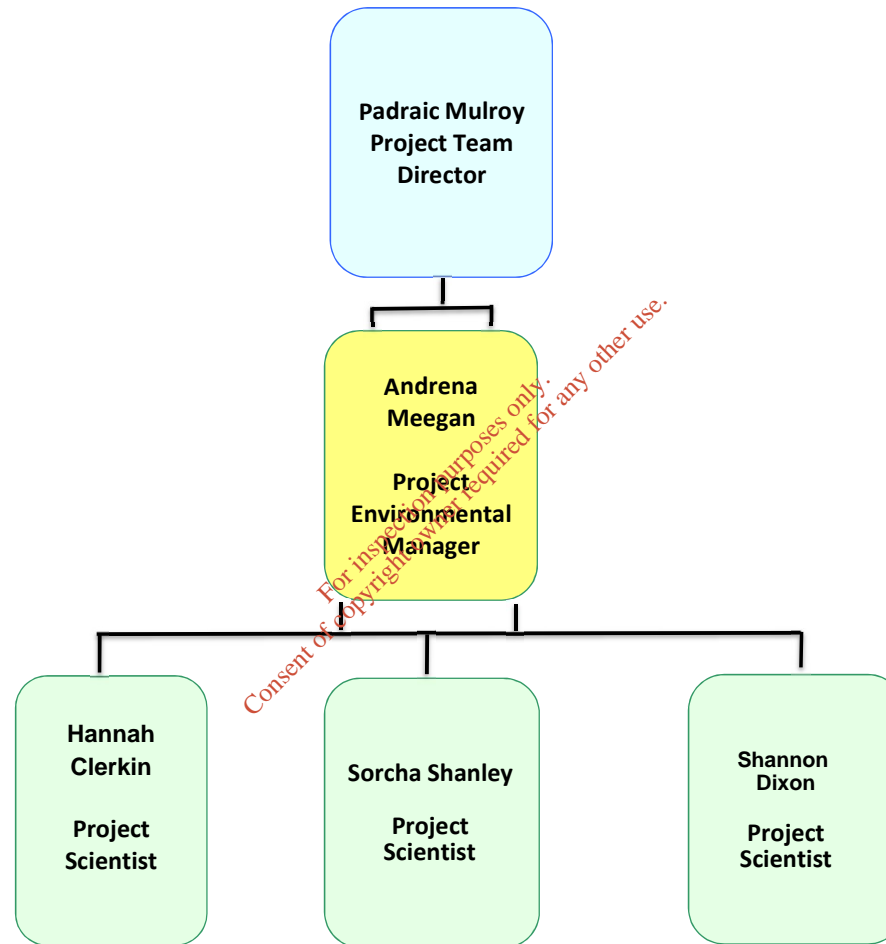
Padraic acts as a Qualified Person (i.e. as defined by Section 2.3 of the EPA's *Code of Practice Environmental Risk Assessment for Unregulated Waste Disposal Sites*) for the risk assessment of historic landfills on behalf of Kildare County Council (1 site), Galway County Council (4 sites) and Fingal County Council (1 site) in the Republic of Ireland.

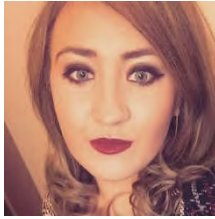
Padraic lectures a 1-day *'Masterclass in Contaminated Land in the Construction Sector'* and has been a registered CPD training provider with Engineers Ireland since 2014. This course is taught through Mulroy Environmental Training (MET). He is also a FAS Accredited Site Suitability Assessor.

Padraic is a certified UAV/Drone SOP licence holder with the Irish Aviation Authority. Mulroy Environmental are licensed and fully insured to carry out aerial/photogrammetric surveys in Control Flight areas (i.e. inner city, etc). Mulroy Environmental have carried out over 50 aerial surveys on project sites (i.e. photogrammetric & video) on behalf of clientele under IAA UF101 licence in inner city locations (i.e. flight control zones).

Padraic is certified to use VHF(SRC) Radio and holds a RYA National Powerboat accreditation since 2008. Mulroy Environmental own a 6.1m 150HP RIB for carrying out environmental monitoring (i.e. surface water sampling, etc) on marine and freshwater projects.

ORGANISATIONAL STRUCTURE - MULROY ENVIRONMENTAL LTD.





Andrena Meegan
BSc., MSc.
LEED Green Associate
BREEAM AP
Project Manager

Andrena Meegan graduated with a B.Sc in Geography from Liverpool Hope University in 2014. Whilst studying Andrena was also employed by B&M Waste Supplies as an intern. There, she was responsible for conducting research and auditing general and recyclable waste bins at the university, gathering data at B&M waste services for the project. This included evaluating and verifying waste, separating waste into DMR and general waste, weighing each waste bin and recording results.

From there Andrena went on to study for a master's degree in Environmental Technology. Her thesis entitled '*Human Health Risk Assessment of Lead found in Tap Water in Ireland*' focused on testing lead water levels in certain parts of Ireland. The objective of the study was achieved by conducting tests on samples of water taken from three different sources of tap water within Ireland. Samples of water will be taken from three different locations; Limerick, Clare and Armagh. Both Limerick and Clare are known as areas of risk relating to lead pollution in water. Armagh is considered an area of low risk relating to lead pollution. The results from the sampling will be run through a quantitative risk assessment with Monte Carlo simulation modelling to determine the results.

Andrena has been with Mulroy Environmental for over 5 years and has considerable experience in the environmental management and supervision of large construction projects, the production of Construction Environmental Management Plans (CEMPs), Phase I and II Contaminated Land Hydrogeological Site Investigation to BS5930 and BS10175 standard, Generic and Detailed Quantitative Risk Assessment, Soil Waste Categorization Studies, hazardous waste assessment (i.e. HazwasteOnline Tool), groundwater dewatering management and treatment, appropriate assessment screening, waste facility design and waste permitting.

Andrena has filled the role of external Environmental Consultant and Environmental Manager for the New Childrens Hospital located at St James Campus, Dublin. The main duties included soil waste classification, soil excavation supervision, groundwater dewatering supervision, discharge license compliance and dust monitoring. Andrena has also acted as Project Manager on the site investigation and risk assessment of three historic landfill sites to date. Andrena is a LEED Green Associate with the US Green Building Council and is a member of the Chartered Institute of Water and Environmental Management (currently applying for Chartered Scientist status). Andrena has recently become a registered BREEAM AP Assessor.

Andrena is certified to use VHF(SRC) Radio and holds a RYA National Powerboat accreditation. Mulroy Environmental own a 6.1m 150HP RIB for carrying out environmental monitoring (i.e. surface water sampling, etc) on marine and freshwater projects.



Hannah Clerkin B. Sc
Staff Scientist

Hannah Clerkin graduated with a B. Sc (Hons) in Environmental Science from Sligo Institute of Technology in 2019.

In the four years Hannah spent studying at IT Sligo, she has learned technical laboratory skills in various science disciplines such as Microbiology, Environmental Chemistry, Biotechnology, Soil, Water and Wastewater Management. Whilst studying Hannah was employed by Monaghan Mushrooms as an intern. There, she was responsible for Monitoring and auditing environmental control systems on site daily, generating summary reports for the site on a weekly basis, daily sampling of compost for analysis, keeping all analysis up to date on the database and ensuring the compost site is audit ready with regards to systems, processes and documentation. After studying Quality Management, Environmental Risk Assessment, Environmental Monitoring and Modelling, Kateryna acquired significant knowledge on the importance of quality management in industry and main environmental legislations.

As part of her Honours degree she undertook a fourth year thesis. The research focused on “A study on the Wild Atlantic Way using the European Tourism Indicator system complemented with the use of GIS”. This project was taken up under her own initiative, designed by herself and carried out successfully with obtaining interesting results.

Hannah has been with Mulroy Environmental for 1 year and is gaining experience in the environmental management and supervision of large construction projects, the production of Construction Environmental Management Plans (CEMPs), Phase I and II Contaminated Land Hydrogeological Site Investigation to BS5930 and BS10175 standard, Generic and Detailed Quantitative Risk Assessment, Soil Waste Categorization Studies, gas monitoring and biological rating systems.

Hannah has also assisted with the environmental manager at the New Childrens Hospital located at St James Campus, Dublin. The main duties assisted with include groundwater dewatering supervision, discharge license compliance and dust monitoring.



Sorcha Shanley
B.Sc., MSc.
Staff Scientist

Sorcha graduated with a B.Sc (Hons) in Zoology from Trinity College Dublin in 2016. During her degree, she learned multidisciplinary technical laboratory skills as well as aquatic and terrestrial ecological field survey and sampling techniques. During her fourth year she carried out her thesis on “*Habitat complexity and the abundance and species richness of nudibranchs in the coral reefs of Hoga Island, Indonesia*”. She designed a field experiment to examine the population distribution of sea slugs in a remote coastal environment, gaining a range of marine surveying skills.

Sorcha then completed a MSc in Marine Biology in University of Essex in 2018, learning advanced marine science theory and practical and professional skills including environmental impact assessment (EIA), Geographical Information Systems (GIS), and laboratory and field work. Her thesis, “Growth responses of toxic and non-toxic strains of *Prorocentrum minimum* to temperature and hydrogen peroxide”, examined whether there are differences in the temperature responses of non-toxic and toxic strains of the same species of a geographically widespread dinoflagellate that forms Harmful Algal Blooms (HABS).

Between her undergraduate and post-graduate degrees Sorcha worked as a scuba diving instructor in Tenerife Diving Academy. One of her roles was organising Project AWARE “Dive Against Debris” dives which involved collecting litter and waste on mapped underwater marine surveys, then inputting this data into the global database.

Sorcha holds a RYA National Powerboating accreditation.

MULROY ENVIRONMENTAL STAFF PROFILE SUMMARY

Mulroy Environmental consists of senior environmental consultants including environmental scientists who specialise in soil science, hydrogeology and environmental engineering. These staff have over 22 years of professional experience in the environmental sector in Ireland, the UK and the MENA Region. Mulroy Environmental staff are used to working in a cross-disciplined approach with other professionals from the architectural, engineering, waste, construction and industrial sector. Mulroy Environmental Staff are all qualified to work in an off-shore capacity and have experience in sampling Rivers and Lakes.

Mulroy Environmental encourages its staff to actively engage with relevant Professional Institutions and actively supports staff's continuous professional development. Members of Mulroy Environmental staff are active members of the following Institutions:

- Institute of Ecology and Environmental Management (IEEM);
- CEEQUAL – 1 x registered CEEQUAL Assessor;
- US Green Building Council (USGBC) – corporate member & 3 LEED Green Associates;
- Irish Green Building Council (IGBC) – corporate member;
- GORD – 1 x Global Sustainability Assessment System (GSAS) Certified Green Practitioner (CGP)
- BREEAM – 2 x registered BREEAM Assessor;
- International Society of Sustainability Professionals (ISSP);
- UK Science Council – Chartered Scientist;
- Institute of Engineers of Ireland (IEI) – Registered CPD Accredited Trainer and Full Member;
- Institute of Professional Soil Scientists (IPSS);
- Chartered Institute of Waste Management (CIWM);
- Society of Brownfield Risk Assessors (SoBRA);
- Institute of Environmental Management & Assessment (IEMA);
- International Association of Hydrogeologists (IAH);
- British Land Reclamation Society (BLRS);
- Association of Petroleum and Explosives Administration (APEA);
- Irish On-Site Wastewater Association (IOWA);
- British Soil Science Society (BSSS);
- Soil Science Society of Ireland (SSSI);
- Environmental Sciences Association of Ireland (ESAI);
- British Land Reclamation Society (BLRS);
- Royal Yachting Association (RYA); and
- Agricultural Science Association Ireland (ASA).

Padraic Mulroy of Mulroy Environmental is a member of the '*Expert Witness Directory of Ireland*'. The Irish Expert Witness Register is an association recognized by the Bar Council of

Ireland. This is a comprehensive and reliable list of expert witnesses working in Ireland and Northern Ireland and is published jointly between Round Hall and Sweet & Maxwell. Admission to the register requires references from practicing solicitors and/or barristers for competent work completed in the past 3 years (i.e. production of affidavits and/or technical reports and provision of expert witness services in court).

Mulroy Environmental have developed close collaborations with a number of recognized expert specialist consultants and contractors to supplement core expertise when required. These subconsultants are members of the following Institutions:

- Chartered Institute of Water and Environmental Management (CIWEM);
- Institute of Geologists of Ireland;
- Institute of Archaeologists of Ireland (IAI);
- Irish Planning Institute (IPI);
- Irish Landscape Institute (ILI);
- Royal Institute of the Architects of Ireland (RIAI);
- Institute of Acoustics (IOA);
- British Occupational Hygiene Society (BOHS); and
- Insurance Institute of Ireland (III).

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Dublin Port (Roadbridge-Keating Construction JV – IED Environmental Compliance Monitoring)

Currently carrying out daily surface water sampling, wastewater sampling and monthly groundwater monitoring at an IED licensed contaminated sediment treatment facility located in Dublin Port on behalf of Roadbridge-Keating Construction JV. This facility is currently treating contaminated sediment excavated from Alexandra Basin West (which is classed as a hazardous waste) using a lime stabilisation/solidification process. The stabilised material (monolith) is being placed in a former lined graving dock and a dedicated bund location within the port. A wastewater is generated as a result of this process which requires daily sampling and testing. Surface water sampling is carried out on a daily basis at 3 locations within Dublin Port using a 6.2m RIB powerboat. Groundwater sampling of 14 wells located within Dublin Port is carried out monthly. Weekly surface water, occasional stormwater and monthly groundwater reports are submitted to our client for onward submittal to the EPA.

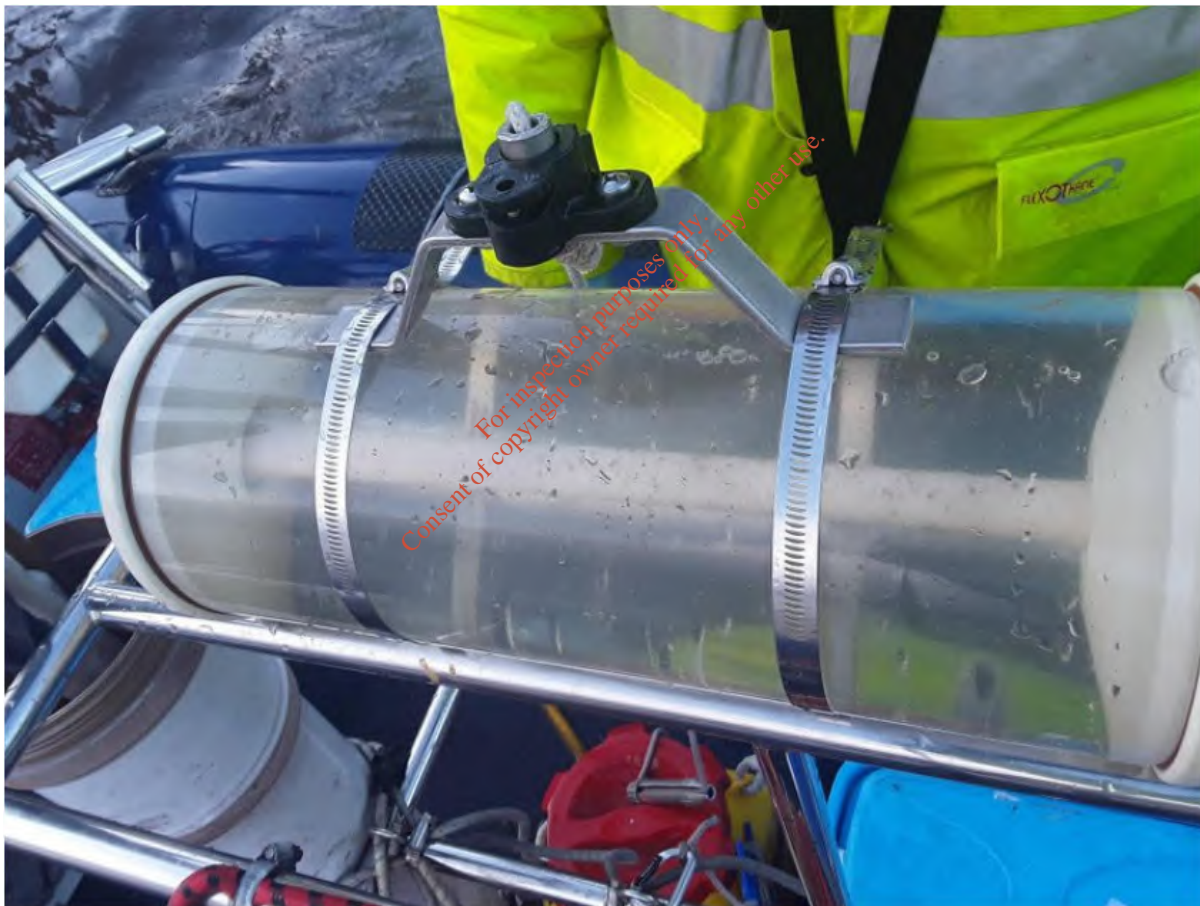


Plate 1. Daily surface water sampling being carried out in Dublin Port using a Van Dorn depth sampler (there are 3 surface water monitoring locations that require daily sampling, one upgradient and 2 downgradient of sediment treatment plant)

National Children's Hospital – BAM Civil – Environmental Consultancy Services

Mulroy Environmental provide on-site environmental management, environmental monitoring, and supervision services as an independent environmental consultant for BAM Civil on the National Children's Hospital in Dublin. The project entailed the supervised removal of approx. 1 million tonnes of overburden/made ground from the site. This was to facilitate the construction of 3 basement levels (i.e. 2 parking & 1 service). Mulroy Environmental produce soil waste classification reports for the removal of made ground and indigenous soil from the site to various infill and landfill sites. This process was carried out using existing data from previous site investigations and on-going site investigation/trialpitting and soil sampling. Mulroy Environmental processed a discharge licence for the discharge of treated groundwater from the site which was accompanied by a Groundwater Dewatering Management Plan (GDMP). Mulroy Environmental supervised the construction/installation of the 3 on-site dewatering wells and are currently installing 11 groundwater monitoring wells on site external to the secant pile wall. Treated groundwater monitoring is carried out weekly with weekly groundwater quality reports submitted to Dublin City Council. The groundwater standing water table is continuously monitored and modelled with pumping rates optimised. Dust monitoring is carried out on a monthly basis. We produce 3D models and orthomosaic aerial photos which aid in the calculation of excavation void space and soil stockpiles volumes (see plate below). The site is directly adjacent to St. James Hospital and residential property is immediately adjacent.



Plate 2: 4K Aerial photograph of NCH/St. James Hospital construction site facing NW on 2nd January, 2018

Galway County Council – Appropriate Assessment of former Glenamaddy Landfill located within Glenamaddy/Lurgeen Bog SAC

Mulroy Environmental in conjunction with Woodrow Sustainability carried out an Appropriate Assessment of a former landfill located in Glenamaddy, Co. Galway which is located within a Special Area of Conservation, Glenamaddy Turlough/Lurgeen Bog. Prior to the commencement of site works, the National Parks and Wildlife Service were consulted with regard to the proposed scope of works. This SAC is a groundwater dependent terrestrial ecosystem (GWTDE). As part of this work comprehensive groundwater monitoring and surface water monitoring was carried during the summer of 2020 to assess the impact on the turlough to the east of the site.

In addition, an assessment of the flora and fauna of the site, its surrounding area and the western side of the turlough was carried out. Given the existence of other external factors potentially impacting on the turlough (i.e. treated wastewater discharge, agricultural run-off, etc), the cumulative impact of the historic landfill was assessment.

The Appropriate Assessment is currently in ‘Advisory Status’ and will be submitted to the NPWS shortly. Further extensive hydrogeological site investigation works are required in 2021 with a Tier 3 Detailed Quantitative Risk Assessment (using Consim) to be processed. Following the finalising of the DQRA, the Appropriate Assessment will be finalised and submitted to the NPWS for comment. Following this, it is proposed to submit an application to the EPA for a Certificate of Authorisation for the historic landfill. The Tier III DQRA and Appropriate Assessment will be submitted as part of this application.



Plate 3. Surface water sampling carried out at Glenamaddy Turlough adjacent to former Glenamaddy Landfill.

Galway County Council – Tier II Site Investigation & Tier III GQRA / GQRA Assessment of former Glenamaddy Landfill.

Mulroy Environmental carried out a Tier II Site Investigation and a Tier III GQRA / DGRA Assessment of a former landfill located in Glenamaddy, Co. Galway. The landfill was deemed high risk after a Tier 1 Environmental Risk Assessment was carried out by Galway County Council.

As part of the investigative works, groundwater monitoring wells and gas monitoring wells were installed on site. In addition, an extensive trialpitting investigation was carried out of the entire site. The purpose of the extensive trialpitting operation was to fully determine the volume of waste, the footprint of the waste and the depth of the waste. Two leachate wells were installed within the body of the waste to determine the type and strength of the leachate.

Groundwater wells with the dual purpose of gas monitoring were also installed to determine the effect on the groundwater for the surrounding area. It should also be noted this site is located beside an SPA and several rounds of surface water was also carried out.

Following the installation of the monitoring wells, quarterly groundwater sampling programmes were implemented. A landfill gas and VOC monitoring programme, followed by a risk assessment according to CIRIA 665 guidelines was also produced.

A Generic Quantitative Risk Assessment (GQRA) was then undertaken to provide a basis for decision making, to ensure the safe re-development of the contaminated land for further use and to ensure that there will be no adverse impact to the environment.



Plate 4. Groundwater Monitoring carried out at former Glenamaddy Landfill.

Galway County Council – Further Information – Hydrology & Small Stream Risk Assessment/Tier III GQRA of former Clifden Landfill.

On behalf of Galway County Council, Mulroy Environmental carried out comprehensive surface water monitoring and invertebrate (i.e. kick) sampling on the surface water network in the vicinity of Tullyvogheen Historic Landfill. The site is a former municipal landfill located in a rural upland area to the east of Clifden town. The site area is 1.27 hectares (ha) and the total waste body was estimated at 114,000m³ or 205,000 tonnes. This work was carried out following the recommendations of the previous 2014 Tier 2 Site Investigation and Tier 3 Generic Quantitative Risk Assessment report.

This was carried out in conjunction with the EPA's Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites. A Small Stream Ecological Risk Assessment (SSRA) was carried out on the stream downgradient of the site as per the *Western River Basin District Project's Small Streams Risk Score Method Manual, December 2005*. It was recommended that further invertebrate kick sampling is carried out in 2021 at KS1, KS2, KS4 and KS5 on the Owenglen River to further assess the Q-Index. This should be carried out during optimal seasonal weather (i.e. May). This report and the previous Tier II Site Investigation & Tier III GQRA / DGRA Assessment report were submitted as part of an application for a Certificate of Authorisation to the EPA in 2020.



Plate 5: Invertebrate kick sampling at a surface water monitoring location downgradient of the former Clifden Landfill

Galway County Council – Tier II Site Investigation & Tier III GQRA / DGRA Assessment of former Clifden Landfill.

On behalf of Galway County Council, Mulroy Environmental managed a Tier 2 Site Investigation and Tier 3 Generic Quantitative Risk Assessment of a former municipal landfill located in a rural upland area to the east of Clifden town. The site area is 1.27 hectares (ha) and the total waste body was estimated at 114,000m³ or 205,000 tonnes. This was carried out in conjunction with the EPA's Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites.

The site investigation involved the excavation of 22 trialpits and the drilling and installation of 3 groundwater monitoring boreholes and 2 leachate/gas monitoring wells. A stream culverted through the site was sampled at a single upgradient and 2 downgradient points to assess the risk to Ownglenn River 600m to the south of site and which is a Special Area of Conservation. Soil, groundwater, leachate, and surface water samples were taken and analyzed for a comprehensive laboratory suite.

A Generic Quantitative Risk Assessment (GQRA) was carried out with some exceedances of generic assessment criteria observed. The surface water downgradient of the site was found to have low to moderate levels of contamination which originated from the site. Recommendations were made on further monitoring of the downgradient surface water body and Ownglenn River.



Plate 6: Drilling and installation of groundwater monitoring wells on former Clifden Landfill

Fingal County Council/Winsac Ltd. – Tier II Site Investigation and a Tier III Detailed Quantitative Risk Assessment (DQRA) of a former landfill located in Skerries, County Dublin

Mulroy Environmental carried out a Tier II Site Investigation and a Tier III Detailed Quantitative Risk Assessment (DQRA) of a former landfill located in Skerries, County Dublin on behalf of a property developer and Fingal County Council from 2018 to 2020. As part of the investigative works, 17 groundwater monitoring wells and 4 gas monitoring wells were installed on site. Landfill gas monitoring, groundwater and surface monitoring were carried out over approximately 2 years to determine the risk to adjacent residential properties with on-going liaison with the local authority. A landfill gas and VOC monitoring programme, followed by a risk assessment according to CIRIA 665 guidelines is being implemented. A joint DQRA was undertaken using CONSIM to determine the risk to groundwater and using RBCA Version 2.6 to determine the risk to residents. These DQRAs provided the basis for decision making, to ensure the safe re-development of the contaminated land for further use and to ensure that there will be no adverse impact to the environment. Recently Mulroy Environmental supervised the installation of an engineered cap which has incorporated leachate and landfill gas controls. Mulroy Environmental have assisted RPS Consulting Engineers and Fingal C.C. in an application for a Certificate of Authorisation to the EPA which is now being assessed.



Plate 7. Drone aerial photo of landfill cap construction in October, 2020.

Galway County Council – Tier II Site Investigation & Tier III GQRA / DGRA Assessment of former Shore Road Landfill.

On behalf of Galway County Council, Mulroy Environmental managed a Tier 2 Site Investigation and Tier 3 Generic Quantitative Risk Assessment of the former municipal landfill located on the southern side of the Shore Road adjacent to the shore of Clifden Bay. This site approximately 0.98 hectares (i.e. 9,800m²) in area. Although the number of tonnes of mixed waste including domestic, commercial and construction & demolition (i.e. C & D) were deposited on site by both the local authority and local people, there was no record of the total waste on site. Mulroy environmental found that approx. 2,325m² was used and the total waste body was estimated at 114,000m³ or 205,000 tonnes.

The site investigation involved the excavation of 17 trialpits to determine the extent of the waste body. The methane generating potential of the site's domestic waste has effectively disappeared given the age of the waste. The lack of landfill gas type odours during the site investigation indicated that methanogenesis within the site had long since ceased. A Generic Quantitative Risk Assessment (GQRA) was carried out.

Further site investigation works were carried out in 2020 to investigate C&D Waste that was illegally landfilled on site in 2019. This waste was found to be contaminated with low risk asbestos. The previous report was updated and the findings of this report are currently being used to amend the design of a proposed public park for the area. An application for a Certificate of Authorisation will be submitted in 2021.



Plate 8. Supervision of Trialpit digging at Shore Road Landfill

Galway County Council – Tier II Site Investigation & Tier III GQRA / DGRA Assessment of former Ballygar Landfill.

Mulroy Environmental carried out a Tier II Site Investigation and a Tier III GQRA / DGRA Assessment of a former landfill located in Glenamaddy, Co. Galway. The landfill was deemed high risk after a Tier 1 Environmental Risk Assessment was carried out by Galway County Council.

As part of the investigative works, groundwater monitoring wells and gas monitoring wells were installed on site. Following the installation of the monitoring wells, quarterly groundwater sampling programmes were implemented. A landfill gas and VOC monitoring programme, followed by a risk assessment according to CIRIA 665 guidelines was also produced.

A detailed DQRA was then undertaken to provide a basis for decision making, to ensure the safe re-development of the contaminated land for further use and to ensure that there will be no adverse impact to the environment.



Plate 9. Drilling and installation of groundwater monitoring wells on former Ballygar Landfill

Kildare County Council –Tier III GQRA / DGRA Assessment of former historic waste landfill.

On behalf of Kildare County Council, Mulroy Environmental managed the production of a Tier 3 Detailed Quantitative Risk Assessment (DQRA) and production of a Remedial Plan of a former historic waste landfill. This was carried out in conjunction with the EPA’s Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites.

A Tier 2 Environmental Risk Assessment had been carried out by a previous consultant on the former waste disposal site on behalf of Kildare County Council (KCC). The purpose of the DQRA was to provide information that would allow an assessment to be made regarding the existence of possible significant pollutant linkages onsite, which may require remediation measures to be put in place.

The Chemical Releases RBCA Model Toolkit Version 2 was utilized to assess the risk to site operatives, groundwater and an adjacent surface water body. Continued monitored natural attenuation of groundwater and surface water was recommended with capping improvements recommended for certain areas of the site.

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Tier II Site Investigation & Tier III GQRA / DGRA Assessment of former landfill located in Dundalk

Mulroy Environmental managed the processing of a Waste Permit application for the remediation of a contaminated historical landfill which was the subject of a Section 55 Notice in north Dundalk. This site is adjacent to a larger parcel of land (containing a landfilled quarry) which required extensive remediation for the construction of a motorway.

The subject site, which was also formerly a quarry was landfilled over a period of 30 years causing groundwater contamination on site. This project involved the review of a large body of reports regarding previous site investigation works carried out on site on behalf of the NRA and Louth C.C. and extensive negotiation with Louth C.C. as client's representative. The project involved the excavation of approximately 14,000m³ of waste consisting of a mixture of construction and demolition waste and domestic waste. C & D waste was processed on site using a trommel, crusher and screen and recycled as construction fill material. This material was assessed for its geotechnical properties to ensure compliance with current NRA standards. The fines segregated by the C & D process was sampled for laboratory analysis and assessed for contamination and its subsequent suitability for use on site. All municipal waste was segregated and transferred to a municipal landfill.

Mulroy Environmental also carried a Tier II Site Investigation & Tier III GQRA / DGRA Assessment of the former landfill on behalf of the client. The GQRA concluded that the waste left in situ during the construction works for the motorway had no adverse impact on the surrounding environment.

Annual environmental monitoring is currently carried out on site by Mulroy Environmental.



Plate 9. Surface Water Monitoring point located beside former landfill in Dundalk

Racarbry Developments – Ulster Builders Providers Phase II/III Site Investigation (Coal Gas Tar/Industrial Brownfield Site)

Mulroy Environmental carried out a Phase II followed by an extensive Phase III Site Investigation and Detailed Quantitative Risk Assessment of a former linen mill/beetling plant/ dyeing plant located adjacent to a water body to the southeast of Keady, County Armagh. The DQRA was carried out using RBCA Software Toolkit for Chemical Releases 2.6. Planning permission was applied for a large residential (i.e. 600 houses) development. The site contained an on-site manufactured town gas plant which was formerly used for heating and lighting the facility. As part of the investigative works, groundwater monitoring wells and gas monitoring wells were installed on site. In addition, an extensive trialpit investigation was carried out the entire site with a later high-density investigation in the vicinity of the gas plant. The purpose of the extensive trialpitting operation was to fully delineate the PAH/TPH/PCB contamination plume arising from the historical gas works. Following the installation of the monitoring wells, monthly surface water and groundwater sampling programmes were implemented. A landfill gas and VOC monitoring programme, followed by a risk assessment according to CIRIA 665 guidelines was produced. This project required significant consultation with the Land Resource Management Unit of the Northern Ireland Environment Agency, Armagh City Banbridge & Craigavon Borough Council Environmental Health Department and the Northern Ireland Loughs Agency in order to facilitate the approval for planning on the site.



Plate 10. Drilling and installation of groundwater monitoring wells on UBP brownfield site.

Bennett Construction – Hanover Quay Phase II/III Site Investigation (Asbestos & Hydrocarbon Brownfield Site)

Mulroy Environmental carried out a Phase II and subsequent Phase III Site Investigation of a former industrial site proposed for commercial/office redevelopment at Hannover Quay in Dublin City. This project involved the delineation of a number of contaminants including chrysotile asbestos, chromium and hydrocarbon contamination. In this project, the HazWasteOnline™ Tool was utilised to quantify the tonnage of inert, non-hazardous and hazardous soil on site as part of a remedial action plan. Mulroy Environmental supervised the removal of the non-contaminated and contaminated soil offsite to either inert soil waste permitted infill, non-hazardous waste landfill or hazardous waste facility. A Close-Out/Validation Report was produced after the remediation.



Plate 11. Supervision of removal of hydrocarbon contaminated soil from basement area.

Bennett Construction – Hanover Quay Phase II Site Investigation (Asbestos & Hydrocarbon Brownfield Site)

Mulroy Environmental carried out a Phase II Site Investigation of a former industrial site proposed for student accommodation development at Dorset Street in Dublin City. The investigation involved an extensive trialpitting programme in compliance with British Standards BS5930 and BS10175. This project involved the delineation of a number of contaminants including chrysotile asbestos, chromium and hydrocarbon contamination. In this project, the HazWasteOnline™ Tool was utilised to quantify the tonnage of inert, non-hazardous and hazardous soil on site as part of a remedial action plan.

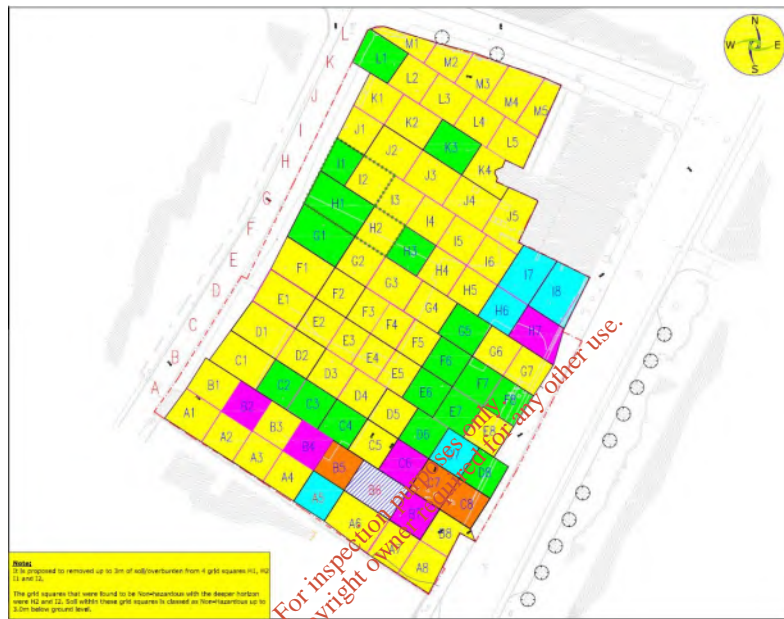


Plate 12. Soil Waste Characterization Map for Brownfield Site.

Bennett Construction – Clanwilliam Place Phase II Site Investigation (Asbestos & Hydrocarbon Brownfield Site)

Mulroy Environmental carried out a Phase II Site Investigation for a proposed commercial building development at Clanwilliam Place in Dublin City. The investigation involved a trialpitting programme in accordance to British Standards BS5930. This project involved the delineation of a number of contaminants including chrysotile asbestos and hydrocarbon contamination. In this project, the HazWasteOnline™ Tool was utilised to quantify the tonnage of inert, non-hazardous and hazardous soil on site as part of a remedial action plan.



Plate 13. On-going demolition during site investigation of Clanwilliam Site.

Bennett Construction – Royal College of Surgeons Site Phase II Site Investigation (Asbestos & Hydrocarbon Brownfield Site)

Mulroy Environmental carried out a Phase II Site Investigation of a brownfield site selected for the significant expansion of a basement for a 3rd level college in the inner city of Dublin. The project successfully delimited and quantified the amount of weathered diesel contamination on site as result of historical use of the site as a garage. The project expanded on previous investigations resulting on a significant amount of soil diverted from disposal at a hazardous landfill. The project involved the weekly assessment of secant pile drilling spoil and excavated boulder till to determine its correct waste category (see Plate 14 below).



Plate 14. Secant piling along periphery of new basement at RCSI Site.

BAM Building Contractors – Grangegorman Tender Preparation – Desk Study & Phase II Site Investigation Supervision

Mulroy Environmental carried out a Site Investigation Review and subsequent Soil Waste Disposal Report on behalf of BAM Building Contractors who were tendering for the construction of two landmark buildings within the proposed Dublin Institute of Technology Grangegorman Campus. The report required the review of a substantial number of environmental site investigation reports which were conducted over a 9 year period. The process involved a review of the existing soil laboratory data in order to assess its suitability to produce a waste classification report. Following this it was decided to carry out a further Phase III Site Investigation to delineate contamination identified on site. This site investigation involved the drilling of 12 window sample boreholes for soil analysis. Following the Final Phase II Site Investigation, a Soil Waste Disposal/Remediation Report was produced including a hazardous waste classification report.



Plate 15. Soil core taken from window sampling exercise on Grangegorman DIT Campus.

Aldi Ireland – Site Investigation of Former Bachelors Peas Site, Rathstewart, Athy, Co. Kildare.

Mulroy Environmental carried out a Phase II Site Investigation of a former industrial site proposed for an Aldi Supermarket located within a short distance of the River Barrow in Athy, County Kildare. This site is in dense residential area. In the northern part of the site extensive deposits of chrysotile shards were identified within topsoil imported for a former garden and orchard. In addition to the asbestos contamination, this project involved the delineation of a number of contaminants including heavy metals resulting from recent anthropogenic effects and natural occurring elevated metals due to the geochemistry of the alluvium deposited within the floodplain of the Barrow. A Detailed Quantitative Risk Assessment (DQRA) was carried out using RBCA Software Toolkit for Chemical Releases 2.6 to assess the risk from trace heavy metals found on site. Approximately 600 tonnes of asbestos contaminated soil were removed from the site and transferred to a Hazardous Waste Landfill in Northern Ireland. This process was supervised by Mulroy Environmental. Over 90% of the construction and demolition waste was crushed on site and re-used as construction fill substituting for virgin aggregate. This material was tested extensively for the presence of asbestos (see Plate 16 below). A Close-Out/Validation Report was produced after the remediation.



Plate 16. Stockpile of material identified with asbestos shards located in Athy, Co. Kildare

Dundalk Distillery – Whiskey Maturation Warehouse Complex – Environmental Impact Statement

Mulroy Environmental contributed to the geological, hydrogeological and hydrological sections of an environmental impact assessment for a large whiskey maturation warehouse complex to be located on a rural agricultural zoned 111-acre site in the northeast of Ireland. The development will require a material contravention of planning zoning. Following this, the EIS accompanied a planning application for the development. The development will consist of 13 maturation warehouses for the maturation of whiskey casks produced by a local distillery (i.e. who are the site owners). The development will require approval by the HSA under the Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations. As part of the environmental baseline study, 85 trialpits were excavated within 4 key areas on site: 2 former infilled quarries, a former farm building complex and a former waterlogged area used for dumping. Seven groundwater monitoring wells have been installed. Monitoring of the adjacent surface water body has been carried out at 6 locations in addition to invertebrate monitoring. The flow of the river is currently being monitored remotely by a GSM equipped Ecolog500.



Plate 17. Ecolog 500 monitoring the flow of the river beside site in Kilcurry.

Generic Quantitative Risk Assessment (GQRA) carried out Cooley Distillery Historic Waste Landfill

Mulroy Environmental managed a Phase II Site Investigation/Generic Quantitative Risk Assessment and production of a Remedial Plan of an historic area located within the site cartilage of an IED facility as part of a licence condition. This was carried out in conjunction with the EPA's *Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites*. The site investigation involved the drilling of 5 boreholes and the subsequent installation of 2 groundwater monitoring boreholes and the excavation of 14 trialpits within the historic waste area. Soil, waste and groundwater samples were taken and analysed for a comprehensive laboratory suite. This historic waste area, which contained boiler ash, was assessed with regard to the potential risk posed to site operatives, the underlying groundwater aquifer and the adjacent surface water body. As stated, a Generic Quantitative Risk Assessment (GQRA) was carried out with no exceedances of generic assessment criteria observed.



Plate 18: Cooley Distillery Historic Waste Landfill Investigation

Qatar Construction Project - Package 06 of Doha Industrial Area

Mulroy Environmental were appointed by ‘Larsen & Toubro Al Sraiya Trading & Contracting JV’ as external environmental managers in September, 2015 for Package 06 of Doha Industrial Area

Mulroy Environmental prepared a Construction Environmental Management Plan (CEMP) which was approved by the Public Works Authority (Ashghal). Mulroy Environmental provided on-site environmental management and environmental monitoring and supervision services as an independent environmental consultant over the initial 6-month establishment period from December, 2015 to March, 2016.



Plate 19. Groundwater sampling in Package 06, Doha Industrial Area.

Mulroy Environmental managed weekly environmental progress meetings with GEC and monthly project team meetings and processed Monthly Environmental Progress Reports and Key Performance Indicator (KPI) Reports for GEC, PMC and PWA approval and uploaded to web based PWA’s LRDP’s Project Management Information System (PMIS). Mulroy Environmental processed environmental permit applications, a groundwater dewatering strategy and microtunnelling method statements. Mulroy Environmental supervised construction of 4 on-site groundwater monitoring wells and follow-up baseline monitoring to assess groundwater treatment requirements. Mulroy Environmental carried out a review of various groundwater treatment technologies to identify most suitable system and subcontractor for treatment of contaminated groundwater prior to injection to deep aquifer well. Supervision and training of L & T environmental staff was provided through in-house presentations (i.e. Phase 1 Environmental Auditing, contaminant soil and groundwater risk, etc) and training of manual labourers in on-site environmental risks through tool box talks prepared jointly by L& T HSE staff and Mulroy Environmental. Client has retained Mulroy Environmental’s services as an external environmental consultant for the duration of the project (approx. 36 months duration).

DRONE/UAV PHOTOGRAMMETRIC & 4K PHOTOGRAPHY SURVEYING CAPABILITIES

Mulroy Environmental use Un-manned Aerial Vehicles (UAV/Drones) for the 3D/aerial photogrammetric surveying of:

Construction sites

We are currently working as the environmental consultant for BAM Civil on the National Children's Hospital and are supervising the removal of approx. 1 million tonnes of overburden/made ground from the site (see plate below). This is to facilitate the construction of 2 basement levels. We are also providing groundwater dewatering supervision services and environmental monitoring. We produce 3D models and orthomosaic which aid in the calculation of excavation void space and soil stockpiles (see plate below). We carry out regular drone surveys of the site under UF101 permission from IAA ATC. The site is directly adjacent to St. James Hospital and residential property is immediately adjacent.



4K Aerial photograph of NCH/St. James Hospital construction site facing NW on 2nd January, 2018



3D Model of NCH/St. James Hospital construction site (2nd January, 2018)

Former Historic Landfills

We are currently finalising 2 Tier II Site Investigation/Tier III GQRA/DQRAs on behalf of Galway County Council for 2 current roads depots which are historic landfills. 3D UAV surveys were carried out on both sites to produce 3D models and orthomosaic to aid in mapping and the calculation of waste deposited on site (see plate below).



4K Aerial drone photo of SAC adjacent to historic landfill

Brownfield sites/historic landfills/Residential Construction Site

We are providing services to our construction contractor client who are constructing a large residential development adjacent to an historic landfill. A Hydrogeological Risk Assessment/Detailed Quantitative Risk assessment is currently being finalised for this project. We are carrying out regular UAV surveys to update existing drawings with regard to current construction progress and to prepare 3D models for hydrogeological modelling.

River floodplains (for flood risk assessments)

We carry out flood risk assessment and used 3D models and orthomosaic to aid in mapping and calculate flood risk. Please note that we use a number of software applications for the various UAV services that we provide e.g. DJI GO, Litchi, Dronedeploy, etc.



3D Model of river taken as part of Flood Risk Assessment project

Please see attached the following:

- Mulroy Environmental SOP Certificate from IAA ATC;
- Pilot Competency Certificate from IAA ATC; and
- Drone Services specific Public and Employers Liability Insurance Policy Schedule for Mulroy Environmental (see Appendix 2).

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**PERSONAL DETAILS:**

NAME: PADRAIC TIMOTHY MULROY
ADDRESS: 30 LISROLAND VIEW,
KNOCKBRIDGE,
DUNDALK,
CO. LOUTH
TELEPHONE: HOME : 042-9384750
WORK: 086-8770380
NATIONALITY: IRISH
STATUS: MARRIED & PARENT
OCCUPATION: ENVIRONMENTAL CONSULTANT
CURRENT: MULROY ENVIRONMENTAL LTD.

Dear Madam/Sir,

My name is Padraic Mulroy and I am a Chartered Scientist with over 24 years' experience in environmental consulting. I have considerable project management experience in environmental impact assessment, waste licensing and permitting, waste facility design, contaminated land assessment, sustainability engineering, planning applications, IED/IPC licensing, wastewater treatment suitability and design, extractive industry and infrastructural projects facilities.

I am a Member of the Institute of Professional Soil Scientists, Engineers Ireland, International Society of Sustainability Professionals, International Association of Hydrogeologists and Society of Brownfield Risk Assessment. I am a registered BREEAM Accredited Professional and a CEEQUAL Assessor with BRE Global and a Global Sustainability Assessment System (GSAS) Certified Green Practitioner (CGP) registered in Qatar. I am also an accredited LEED Green Associate with the US Green Building Council.

I have experience of working as an expert witness in court and at oral hearings and I am a member of the Round Hall 'Irish Bar and Expert Witness Register'. My most recent presentation was titled '*Contaminated Land & Soil Waste Management in the Construction Sector in Ireland*' and given to the National Construction Summit held in May 2019. In 2014, I set up a training wing Mulroy Environmental Training (MET). MET runs a 1-day '*MasterClass in Contaminated Land in the Construction Sector*'. MET is certified by Engineers Ireland as an Accredited CPD Trainer.

I have extensive experience in providing environmental consultancy services in Ireland, Northern Ireland and in Qatar. I am currently the Managing Director of a small environmental consultancy firm, Mulroy Environmental. We currently have 3 full-time employees.

Please feel free to contact me if you have any questions (086-8770380).

Padraic Mulroy

BSc., MSc., MIPSS, MIEI, C.Sci., BREEAM AP, CEEQUAL Assessor, LEED Green Assoc.

PUBLIC PRESENTATIONS:

The following are some of the public presentations which I have given over the past 10 years:

Professional Capacity

- Presentation entitled '**Contaminated Land & Soil Waste Management in the Construction Sector in Ireland**' and given to the National Construction Summit held in May 2018 and 2019. This presentation which is a subset of our 1-day Engineers Ireland CPD Accredited Masterclass in Contaminated Land masterclass course was designed to provide attendees with a focused look at key contaminated land legislative issues and environmental risks along with providing a pragmatic guide to cost effective land investigations, risk assessment, soil waste characterisation, remediation and sustainable soil waste management practices. If you work with civil, structural, building or development work in any capacity, contaminated land can affect your construction project. This presentation provided an understanding of the legislation and science behind site investigation. It looks at the current soil waste management/disposal infrastructure in Ireland and its limitations (i.e. waste licence landfills, waste permitted infills and Article 27 Sites) and waste export options. We looked at legislation in Ireland dealing with contaminated land and soil waste acceptance criteria in the context of construction projects; How regulators (i.e. local authorities and EPA) in Ireland enforce when dealing with brownfield development projects (we look at some Dublin case studies); We looked at current soil waste management/disposal infrastructure in Ireland and its limitations (i.e. waste licence landfills, waste permitted infills and Article 27 Sites); We looked at groundwater contamination, dewatering techniques, discharge licensing and common problems encountered; and we looked at building contractor's requirements for sustainability certification systems (BREEAM, LEED, CEEQUAL, etc) with regard to contaminated land management.
- Presentation entitled '**An Argument for a GIS Inventory of Contaminated Land in Ireland**' given at the 'ICT and Environmental Regulation: Developing a Research Agenda' Conference held at National University of Ireland Galway from the 20th to 21st June, 2013. In an inventory of contaminated land sites carried out by the Irish EPA in 1999 and presented in a CARACAS publication, the number of contaminated land sites in Ireland was conservatively estimated at a relatively modest 2,000 to 2,500. This number was derived from an inventory of contaminated land sites in the petroleum retail sector, at various industrial sites, at closed landfill sites, timber treatment yards, scrap yards, railway yards and former gasworks sites. In comparison, the number of contaminated land sites in the UK is estimated at possibly over 100,000. It is stated that the number of brownfield sites or facilities with contaminated land legacies in Ireland is significantly less in Ireland than those of most other more industrialized European countries such as the UK, due to Ireland's relative late arrival into the industrial age. The Northern Ireland Environment Agency (NIEA) carried out an inventory of potentially contaminated land and has stated in 2011 that they have identified a number in excess of 14,000 sites. This number was revised upwards from 12,000 in 2009. Mulroy Environmental carried out an 'in-house' inventory of key industrial sectors. This in-house inventory suggests that the NIEA contaminated land database number is correct. As such, it is likely that the Rep. of Ireland has over twice the number of potentially contaminated sites as that of Northern Ireland i.e. >30,000.
- Presentation entitled '**Environmental Site Investigation and Due Diligence in the Current Market**' given at the Association of Petroleum and Explosives Administration (APEA) Petroleum Seminar 2012, which was held on the 18th October 2012 in the Silverbirch Hotel, Omagh, Co. Tyrone and on the 15th November 2012 in the Firgrove Hotel, Mitchelstown, Co. Cork. In this presentation, I look at the type and scale of petrol station operating in Ireland. I review the chemical difference between the various types of products retailed in Ireland and the key pollutants/carcinogens within gasoline. I assess what makes a petrol station an environmental liability and review some case studies on what can happen when a serious fuel leak occurs (i.e. impact on adjacent residences and remedial costs incurred). A review of Phase I Site Audit procedures (i.e. desk study, operational assessment, site inspection, etc) is given followed a description of Soil Vapour Survey procedure. A review of Phase II Site Investigation techniques is given followed by a description of current practices in Generic Quantitative Risk Assessment and Detailed Quantitative Risk Assessment. A 'Reality Check' is given on current remediation practices in Ireland and the current waste licensing regime. Finally, suggestions are given with regard to the introduction of the Soils Framework Directive and amendments to the current EPA waste licensing regime and local authority regulation. This presentation was 50 minutes in duration and hosted approximately 40 and 60 delegates respectively.
- Presentation entitled '**Appropriate Due Diligence of Brownfield Sites in the Current Market**' given at the CMG Contaminated Land Conference 2012, which was held on the 16th May 2012 in the Royal Marine Hotel, Dun Laoghaire, Co. Dublin. This presentation addresses current practices in pre-purchase Due Diligence work in Ireland particularly desk study (i.e. historic mapping reviews, on-line data sources, ordnance survey data gaps, etc), site walkover practices, Conceptual Site Modelling, preliminary site investigation design and implementation and generic and detailed quantitative risk assessment procedures. This presentation addresses the current over reliance on 'dig and dump' solutions to contaminated land remediation projects and the lack of expertise within local authorities in addressing the redevelopment of brownfield sites. This presentation also addresses the current waste licensing system and the need for a waste licence where a linked soil management process is proposed. This presentation also compares the cost of waste licence applications in the south to those in the north and address the number of waste licences applied for to date in the Rep. of Ireland. This presentation was 0.5 hours in duration and hosted approximately 46 delegates;
- Presentation entitled '**Contaminated Land in Ireland – A Consultant's Perspective**' given on the 8th September, 2011 at the Scottish Contaminated Land Forum, University of Strathclyde, Glasgow. The issue of historic contaminated land is one which in Ireland we have managed, insofar as it has been possible to do so, to avoid directly addressing. There is no definition of contaminated land within the Irish legislature. Other EU member states have chosen individual methods of addressing this issue e.g. the UK Environmental Protection Act 1990, Part 11A in the UK. To date Ireland has no national soil protection policy nor does it have any national soil quality and/or remediation standards. There is as yet no dedicated regulatory regime providing guidance on the identification, assessment or remediation of brownfield sites. In effect, the regulation of contaminated land in Ireland is a 'Non Liqueur' or legal Lacuna (i.e. a gap or void). This presentation was 0.5 hours in duration and hosted approximately 100 delegates;

DETAIL MEMBERSHIP OF PROFESSIONAL ASSOCIATIONS & INSTITUTIONS:

PROFESSIONAL ASSOCIATION, INSTITUTION	GRADE OF MEMBERSHIP	DATE OF ADMISSION
PROFFESIONAL		
International Society of Sustainability Professionals	Member (applying for ISSP-CSP)	2020
BREEAM Accredited Professional (AP)	Licensed Accredited Professional (AP)	2018
CEEQUAL Assessor	Assessor	2016
LEED Green Associate	Member	2015
Global Sustainability Assessment System (GSAS) – Certified Green Practitioner (CGP) (Qatar)	Member	2014
Round Hall Irish Bar & Expert Witness Register	Ordinary	2010
UK Science Council	Chartered Scientist	2009
Institute of Professional Soil Scientists	Ordinary (PSS /115/000198)	2009
Institute of Engineers (Secretary/ Public Relations Officer of NE Branch of IEI in 2003)	Ordinary (IEI No. 037097)	1997
International Register of Certified Auditors (IRCA)	EMS Auditor A11958	1998
RELATED PROFESSIONAL ACTIVITES:		
Society of Brownfield Risk Assessment (SoBRA)	Ordinary	2015
International Association of Hydrogeologists (IAH)	Ordinary	1998
British Soil Science Society (BSSS)	Member	2008
Site Suitability Testing – Register of Site Assessors for Louth	Member	2008
Irish On-Site Wastewater Association (IOWA)	Ordinary	2007
Association of Petroleum and Explosives Administration (APEA)	Ordinary	2009
Soil Science Society of Ireland (SSSI)	Member	1999
Environmental Sciences Association of Ireland (ESAI)	Ordinary	1997
Sigma Xi, The Scientific Research Society	Associate	1995

PUBLICATIONS :

TITLE OF PUBLICATION	BRIEF OUTLINE OF THE CONTENT	JOURNAL TITLE & DATE
<i>Contaminated Land in Ireland – A Consultant’s Perspective</i>	The issue of historic contaminated land is one which in Ireland we have managed, insofar as it has been possible to do so, to avoid directly addressing. There is no definition of contaminated land within the Irish legislature. Other EU member states have chosen individual methods of addressing this issue e.g. the UK Environmental Protection Act 1990, Part 11A in the UK. To date Ireland has no national soil protection policy nor does it have any national soil quality and/or remediation standards. There is as yet no dedicated regulatory regime providing guidance on the identification, assessment or remediation of brownfield sites. In effect, the regulation of contaminated land in Ireland is a ‘ <i>Non Liqueur</i> ’ or legal Lacuna (i.e. a gap or void).	Chartered Institute of Water and Environmental Management (CIWEM) – Contaminated Land Newsletter, April 2011
<i>Influence of Nitrogen and Phosphorous Fertilizers on of 2,4-Dichlorophenoxyacetic acid Degradation in Soil</i> , P. T. Mulroy and L.T. Ou,	Mineralization of ¹⁴ C-2,4-D in soil amended with a nitrogen fertiliser (NH ₄ NO ₃) was markedly reduced and progressively decreased with N application rate. On the other had, 2,4-D mineralization in soil was generally not affected by the addition of a phosphorous (P) fertilizer (Ca {(H ₂ PO ₄) ₂). Addition of both N an P fertilizers to soil, 2,4-D mineralization either further reduced or was not affected. Even though NH ₄ NO ₃ may increase overall soil microbial activity, especially nitrification activity, as a result of catabolite repression, it may inhibit 2,4-D degradation.,	Journal of Environmental Science and Health B32(3), 353-362(1997).
<i>Degradation of Tetraethyllead during the Degradation of Leaded Gasoline Hydrocarbons in Soil</i> , P. T. Mulroy and L.T. Ou,	Little is known regarding the fate of Tetra-ethyl lead (TEL) in leaded gasoline-contaminated subsoils and groundwater. In soil not contaminated with gasoline, TEL was rapidly degraded and completely disappeared in 14 days. In gasoline-contaminated soil, TEL degradation was slower; after 77 days 4 to 37% of the applied TEL still remained in the contaminated soil. Disappearance of Total Petroleum Hydrocarbons (TPH) was initially rapid but slowed appreciably after 7 to 14 days. As a result, after 77 days, 33 to 51% of the applied gasoline still remained in the soil. The retardation of TEL degradation in leaded gasoline-contaminated soil is due to the presence of gasoline hydrocarbons. As long as gasoline hydrocarbons remain in soil, TEL may also remain in soil, most likely in the gasoline hydrocarbon phase.	Environmental Toxicology and Chemistry, Vol. 17, No. 5, 777-782 (1998).

DETAILED INFORMATION ON UNDERGRADUATE QUALIFICATIONS:

QUALIFICATION (BA, MA, PH.D.)	FULL/ PART TIME	FROM	TO	SUBJECTS										
B.Sc. (Microbiology) Final Year Thesis: <i>Anaerobic digestion of pharmaceutical Wastewater</i>	FULL	1989	1993	<table border="1"> <thead> <tr> <th>SUBJECT</th> <th>GRADE</th> </tr> </thead> <tbody> <tr> <td>Microbiology (Final)</td> <td>2.1 Honour</td> </tr> <tr> <td>Marine Microbiology (3rd Year) Genetics (3rd Year) Human Nutrition (3rd Year) Advanced Microbiology (3rd Year)</td> <td>Pass</td> </tr> <tr> <td>Zoology (2nd Year) Advanced Microbiology (2nd Year) Stats/Algebra (2nd Year)</td> <td>Pass</td> </tr> <tr> <td>Physics (1st Year) Biology (1st Year) Chemistry(1st Year) Applied Mathematics (1st Year)</td> <td>Pass</td> </tr> </tbody> </table>	SUBJECT	GRADE	Microbiology (Final)	2.1 Honour	Marine Microbiology (3 rd Year) Genetics (3 rd Year) Human Nutrition (3 rd Year) Advanced Microbiology (3 rd Year)	Pass	Zoology (2 nd Year) Advanced Microbiology (2 nd Year) Stats/Algebra (2 nd Year)	Pass	Physics (1 st Year) Biology (1 st Year) Chemistry(1 st Year) Applied Mathematics (1 st Year)	Pass
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Physics (1 st Year) Biology (1 st Year) Chemistry(1 st Year) Applied Mathematics (1 st Year)	Pass													

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DETAILED INFORMATION ON POSTGRADUATE QUALIFICATION:

QUALIFICATION	TIME	FROM	TO	SUBJECTS																								
<p>M.SC. (THESIS) MAJOR: SOIL & WATER SCIENCE MINOR: ENVIRONMENTAL ENGINEERING</p> <p>University of Florida, Gainesville, Florida, U.S.A., 1996.</p>	FULL	Jan 1994	Jan 1996	<table border="1"> <thead> <tr> <th>SUBJECT</th> <th>GRADE</th> </tr> </thead> <tbody> <tr> <td>Aquatic Microbiology</td> <td>A</td> </tr> <tr> <td>Soil Microbiology</td> <td>A</td> </tr> <tr> <td>Water Chemistry</td> <td>A</td> </tr> <tr> <td>Soil Chemistry</td> <td>B+</td> </tr> <tr> <td>Environmental Toxicology</td> <td>A</td> </tr> <tr> <td>Contaminant Behaviour in Soils</td> <td>A</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>SUBJECT</th> <th>GRADE</th> </tr> </thead> <tbody> <tr> <td>Pollutant Behaviour in Groundwater</td> <td>A</td> </tr> <tr> <td>Biodegradation/ Bioremediation</td> <td>A</td> </tr> <tr> <td>Soil Fertility</td> <td>A</td> </tr> <tr> <td>Instrumental Analysis</td> <td>B</td> </tr> </tbody> </table> <p>Grade Points Average (GPA) = 3.67</p> <p><u>Thesis: Degradation and Remediation of Tetra-ethyllead in Leaded Gasoline Contaminated Soil.</u> Awarded State Studentship by University of Florida following submission of Graduate Requirements Examination results.</p> <ul style="list-style-type: none"> Contracted on 0.40 Full Time Equivalent 32 Hour biweekly workload. <p>1994 - 1996: Graduate Assistant, Soil Microbiology/ Biotechnology Laboratory, Soil and Water Science Department, University of Florida, Gainesville, Florida, U.S.A. (advisor Dr. L.-T. Ou).</p>	SUBJECT	GRADE	Aquatic Microbiology	A	Soil Microbiology	A	Water Chemistry	A	Soil Chemistry	B+	Environmental Toxicology	A	Contaminant Behaviour in Soils	A	SUBJECT	GRADE	Pollutant Behaviour in Groundwater	A	Biodegradation/ Bioremediation	A	Soil Fertility	A	Instrumental Analysis	B
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<p>University of Florida, Gainesville, Florida, U.S.A., 2009.</p> <p>ENVIRONMENTAL SOIL PEDOLOGY</p>	PART	Jan 2009	May 2009	<p>Soil & Water Science Department, University of Florida, Gainesville, Florida, U.S.A. (advisor Dr. W. Harris) Distance Education Programme – 3hrs/week 4 Course Credits towards Ph.D Programme (Environmental Soil Science) Result: A</p>																								
<p>University of Florida, Gainesville, Florida, U.S.A., 2009.</p> <p>BIO-GEOCHEMISTRY OF HEAVY METALS</p>	PART	Jan 2010	May 2010	<p>Soil & Water Science Department, University of Florida, Gainesville, Florida, U.S.A. (advisors Dr. L. Ma & Dr. J.C. Bonzongo) Distance Education Programme – 4 hrs/week 3 Course Credits towards Ph.D Programme (Environmental Soil Science) Result: A</p>																								

EMPLOYMENT RECORD:**Present or most recent employment:**

Position Held: Managing Director of Mulroy Environmental **From - To:** January 2007 - present

Name & Address of Employer: Self-employed (i.e. Mulroy Environmental)

Duties and Responsibilities:

- Certification of green building e.g. BREEAM, CEEQUAL, LEED, GSAS, etc
- Preparation of Environmental Impact Statements & Planning Applications;
- Contaminated Site Risk Assessment;
- Site Investigation and Remediation, Bioremediation of Contaminated Soil/Groundwater;
- Waste Licensing, Permitting & Facility Design;
- Groundwater Resource Assessment;
- Discharge Licence Applications/Wastewater Treatment Plant Design & Site Suitability Assessment;
- Strategic Environmental Assessment;
- Water Quality Monitoring and Wastewater Characterisation & Monitoring; and
- Soil and Water Microbiology & Environmental Chemistry.

Previous employment:

Position Held: Project Manager/Senior Scientist **From - To:** 1999-2006

Name & Address of Employer: Tobin Consulting Engineers, Blanchardstown Corporate Park, Blanchardstown, Dublin 15

Duties and Responsibilities: Project management in a range of Environmental Impact Assessments, Planning Applications and Waste Licence Applications for Industrial/Commercial/Residential projects for private and public sector. Contaminated land site investigation and remediation supervision. This role entailed staff recruitment, supervision and maintaining contact and supervision of sub-consultants and sub-contractors as well as ensuring discharge of reports and other project deliverables within agreed timeframe and within agreed budget.

Reason for Leaving: To start up own company (Mulroy Environmental)

Previous employment:

Position Held: Project Scientist **From - To:** 1996 – 1999

Name & Address of Employer: Dames & Moore Environmental Consultants (now URS), Iveagh Court, Harcourt Road, Dublin 2.

Duties and Responsibilities: Groundwater investigation and remediation with a particular emphasis on bioremediation. Environmental Management System (ISO 14001) implementation and auditing. Installation of product recovery systems (pump & treat, soil vapour extraction, bioslurping, skimming, etc), well drilling (Shell & Auger, Air Rotary) and piezometer installation, falling/rising head testing, landfill monitoring, window sampling, trial-pitting, surveying, bioremediation skills (field bioreactor & microbial culture vessels set-up, terraventing, etc) and emergency spill response. Design of the afore-mentioned systems; desk study, interpretation of chemical, microbiological, geological, and hydrogeological data collected; groundwater vulnerability assessment; as well as report writing, and liaison with clients and regulatory bodies.

Laboratory QA/QC Co-ordinator - Data interpretation and laboratory quality assurance and quality control planning i.e. the application of field, method and trip blanks, matrix spikes and field duplicates.

Reason for Leaving: To gain broader experience

SOFTWARE EXPERIENCE:

SOFTWARE	EXPERTISE		
	EXTENSIVE WORKING KNOWLEDGE	GOOD WORKING KNOWLEDGE	BASIC KNOWLEDGE
RBCA Risk Assessment Model Toolkit Version 2		y	
Litchi (4K Drone Video/Photography software)	y		
Dronedeploy (2D/3D Drone Mapping software)	y		
DJI Go/Groundstation/PIX4D (Drone Software)	y		
HazWasteOnline – Hazardous Waste Classification Tool		y	
RTM Methodology for the derivation of remedial targets for soil and groundwater to protect water resources		y	
Contaminated Land Exposure Assessment Model (CLEA)		y	
Autocad Land Desktop & Map 2017 & earlier		y	
Garmin BaseCamp		y	
Corel Draw		y	
Microsoft Office	y		
MS Access Power Point		y	
Microsoft Project		y	
MS Access, Excel & Word	y		
MS Visio			y

FIELD SKILLS:

Drill rig supervision, land surveying, site suitability assessments, trial pitting, P & T-Testing, GPS, flying & programming drones for aerial photography & video, etc. Familiar with use of field instrumentation such as PID, FID, explosimeter, landfill gas monitors, pH-, EC-, eV-meters, transducer, flow meter, interface-probe, automated samplers, colorimetric field testing kits, etc. Familiar with use of noise meter (Bruel & Kjaer, 2250).

HOBBIES:

Swimming, rowing, running, sailing, water sports, classical music and yoga.

REFEREES:

NAME : Dr. L. -T. Ou	NAME : Sean Finlay
POSITION : Former Professor (now retired)	POSITION : Director – Business Development
ADDRESS : Soil & Water Science Department	ADDRESS : Geoscience Ireland
2169 McCarty Hall A, IFAS, University of Florida, Gainesville, Florida, FL 32611, USA	Geoscience Ireland Geological Survey of Ireland Beggars Bush Haddington Road Dublin 4 Ireland
PH: (352)392-1951 ext 214 FAX: (352) 392-3902 EMAIL: lto@ifas.ufl.edu	PH +353 (0)1 678 2842 MOB +353 (0)87 257 5017 EMAIL: sean.finlay@geoscience.ie

EMPLOYMENT RECORD:**Present or most recent employment :**

Position Held: Managing Director of Mulroy Environmental/former Principal of Environmental Section, Duffy Consulting Engineers, Qatar

From - To: January 2007 - present

Name & Address of Employer: Self-employed (i.e. Mulroy Environmental)

Duties and Responsibilities:

- Infrastructure Sustainability Certification - CEEQUAL Certification
- Green Building/Sustainability Certification – BREEAM, GSAS & LEED Certification;
- Preparation of Construction Environmental Management Plans (CEMPs);
- Preparation of Environmental Impact Statements & Planning Applications;
- Contaminated Site Risk Assessment;
- Site Investigation and Remediation, Bioremediation of Contaminated Soil/Groundwater;
- IPC/IED Licensing & compliance monitoring;
- Waste Licensing, Permitting & Facility Design;
- Groundwater Resource Assessment;
- Discharge Licence Applications/Wastewater Treatment Plant Design & Site Suitability Assessment;
- Strategic Environmental Assessment;
- Water Quality Monitoring and Wastewater Characterisation & Monitoring; and
- Soil and Water Microbiology & Environmental Chemistry.

IPPC/IED LICENSED SECTOR

- Currently carrying out daily surface water sampling, wastewater sampling and monthly groundwater monitoring at an IED licensed contaminated sediment treatment facility located in Dublin Port. This facility is currently treating contaminated sediment excavated from Alexandra Basin West (which is classed as a hazardous waste) using a lime stabilisation/solidification process. The stabilised material (monolith) is being placed in a former lined graving dock and a dedicated bund location within the port. A wastewater is generated as a result of this process which requires daily sampling and testing. Surface water sampling is carried out on a daily basis at 3 locations within Dublin Port using a 6.2m RIB powerboat. Groundwater sampling of 14 wells located within Dublin Port is carried out monthly. Weekly surface water, occasional stormwater and monthly groundwater reports are submitted to our client for onward submittal to the EPA.
- Managed the production of an Environmental Baseline Report and Appropriate Assessment Screening Report for existing IED licensed polymer manufacturing facility. The EBR involved a Phase I environmental site audit and a Phase II hydrogeological site investigation encompassing the installation of 3 groundwater monitoring boreholes followed by a Detailed Quantitative Risk Assessment (DQRA).
- Currently providing groundwater, surface water, noise and dust monitoring and bund integrity testing services to 4 IPC licence holders.
- Managed a Phase II Site Investigation/Generic Quantitative Risk Assessment and production of a Remedial Plan of an historic area located within the site cartilage of an IPC facility as part of a licence condition. This was carried out in conjunction with the EPA's *Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites*. The site investigation involved the drilling of 5 boreholes and the subsequent installation of 2 groundwater monitoring boreholes and the excavation of 14 trialpits within the historic waste area. Soil, waste and groundwater samples were taken and analysed for a comprehensive laboratory suite. This historic waste area, which contained boiler ash, was assessed with regard to the potential risk posed to site operatives, the underlying groundwater aquifer and the adjacent surface water body. As stated, a Generic Quantitative Risk Assessment (GQRA) was carried out with no exceedances of generic assessment criteria observed.
- Managed a Phase II Site Investigation/Risk Assessment and production of a Remedial Plan of a former Bunker Oil Bund located within the site cartilage of an IPC facility as part of a licence condition. The site investigation involved the drilling of 7 boreholes within the former bund area. Soil samples were taken and analysed for a comprehensive laboratory suite. A Generic Quantitative

Risk Assessment (GQRA) was initially carried out with 2 exceedances of generic assessment criteria observed. Following this a Detailed Quantitative Risk Assessment was carried out, following which an exceedance of a specific hydrocarbon chain group was observed. Recommendations were given for the removal of contaminated soil on site. Mulroy Environmental supervised the removal of approximately 26 tonnes of soil to a licensed hazardous waste treatment facility. Following this, a Validation/Close-Out Report was submitted to the EPA and accepted.

- Managed a Hydrogeological Investigation on an IPC facility as part of a licence condition. The purpose of this investigation was to examine the elevated levels of ammonia observed within the groundwater on-site and to assess if natural attenuation is occurring following the remedial works carried out at the facility on leaking stormwater drains. The Hydrogeological Investigation involved the pump testing of the 4 existing on-site groundwater monitoring boreholes within the site's cartilage and the sampling of groundwater for laboratory analysis. Ammonia and other parameters were compared to historical groundwater data for the site. It was concluded that the remedial works carried out at the facility on leaking stormwater drains was successful and that natural attenuation is occurring within the aquifer.
- Carried out a wastewater characterisation study on behalf of a pharmaceutical research facility that intended to commence research on a cancer treatment drug. This facility which currently has a wastewater treatment plant on site discharges into the municipal foulwater system. A discharge licence was issued by a local authority in the 1980s. The facility's management felt that it was prudent to determine if the change in processing would generate toxic waste streams. The washdown water from a scaled down batch of the cancer treatment drug was collected and a subsample was submitted for chemical and toxicological testing. A report was prepared on the findings of the afore-mentioned testing.

ENVIRONMENTAL IMPACT ASSESSMENT (INDUSTRIAL)

- Contributed to the geological, hydrogeological and hydrological sections of an environmental impact assessment for a large whiskey maturation warehouse complex to be located on a rural agricultural zoned 111-acre site in the northeast of Ireland. The development required a material contravention of planning zoning. Following this, the EIS will accompany a planning application for the development. The development will consist of 13 maturation warehouses for the maturation of whiskey casks produced by a local distillery (i.e. who are the site owners). The development will require approval by the HSA under the Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations. As part of the environmental baseline study, 85 trialpits were excavated within 4 key areas on site: 2 former infilled quarries, a former farm building complex and a former water logged area used for dumping. Seven groundwater monitoring wells have been installed. Monitoring of the adjacent surface water body has been carried out at 6 locations in addition to invertebrate monitoring. The flow of the river is currently being monitored remotely by a GSM equipped Ecolog500.

CONSTRUCTION SECTOR

- *National Childrens Hospital, St. James Hospital, Dublin*

We are currently working as the environmental consultant for BAM on the National Children's Hospital and have supervised the removal of approx. 1 million tonnes of overburden/made ground from the site (see plate below). This is to facilitate the construction of 3 basement levels. We are carrying out weekly monitoring of treated (i.e. carbonised) stormwater and groundwater discharges to storm and also providing groundwater table monitoring and groundwater dewatering supervision services and monthly dust monitoring. The site is directly adjacent to St. James Hospital and residential property is immediately adjacent.

- *Qatar Construction Project - Package 06 of Doha Industrial Area (Contract No.: QS001-P06)*

Appointed by 'Larsen & Toubro Al Sraiya Trading & Contracting JV' as external environmental consultant in September, 2015 for Package 06 of Doha Industrial Area (Contract No.: QS001-P06, €400m capital project). Prepared Construction Environmental Management Plan (CEMP) and gave a successful presentation to Public Works Authority (Ashghal). PWA approval of CEMP granted and construction initiated on site on the 1st December, 2015. Provided on-site environmental management, environmental monitoring and supervision services as an independent environmental consultant over the initial 4-month establishment period and from December, 2015 to March, 2016. Weekly environmental progress meetings with GEC and monthly project team meetings. Processed Monthly Environmental Progress Reports and Key Performance Indicator (KPI) Reports for GEC, PMC and PWA

approval and uploaded to web based PWA's LRDP's Project Management Information System (PMIS). Processed environmental permit applications, Groundwater Dewatering Strategy and Microtunnelling Method Statements. Supervised construction of 4 on-site groundwater monitoring wells and follow-up baseline monitoring to assess groundwater treatment requirements. Carried out groundwater treatment technology of various technologies to identify most suitable system and subcontractor for treatment of contaminated groundwater prior to injection to deep aquifer well. Supervision and training of L & T environmental staff through in-house presentations (i.e. Phase 1 Environmental Auditing, contaminant soil and groundwater risk, etc) and training of manual labourers in on-site environmental risks through tool box talks prepared jointly by L& T HSE staff and DCE. Client has retained DCE's services as an external environmental consultant for the duration of the project (approx. 36 months duration).

CONTAMINATED LAND

- Carried out a Tier II Site Investigation and a Tier III Detailed Quantitative Risk Assessment (DQRA) of a former landfill located in Dublin on behalf of a property developer. As part of the investigative works, 17 groundwater monitoring wells and 4 gas monitoring wells were installed on site. Landfill gas monitoring, groundwater and surface monitoring were carried out over approximately 2 years to determine the risk to adjacent residential properties with on-going liaison with the local authority. A landfill gas and VOC monitoring programme, followed by a risk assessment according to CIRIA 665 guidelines is being implemented. A joint DQRA was undertaken using CONSIM to determine the risk to groundwater and using RBCA Version 2.6 to determine the risk to residents. These DQRAs provided the basis for decision making, to ensure the safe re-development of the contaminated land for further use and to ensure that there will be no adverse impact to the environment. Currently supervising the installation of an engineered cap which is incorporated leachate and landfill gas controls.
- Carried out a Tier II Site Investigation and a Tier III GQRA Assessment of a former landfill on behalf of a local authority. The site area is 1.21 hectares (ha) and is currently used as a roads maintenance depot. The landfill which is located in a karstified limestone area, was deemed to be high risk after a COP Tier 1 Environmental Risk Assessment was carried out. As part of the investigative works, 3 gas/groundwater monitoring wells and 2 gas monitoring/leachate wells were installed on site. Surface water monitoring was carried out on the site given its proximity to an SAC (i.e. turlough/wetland area to the east). In addition, 12 trialpits were excavated as part of an extensive trialpit investigation. The purpose of the trialpit investigation was to determine the classification and approximate volume of waste. A geophysical survey was carried out after the trialpit investigation to aid in this process. Soil, groundwater, leachate, and surface water samples were taken and analysed for a comprehensive laboratory suite. Following the installation of the 3 monitoring wells, a quarterly groundwater sampling programme was implemented. A landfill gas and VOC monitoring programme, followed by a risk assessment according to CIRIA 665 guidelines was carried out. An ecological survey was carried out by a Chartered Ecologist and an appropriate assessment screen was carried out on the site to determine if a Natura Impact Assessment was required given its proximity to the Special Area of Conservation to the east. A Generic Quantitative Risk Assessment (GQRA) was completed to provide a foundation for decision making. An Advisory Appropriate Assessment is currently being completed.
- Carried out a Tier II Site Investigation and a Tier III GQRA Assessment of a former landfill on behalf of a local authority. The site area is over 10 hectares (ha) and is currently used as a roads maintenance depot. The landfill, which is located in an upland blanket bog area, was deemed to be high risk after a COP Tier 1 Environmental Risk Assessment was carried out. As part of the investigative works, 3 gas/groundwater monitoring wells and 2 gas monitoring/leachate wells were installed on site. A comprehensive surface water monitoring survey (i.e. Small Stream Risk Assessment) was carried out on a mountain stream in proximity to the site which discharges into a Special Area of Conservation. In addition, 12 trialpits were excavated as part of an extensive trialpit investigation. The purpose of the trialpit investigation was to determine the classification and approximate volume of waste. A geophysical survey was carried out after the trialpit investigation to aid in this process. Soil, groundwater, leachate, and surface water samples were taken and analysed for a comprehensive laboratory suite. Following the installation of the 3 monitoring wells, a quarterly groundwater sampling programme was implemented. A landfill gas and VOC monitoring programme, followed by a risk assessment according to CIRIA 665 guidelines was carried out. An invertebrate sampling survey was carried out on the stream and a qualitative hydrological survey was carried out on the site to determine if a Natura Impact Assessment was required given its proximity to the Special Area of Conservation to the south. A Generic Quantitative Risk

Assessment (GQRA) was completed to provide a foundation for decision making. An application for a Certificate of Authorisation for the historic landfill was made on behalf of the local authority to the EPA.

- Managed the production of a Tier 3 Detailed Quantitative Risk Assessment (DQRA) and production of a Remedial Plan of a former historic waste landfill. This was carried out in conjunction with the EPA's *Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites*. A Tier 2 Environmental Risk Assessment had been carried out by a previous consultant on the former waste disposal site on behalf of Kildare County Council (KCC). The purpose of the DQRA was to provide information that would allow an assessment to be made regarding the existence of possible significant pollutant linkages onsite, which may require remediation measures to be put in place. The RBCA Model Toolkit Version 2 was utilised to assess the risk to site operatives, groundwater and an adjacent surface water body. Continued monitored natural attenuation of groundwater and surface water was recommended with capping improvements recommended for certain areas of the site.
- Mulroy Environmental carried out a Phase II Site Investigation of a former industrial site proposed for a supermarket located within a short distance of the river. This site is in dense residential area. In the northern part of the site extensive deposits of chrysotile shards were identified within topsoil imported for a former garden and orchard. In addition to the asbestos contamination, this project involved the delineation of a number of contaminants including heavy metals resulting from recent anthropogenic effects and natural occurring elevated metals due to the geochemistry of the alluvium deposited within the floodplain of the river. A Detailed Quantitative Risk Assessment (DQRA) was carried out using RBCA Software Toolkit for Chemical Releases 2.6 to assess the risk from trace heavy metals found on site. Approximately 600 tonnes of asbestos contaminated soil were removed from the site and transferred to a Hazardous Waste Landfill in Northern Ireland. This process was supervised by Mulroy Environmental. Over 90% of the construction and demolition waste was crushed on site and re-used as construction fill substituting for virgin aggregate. This material was tested extensively for the presence of asbestos (see Plate 9 below). A Close-Out/Validation Report was produced after the remediation.
- Managed a Phase II Site Investigation/Risk Assessment & Remedial Plan of a Petrol Retail Station located in County Westmeath. The investigation works involved drilling 8 boreholes using a Bobcat Window Sampler to assess the degree of contamination of the overburden and the underlying groundwater. Six of these boreholes were installed with groundwater piezometers for groundwater sampling. Residual contamination and a minor groundwater plume was identified on site. The RBCA Model Toolkit Version 2 was utilised to assess the risk to site operatives and an adjacent surface water body. This will be remediated in 2009 by excavation of approximately 500 tonnes of the contaminated material and transfer to a Hazardous Waste Facility.
- Managed a Phase II Site Investigation/Risk Assessment & Remedial Plan of a Petrol Retail Station located in County Offaly. The investigation works involved drilling 6 boreholes using a Bobcat Window Sampler to assess the degree of contamination of the overburden and the underlying groundwater. These boreholes were installed with groundwater piezometers for groundwater sampling. A public water abstraction borehole is located to the east of the site with the subject site being within the outer source protection zone. The RBCA Model Toolkit Version 2 was utilised to assess the risk to site operatives, groundwater and the afore-mentioned water abstraction borehole. This was remediated by excavation of approximately 1,700 tonnes of the contaminated material and transfer to a Hazardous Waste Facility. In order to determine the impact of historical activities on the underlying aquifer a groundwater monitoring borehole was installed to 46m (i.e. 29m into bedrock) and sampled. The site was remediated successfully and is now being developed into a modern petrol retail site with accompanying shop and restaurants.

NUTRIENT MANAGEMENT PLANS/LANDSPREADING

- Processed a Nutrient Management plan for a 600-acre mixed pastureland and tillage farm located in County Meath. This work involved the division of the site into 5-hectare subplots and the taking of 31 composite soil samples for pH, organic matter, clay content, Total Phosphorus, Potassium, lime requirement and heavy metals analysis. This project involved the preparation of an extensive set of land spreading maps using Autocad Map 2009 which included the application of residential, surface water body, Special Area of Conservation (SAC) and flood buffer zones and Groundwater Protection Zone restrictions on a public water abstraction well in the vicinity of the site. Following this, approximately 55% of the site

was found to be suitable for the application of biosolids in Spring, 2013. It is proposed to spread approximately 6,500 tonnes of lime stabilised biosolids on this land in 2013.

WASTE MANAGEMENT/STATUTORY APPLICATIONS

- Processed a successful planning application for an 'End-of-Life Vehicle' (ELV)/Authorised Treatment Facility (ATF) in a rural area in Aughrim, County Galway. The site was formerly used for a truck repair and dismantling operation. The site is over 2 hectares in area and the expected throughput for the site is 500 ELVs per year with an eventual potential storage of 2,000 depolluted ELVs on site. This project involved a comprehensive pre-planning consultation process with the Galway County Council Planning Department. Mulroy Environmental is now processing the waste permit application;
- Working with Mcardle Doyle Consulting Engineers Ltd., secured planning permission for a 3,600 tonnes per annum waste transfer station in Thurles, Co Tipperary. The proposed development included a change of use for the existing warehouse building, offices, and wholesale timber yard to a domestic/ commercial/ non-hazardous industrial waste transfer station and dry recycling facility to include a new surface water attenuation with waste water interceptor, rain water harvesting system, a commercial vehicle weighbridge, a new public civic amenity recycling facility, signage and planting. Mulroy Environmental carried out a site suitability assessment and processed a detailed environmental report and revised drawings to comply with a request for further information by North Tipperary County Council. Planning permission was granted by North Tipperary County Council on the 23/03/11. This decision, however was appealed by a 3rd party to An Bord Pleanála on the 27th April 2011. North Tipperary County Council's decision was upheld by An Bord Pleanála on the 12th March 2012;
- Acted as an expert witness for operator of an ELV facility who was subject to legal proceedings brought by a local authority. These legal proceedings involved 3 items of suspected non-compliance with planning conditions from a previous planning permission. These proceedings have since been dropped by the local authority following arbitration by an agreed intermediary.
- Managed a successful Waste Permit Application for an existing 'End-of-Life Vehicle' Recycling Plant which will de-pollute cars in a dedicated de-pollution area. This site is in rural area. As part of this work 2 dedicated groundwater monitoring wells were installed on site to assess groundwater pollution from on-site and off-site activities;
- Managed a successful Waste Permit Application for an existing 'End-of-Life Vehicle' Recycling Plant which will de-pollute cars in a dedicated de-pollution area on site prior to transfer to another End-of-Life Vehicle Recycling Plant. This site is in a heavily industrialised area and as part of this work 2 dedicated groundwater monitoring wells were installed on site to assess groundwater pollution from on-site and off-site activities.
- Managed the processing of a Waste Permit application for the remediation of a contaminated historical landfill. This site which was formerly a quarry was landfilled over a period of 30 years causing groundwater contamination on site. The project involved the excavation of approximately 14,000m³ of waste consisting of a mixture of construction and demolition waste and domestic waste. C & D waste will be processed on site using a trommel, crusher and screen and recycled as construction fill material. This material will be assessed for its geotechnical properties to ensure compliance with current NRA standards. The fines segregated by the C & D process will be sampled for laboratory analysis and assessed for contamination and its subsequent suitability for use on site. All municipal waste will be segregated and transferred to a municipal landfill. Hazardous waste will be transferred to a Waste Licensed Facility;
- Managed the successful application for a waste permit on behalf of Aranmount Ltd. (the client) for an infill/reclamation of a 4.1-hectare site which is located at Drummeenagh, Castlebellingham, County Louth. The site will be infilled by raising the site an average of 1m over its present height and that this 1m of fill would be made up of 0.75m subsoil and a minimum of 0.25m of topsoil. Given a surface area for infilling of 30,369m², it is estimated that approximately 60,738 tonnes of soil will be required.
- Managed the compliance with a Section 55 Notice which was issued by Louth C.C. on the 17th July, 2006 regarding a Brownfield Site located in North Drogheda. This land is owned by a client who wishes to develop the property for commercial and industrial usage. The site was originally the location of a limestone quarry which following its end of life was used for the landfilling of domestic waste and inert rubble. Following a risk assessment by a previous consultant, recommendations were made with regard to the safe development of the site. Following an assessment of the age of the domestic waste encountered onsite and its associated risk, a capping design and gas cut-off wall design were drawn up. This site is now being developed.

- Managed the compliance with a Section 55 Notice which was issued by Louth C.C. regarding a brownfield site in Dundalk. The site was originally the location of a limestone quarry which following its end of life was used for the landfilling of domestic waste and inert rubble. As part of this work, a successful Waste Permit Application was processed for the remediation of the site. All waste was removed from the site as part of preliminary groundworks for a motorway.

EXPERT WITNESS

- Acting as an expert witness and providing consultancy to client who has enforcement proceedings initiated against him by Meath County Council regarding non-conformance with certain conditions of his planning permission. The client currently runs a waste permitted End-of-Life Vehicle Authorised Treatment Facility (ATF).
- Acted as an expert witness and providing consultancy to a client who wishes to purchase a petrol retail property. This property has been historically contaminated by on-site leakages of both diesel and petrol with both the overburden and the underlying aquifer found to be contaminated. Our client proposes to redevelop the site following its remediation by the vendor. The site is located in a primarily residential area. To date, 44 intrusive site investigation boreholes have been drilled on site since 1995. Our client ordered an environmental audit of the site and a comprehensive review of all of the 7 associated environmental reports which contains a Remediation Action Plan. The Remediation Action Plan devised by the vendor was reviewed by Mulroy Environmental and was deemed to be insufficient to remove all of the on-site and off-site risks. A number of flaws and shortcomings were identified by Mulroy Environmental with recommendations given to the client and his legal representative. The client's legal representative initiated legal proceedings against the vendor for breach of contract and Mulroy Environmental will assist in the production of affidavits.
- Currently acting as an expert witness and providing consultancy to a client whose water abstraction borehole was contaminated by a malfunctioning/overloaded wastewater treatment plant. This work involved a comprehensive qualitative assessment of the groundwater within the contaminated borehole over a period of time to determine the cause of the contamination. Mulroy Environmental co-ordinated communications with the regulator, Louth C.C. regarding the contaminated groundwater. Louth C.C. issued a Section notice under the Water Pollution Act, 1997-1990. Our client's legal representative has initiated legal proceedings with the High Court against our client's neighbour over damages caused to his property and to loss of quality of life. Mulroy Environmental contributed to the production of the affidavits.
- Acted as an expert witness and providing consultancy to a client whose property was leased to a commercial tenant. This tenant operated an oil depot and diesel retail shop as a leasee for approximately 20 years. Following a termination of the lease, a site investigation and risk assessment report was carried out on the subject site by a consultant working on behalf of the former leasee. Our client ordered an environmental audit of the site and a comprehensive review of the afore-mentioned report. A number of flaws and shortcomings were identified by Mulroy Environmental with recommendations given to the client and his legal representative.
- Acted as an expert witness and provided consultancy to a client who was subject to circuit court proceedings by Louth C.C. regarding the suspected illegal deposition of waste on his farmstead without a waste permit. A site investigation was carried out on behalf of the client following which a Risk Assessment Report was produced by Mulroy Environmental. This report was taken as evidence in court session at Ardee District Court during which Padraic Mulroy was questioned by the judge on elements of the report.
- Provided consultancy to the Toome Anti-Power Plant Residential Group and acted as an expert witness at the An Bord Pleanála Oral Hearing which was held in the Nuremore Hotel, Carrickmacross, County Monaghan on the 20th March, 2008. The planning application and environmental impact statement for the proposed power plant were prepared by the Quinn Group. The planning application for the proposed 450MW Power Plant was submitted directly to ABP under the Strategic Infrastructure Development Act, 2006. This work required the review of the soil and water sections of an Environmental Impact Statement prepared for the proposed power plant.

ENVIRONMENTAL AUDITS

- Mulroy Environmental was engaged by Dromad Hire (the client) to undertake a Risk Assessment of their facility which is located on the Dublin Road, Dundalk, County Louth. This work was carried out in order to respond to a letter sent by Louth County Council titled, “*Local Government (Water Pollution) Acts 1977-1990, Oil Discharge to surface waters at Dublin Road, Dublin, County Louth.*” This risk assessment involved a Fuel Storage, Liquid Raw Materials and Liquid Waste Audit, a Storm Drainage Audit. Following the audits, the information in the above audits was collated, tabulated and associated existing risks identified. Mitigation measures (i.e. operational and infrastructural) were then proposed to eliminate the afore-mentioned risks.
- Mulroy Environmental was engaged by ICB Emulsions Ltd. (the client) to undertake a Risk Audit of their stormwater drainage system on their facility located at 76 Ballyhannon Road, Portadown, Co. Armagh. This work was carried out in order to respond to a letter issued by the Water Management Unit of the Environment & Heritage Service.

STATUTORY APPLICATIONS

- Managed the processing of a successful Discharge Licence Application for a 19-house residential development in Ballindaggin, Enniscorthy, Co. Wexford. This Discharge Licence Application involves the treatment of wastewater by Submerged Membrane Bioreactor followed by a stratified sand polishing filter after which the treated effluent is discharged to groundwater. A groundwater assessment involving the installation of 2 groundwater monitoring boreholes, pump testing of each borehole and qualitative monitoring was carried out.
- Managed the processing of a Discharge Licence Applications for a mixed 25-house residential and commercial development in Ballindaggin, Enniscorthy, Co. Wexford. This discharge licence application involves the treatment of wastewater by Membrane Bioreactor followed by sand polishing filter after which the treated effluent is discharged to groundwater. A groundwater assessment involving the installation of 2 groundwater monitoring boreholes, pump testing of each borehole and qualitative monitoring was carried out. This application has been suspended.
- Managed the processing of Water Abstraction Surveys for a 19-house and a 25-house residential and commercial development in Ballindaggin, Enniscorthy, Co. Wexford. A borehole was drilled on each site followed by a 72-hour pumping test and groundwater quality monitoring. A yield of 250gallons/hour and 300gallons/hour were achieved for the 19-house and 40-house residential developments respectively.
- Managed the processing of Water Abstraction Surveys for a 14-house and a 30-house residential development in Kilcurry and Faughart, Dundalk, Co. Louth respectively. Boreholes were drilled on each site followed by 7-day pumping tests and groundwater quality monitoring. A yield of 416gallons/hour and 1200 gallons/hour were achieved for the 30-house and 14-house residential developments respectively.
- Processed a number of Site Suitability Assessments to accompany successful planning applications for commercial and single house developments in Counties Louth, Meath, Monaghan, Galway and Wexford.
- Supervised an ecological assessment to be carried out as part of an external review of SAC designation on a site located in the townland of Cloghaunamallagt located to the southwest of Oranmore, Co. Galway. The survey site is currently designated as a Special Area of Conservation (SAC No. 0268). The survey work was carried out by Claire Deasy, MRes. (Marine Science); BSc (Applied Ecology). Overall project supervision was provided by Mulroy Environmental.
- Managed an Appropriate Assessment Screening exercise on a proposed extension to a commercial/recreational development within 200m of a Special Protected Area and SAC. The purpose of this exercise was to determine if an appropriate assessment as defined under the European Communities (Natural Habitats) Regulations, 1997 S.I. No. 94 of 1997. The result was negative.
- Managed an Appropriate Assessment Screening exercise on a proposed residential development consisting of 3 detached houses to be located within 100m of a Special Protected Area and SAC. The purpose of this exercise was to determine if an appropriate assessment as defined under the European Communities (Natural Habitats) Regulations, 1997 S.I. No. 94 of 1997. The result was negative.
- Managed a feasibility study for a proposed Bowling Arena and Shopping Centre development in the northwest of the country. The proposed location is a brownfield site located directly adjacent to a tidal river which is classed as a Special Protected Area

and SAC. As part of this work, an ecological survey was carried out on the site, 40% of which is designated as an SAC. Representations were made by Mulroy Environmental on behalf of the client with the local authority and National Parks and Wildlife Service. Following, meetings with the NPWS, a remedial plan was proposed for the site which will involve the removal of the construction and demolition waste, its reprocessing elsewhere on site and its ultimate reuse within the proposed development. This Remedial Plan was accepted by the NPWS and local authority.

Previous employment :

Position Held: Project Manager/Senior Scientist

From - To: 1999-2006

Name & Address of Employer: Tobin Consulting Engineers, Blanchardstown Corporate Park, Blanchardstown, Dublin 15

Duties and Responsibilities: Project management in a range of Environmental Impact Assessments, Planning Applications and Waste Licence Applications for Industrial/Commercial/Residential projects for private and public sector. Contaminated land site investigation and remediation supervision. This role entailed staff recruitment, supervision and maintaining contact and supervision of sub-consultants and sub-contractors as well as ensuring discharge of reports and other project deliverables within agreed timeframe and within agreed budget.

Reason for Leaving : To start up own company (Mulroy Environmental)

IPC/IED/WASTE LICENSING

• *EPA OEE Contract (2 years duration)*

Managed the production of a risk assessment methodology for the Office of Environmental Enforcement (OEE). The EPA's Office of Environmental Enforcement (OEE) currently regulates/enforces in the region of 800 IPC and waste licenses issued under the EPA and WMA Acts. The function of the methodology is to allow the OEE to prioritise its enforcement efforts while at the same time meeting the principles and objectives set out in its Enforcement Policy and also having regard to relevant environmental legislation. Initially an international review of current risk assessment methodology was carried out to assess the systems utilized by more experienced enforcement authorities (i.e. Denmark, England, France, Germany, Netherlands, Scotland, USA, etc). The information gathered was used to aid the production of the methodology. The methodology consisted of a spreadsheet with Visual Basic programming accompanied by an instruction manual outlining the background to the methodology and the steps required for completion. The risk methodology assessed emissions, waste production, site location, operator performance and compliance history with each waste or IPPC activity given a risk band. The methodology produces a numerical score which indicates what risk band of 5 bands the facility falls in e.g. A1 (High Risk) or C2 (Low Risk).

ENVIRONMENTAL IMPACT ASSESSMENT/QUARRYING SECTOR

- Managed a successful Planning Application/Environmental Impact Statement for a proposed rock quarry extension for a large Irish road aggregate and buildings supplier in the County Meath in 2004. This planning application was successful and the rock is currently being extracted.
- Managed a successful Planning Application/Environmental Impact Statement for a proposed rock quarry for a large Irish road aggregate and buildings supplier in County Louth in 2001. The planning permission granted for the facility was appealed to An Bord Pleanála and was upheld.
- Managed the processing of a planning application and an EIS for a quarry located in County Cork in 2005 and 2006. Planning permission was granted by Cork County Council for the facility.

ENVIRONMENTAL IMPACT ASSESSMENT/AGRICULTURAL SECTOR

- Managed a planning application/EIS for a Category I Intermediate Plant proposed by Maloney & Matthews Animal Collection Ltd. The purpose of this plant is to receive fallen farm animals and take spinal tissue samples from fallen cattle for BSE Testing by the Department of Agriculture. Planning permission for this facility was refused by Sligo C.C. and was appealed to An Bord Pleanála. Planning permission was granted by An Bord Pleanála in April 2004. An application was made by a third party for a

judicial review of An Bord Pleanála's decision with a hearing expected in the High Court in January 2006. The judicial review was granted by the High Court and affidavits were prepared on behalf of the client in defence of An Bord Pleanála's decision. Padraic Mulroy played a central role to the production of the affidavits. An Bord Pleanála's decision was upheld by Justice McMahon in 2007.

ENVIRONMENTAL IMPACT ASSESSMENT (RESIDENTIAL)

- Managed the preparation of an EIS for a large residential development and sports and park area on 200 acres of coastal land in Dundalk, Co. Louth. This land is adjacent to Dundalk Bay, which supports the 3rd largest migratory bird population in Ireland and is designated as a Special Protection Area (SPA), National Heritage Area (NHA) and Special Area of Conservation (SAC) and is also adjacent to an army firing range. The land in question is protected from the sea by a coastal protection barrier and requires significant mitigation measures for development. A Local Area Plan for the area is currently being prepared for submission by the project team. A Strategic Environmental Assessment (SEA) – Environmental Report which forms a subset of the LAP is currently being finalised by TES to accompany the LAP. This project has required significant consultation with the National Parks and Wildlife Service (NPWS) in order to mitigate against any adverse impacts on the birdlife within the SPA and within the 275 mature trees identified on site.
- Managed the preparation of an EIS for Phase II of a large residential development on 70 acres of land in Dundalk, Co. Louth. A Masterplan for the area has been produced by the project team and was submitted in conjunction with the planning application for Phase I of the development in December, 2005. The land in question is located in an area of rich archaeological potential (i.e. adjacent to a Viking Ring Fort) and during site investigations a potential early Christian burial site was uncovered. Subsequently, this project has required significant consultation with the National Monuments Service (NMS) in order to mitigate against any adverse impacts on any archaeological material on site.
- Managed the preparation of an EIS to accompany a planning application for a proposed golf and residential development at a 285 acre (i.e. 114 hectare) site in Dundalk, Co. Louth. The site will contain approximately 150 holiday homes, a golf club, a driving range, lawn bowls club, an equestrian centre and stables. The golf course will be of links construction and sand will be imported on site to facilitate this. This land is adjacent to Dundalk Bay, which supports the 3rd largest migratory bird population in Ireland and is designated as a Special Protection Area (SPA), National Heritage Area (NHA) and Special Area of Conservation (SAC). Approximately 85ha of the site was designated as a proposed Natural Heritage Area (pNHA; 000455). Of these 85ha, 70ha was designated as a candidate Special Area of Conservation (SAC; 000455). An application for an internal review of the SAC and NHA classification for the site was submitted on the 29th October, 2004 to the Designated Areas Appeal Unit, Environment Infrastructure and Services of the Dept. of the Environment, Heritage & Local Government. The aforementioned application consisted of an appeal against the designation of the afore-mentioned sections of property to the National Parks and Wildlife Service (NPWS). This appeal was successful and the NPWS withdrew both pNHA and cSAC boundaries to exclude lands under appeal in March 2005.
- Managed the production of a Wastewater Treatment Plant Feasibility Study for a 50-house residential development site in County Monaghan. This study involved the assessment of the suitability of adjacent surface water bodies for discharge. It was concluded that an on-site Membrane Bioreactor Filtration system in conjunction with a discharge to groundwater (i.e. on site) via a constructed sand polishing filter was suitable for the site given the extreme vulnerability of the underlying groundwater. This report is currently being assessed by Monaghan County Council.
- Managed the production of a Wastewater Treatment Plant Feasibility Study for a 400-house residential development site in County Monaghan. This study involves the assessment of the suitability of an adjacent surface water body for discharge and involves the installation of a remotely accessed hydrometric station (i.e. GSM Data Transmission) and extensive flow surveying over the summer months. Preliminary results indicate that the WWTP system will entail an on-site Membrane Bioreactor Filtration system in conjunction with a discharge to surface water via a sand filter (i.e. on site). This report is currently being compiled.
- Managed the production of the soil/geology, water, climate and air/noise sections of an EIS for a mixed retail and residential development in Dundalk. The EIS and planning application was compiled by a Town Planning Consultant and was successful.

ENVIRONMENTAL IMPACT ASSESSMENT/WASTE MANAGEMENT FACILITIES

- Managed a successful waste licence application and planning application (**accompanied by an EIS**) for a Waste Transfer/Recycling Facility (capacity 90,000tpa) in Castlebar, County Mayo. A waste licence was granted by the EPA for the facility in February, 2002. The planning permission granted for the facility was however appealed to An Bord Pleanála by a 3rd Party and refused. A revised planning application was processed and submitted in November 2004. Significant further information was submitted in July 2005. A request for clarification on the afore-mentioned further information was received in August 2005. The planning permission was again granted for the facility by Mayo County Council and was appealed again to An Bord Pleanála by a 3rd Party and refused.
- Managed a successful planning application for a Waste Transfer/Recycling and Baling Facility designed to handle 150,000 tonnes per annum of domestic, commercial and non-hazardous industrial waste. This facility has been constructed and currently serves the Dublin Region. Managed the processing of a successful fire safety certificate applications.
- Managed a successful planning application for a Waste Transfer/ Recycling Facility designed to handle under 5,000 tonnes per annum of domestic, commercial and non-hazardous industrial waste. Planning permission for the development was granted by South Dublin County Council on 3rd June, 2002. This facility has been constructed and is now in operation.
- Managed a planning and waste permit application for a Waste Transfer/ Recycling Facility designed to handle under 5,000 tonnes per annum of domestic, commercial and non-hazardous industrial waste. Planning permission for the development was granted by Drogheda Borough Council in September, 2003. This facility has been constructed and is now in operation.
- Carried out a 'Fatal Flaw' Investigation and environmental baseline study for a Recycling Village to serve the Greater Dublin Region. This work was carried out on behalf of Fingal C.C. This facility will entail a Biological Treatment Facility, a Sludge Thermal Treatment Facility, a domestic waste transfer facility and an inert waste processing facility.
- Managed the site selection process for a municipal organic waste composting facility to be located on the north side of Dublin. This work involves an assessment of the land zoning objectives for North Dublin, the transport infrastructure and the environmental aspects pertaining to the operation of a composting facility. This work was being carried out on behalf of the four Dublin local authorities.
- Managed an unsuccessful planning application for a Waste Transfer/ Recycling Facility designed to handle under 5,000 tonnes per annum of domestic, commercial and non-hazardous industrial waste. Planning permission for the development was refused by Louth County Council in 2002.
- Managed an unsuccessful planning application for a Waste Transfer/ Recycling Facility designed to handle under 5,000 tonnes per annum of domestic, commercial and non-hazardous industrial waste. Planning permission for the development was refused by Kildare County Council in 2001.

COMMERCIAL/PETROL RETAIL SECTOR

- Managed a successful planning application for a Motorway Service Station to be located at Woodlands Junction on the M1 in Dunleer, County Louth. When constructed, it will be one of the first purpose built Motorway Service Station in Ireland. This station will include a shop/petrol retail outlet (472m²), family and fastfood restaurant (944m²), vehicle repair shop (120m²), car park (80 spaces), truck park (20 spaces) and coach parking area (8 spaces). Contributed to the Fire Safety Certificate application process. Tobin Consulting Engineers will act as client's representative for the construction of the facility.
- Managed the production of a feasibility study for the siting of a Motorway Service Station on the proposed M3 Motorway. This feasibility study involved the production of preliminary junction design drawings and a preliminary visual impact assessment. The results of the feasibility study were negative.

WASTE SECTOR RELATED WORK

- Managed the production of an environmental report to accompany a planning application for a Proposed End of Life Vehicle (ELV) Recycling Facility in Kilcock, County Kildare. This facility will involve the construction of a purpose built building to accommodate the complete dismantling of ELVs. Hazardous waste will removed followed by tyre removal and shredding.

Saleable vehicle parts will be removed from the ELV and stocked with the decommissioned car shells stockpile in an area for crushing which will be carried out externally. A clarification on further information was processed.

- Managed a leachate characterisation study for Derrinnumera Landfill. The purpose of this study was to assess the chemical constituents of the leachate with the aim of identifying a suitable treatment system. The study recommended a Sequence Batch Reactor System with an activated carbon filtration system. This work was carried out as part of a revised Waste Licence Application to the EPA.
- Managed the implementation and reporting of a Packaging Waste Audit on Richard Barrett Moulds Ltd., Bray, Co. Wicklow. This company produces moulds for the plastic component manufacturing industry. The results of the waste audit indicated that the company was not a major producer of packaging waste (i.e. <25 tonnes of packaging waste per year). This report was submitted to Wicklow C.C.
- Co-ordinated the fulfilment of requirements stipulated in the Derrinnumera Landfill Waste Licence. These requirements were subdivided into 3 month and 6 month and involve the upgrading of the facility to a modern contained waste body to serve the North Mayo area in the coming 20 years.
- Contributed to Restoration and Aftercare Plan for Morenane Landfill, Co. Limerick. This plan describes the capping design to be constructed on site followed by the landscaping and planting techniques to assimilate the landfill into the existing farmland. It also describes the post-closure monitoring programme to be carried out at the former landfill.
- Contributed to the Louth Sludge Management Plan with respect to the nutrient balancing exercise, the beneficial reuse of Biosolids in agriculture and quality assurance/control aspects of Biosolids production and use.
- Co-ordinated the appraisal of a planning application submitted to Tipperary North Riding County Council by Waste Management Ireland for a large sanitary landfill in the disused Magcobar open cast pit in Silvermines, Tipperary North Riding.

CONTAMINATED LAND SITE INVESTIGATION RISK ASSESSMENT & REMEDIATION SUPERVISION

- Managed an Environmental Risk Assessment of a 2.5-hectare 'brownfield site' Drogheda, County Louth. This land is owned by a client who wishes to develop the property for commercial and industrial usage. The site was originally the location of a limestone quarry which following its end of life was used for the landfilling of domestic waste and inert rubble. A site investigation encompassing air rotary drilling and groundwater well installation, landfill gas well installation and trialpitting was carried out. Landfill gas levels were monitored over a 2 month period in conjunction with groundwater sampling. Following the risk assessment, recommendations were made with regard to the safe development of the site. These recommendations included the incorporation of an active LF gas removal and detection system in conjunction with the maintenance and upgrading of existing LF gas monitoring wells on site. Although the groundwater was found to be impacted by a source upgradient of the site, active remediation of the groundwater was not warranted. The remedial plan for the site has since been accepted by Louth C.C. and are now being implemented as part of a Section 55 Notice.
- Managed the Quantitative Environmental Risk Assessment of a brownfield site formerly owned by Iannród Eireann and the OPW. The purpose of this risk assessment was to determine the extent of contamination at the site and to make recommendations for the remediation of the site to make it suitable for an affordable housing development, and to prevent contamination of the surrounding environment. A site investigation encompassing air rotary drilling and groundwater well installation, window sampling and trialpitting was carried out during which over 200 soil and groundwater samples were taken and submitted for laboratory analysis. This was followed by interpretation of the analytical data, reporting on the nature and extent of contamination at the site, a detailed Quantitative Risk Assessment for the proposed end use, and the making recommendations on the most appropriate remediation measures for dealing with the contamination present together with cost estimates. The Contaminated Land and Exposure (CLEA) Model was used to determine Soil Guideline Values (SGVs) for the safe clean-up of the site.
- Managed the Quantitative Environmental Risk Assessment of a brownfield site currently being developed by a local authority as a civic amenity facility. The purpose of this risk assessment was to determine the extent of contamination at the site and to make recommendations for the remediation of the site to make it suitable for the development, and to prevent contamination of the surrounding environment. A site investigation encompassing trialpitting was carried out during which 20 soil samples and

upgradient and downgradient surface water samples were taken and submitted for laboratory analysis. This was followed by interpretation of the analytical data, reporting on the nature and extent of contamination at the site, a detailed Quantitative Risk Assessment for the proposed end use, and the making recommendations on the most appropriate remediation measures for dealing with the contamination present. Following an assessment of the groundwater vulnerability, the recommendations were that the material remain in situ. The Contaminated Land and Exposure (CLEA) Model was used to determine Soil Guideline Values (SGVs) for the safe clean-up of the site.

- Managed a Due Diligence Site Assessment of a brownfield and 3 greenfield sites located alongside the River Barrow on behalf of Kildare County Council who wished to identify the site most suitable for the siting of a water abstraction/treatment plant. Utilising the laboratory data, groundwater and toxicological models were carried out on the brownfield site to assess the risk posed to the possible development of the water treatment plant on site. A greenfield site was identified and following a substantial planning application/EIS, a water abstraction plant has being constructed in Athy.
- Managed the risk assessment of a brownfield riverside site where waste from a diesel laundering operation was dumped. This work was carried out on behalf of a local authority wishing to construct a rising sewer main through the site. A trialpitting exercise was carried out during which soil and groundwater samples were taken and submitted for laboratory analysis. The site was found to be contaminated and recommendations were made for the safe clean-up of the site which encompassed soil removal and a pump and treat process.
- Managed the Risk Assessment of a former fertiliser depot being developed as residential property in a harbour area. The soil and groundwater beneath the site were found to be contaminated with heavy metals and saturated with fertiliser elements such as ammonia, nitrates and phosphates. An assessment was made of the leachability of the contaminants and recommendations were made regarding the safe re-use of approximately 3,000 tonnes of soil at a development within the harbour area.
- Managed the risk assessment of a disused sand and gravel pit, which had been used as an inert landfill and was being developed for residential housing. Small but persistent levels of landfill gas were found in gas monitoring wells installed on site during the preliminary site investigation phase. As part of a planning application request for additional information, recommendations were made with regard to further monitoring and remediation in order to remove any liabilities prior to the construction phase.
- Managed the Risk Assessment of a former petrol retail station that was being developed as a hotel complex. An assessment was made of the leachability of the contaminants and recommendations were made to remove the contaminated material off-site. This involved a site investigation followed by removal of contaminated soil off-site.

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Previous employment :**Position Held:** Project Scientist **From - To:** 1996 – 1999**Name & Address of Employer:** Dames & Moore Environmental Consultants (now URS), Iveagh Court, Harcourt Road, Dublin 2.**Duties and Responsibilities:** Groundwater investigation and remediation with a particular emphasis on bioremediation. Environmental Management System (ISO 14001) implementation and auditing. Installation of product recovery systems (pump & treat, soil vapour extraction, bioslurping, skimming, etc), well drilling (Shell & Auger, Air Rotary) and piezometer installation, falling/rising head testing, landfill monitoring, window sampling, trial-pitting, surveying, bioremediation skills (field bioreactor & microbial culture vessels set-up, terraventing, etc) and emergency spill response. Design of the afore-mentioned systems; desk study, interpretation of chemical, microbiological, geological, and hydrogeological data collected; groundwater vulnerability assessment; as well as report writing, and liaison with clients and regulatory bodies.

Laboratory QA/QC Co-ordinator - Data interpretation and laboratory quality assurance and quality control planning i.e. the application of field, method and trip blanks, matrix spikes and field duplicates.

Reason for Leaving : To gain broader experience***CONTAMINATED LAND REMEDIATION***

- Managed the remediation within an oil depot, which contaminated an adjacent river. Measures involved a soils investigation by window sampling, the installation of sumps and a cut-off trench, and the setting up of an automated product recovery system. Close liaison with local authorities is required.
- Managed the design and construction of a pilot-scale reed bed study to examine the feasibility of using a full-scale reed bed in removing tetrahydrofuran and toluene from the contaminated groundwater underlying a large chemical manufacturing plant.
- Co-ordinated the remediation within two diesel-contaminated operational locomotive maintenance areas in Dublin using soil flushing, in-situ and ex-situ bioremediation, product skimming and dual-phase vacuum extraction (bioslurping) techniques. Responsible for design and overseeing implementation of the remedial works, collection of monitoring and validation data and liaison with the client.
- Contributed to the design, construction and management of a pilot-scale UV-peroxidation study to examine the feasibility of using a full-scale UV-peroxidation plant in removing tetrahydrofuran and toluene from the contaminated groundwater underlying a large chemical manufacturing plant.
- Managed four domestic heating oil spill remediation projects. A combination of contaminated soil/fill removal and non-intrusive in-situ bioremediation techniques were used to reduce contamination to background levels.

SITE INVESTIGATION

- Co-ordinated a soil and groundwater investigation of an unlined disused landfill located at a large pharmaceutical plant. This involved the installation of monitoring wells equipped with gas monitoring taps and the extensive monitoring of groundwater, leachate and landfill gases.
- Co-ordinated a soil and groundwater investigation of green-field agricultural land being developed for industrial use. This land had been the subject of previous investigations by the EPA with regard to unexplained livestock deaths.
- Co-ordinated two soil and groundwater investigations of derelict petrol retail stations with the purpose of formulating a remedial plan prior to divesting the sites for residential use.
- Carried out five Phase II investigations of oil depot sites which involved window sampling and groundwater sampling.

PHASE I/ENVIRONMENTAL AUDITING

- Co-ordinated an environmental audit of a former bitumen importation and manufacturing facility located in a large industrial port. Works involved on-site inspections, product sampling, desk-based searches, soil sampling, monitoring well installation followed by groundwater sampling and data assessment and reporting.

- Managed a major Phase I investigation of a large, national chain of twenty-eight petroleum retail site. Involved planning the various aspects of the work on each site, including questionnaires, site inspection and soil vapour surveying. Works also involved collation and interpretation of all results.
- Completed a data validation report according to U.S.E.P.A. Contract Laboratory Protocol of an extensive organic and inorganic laboratory analytical program of contaminated soil and groundwater. The purpose of the data validation was to ensure the reliability of data if required as evidence in a court of law.
- Co-ordinated a major Phase I investigation of a large, national chain of ninety-six petroleum retail site. Involved planning the various aspects of the work on each site, including questionnaires, site inspection, soil vapour surveying and soil corrosivity testing. Works also involved collation and interpretation of results.
- Co-ordinated approximately twenty individual Phase I investigations of petroleum retail sites and ten individual Phase I investigations of oil depot sites.

SPILL RESPONSE/TREATABILITY STUDIES/WASTEWATER CHARACTERISATION/DATA QA/QC

- Co-ordinated two rapid emergency responses to accidental oil discharges to rivers.
- Undertook rapid emergency action on a number of petrol station sites which were suspected by clients to be in imminent danger of causing major accidents /pollution events.
- Designed a lab-scale in-situ aerobic and anaerobic treatability study of tetrahydrofuran contaminated groundwater.
- Co-ordinated a project involving the characterisation of the different industrial wastewater streams in a large cardboard box manufacturing plant. This plant was suspected by the local authority of accidentally causing the recipient municipal treatment plant to crash. The work involved: an extensive laboratory analysis of aqueous sludge and filter cake waste produced on site, an assessment of the existing on-site primary treatment plant's performance along with on-going waste disposal methods.
- Contributed to a number of projects with regard to data interpretation and laboratory quality assurance and quality control planning i.e. the application of field, method and trip blanks, matrix spikes and field duplicates. Liaised with laboratories when confronted with problems such as suspected cross-contamination, sample turnaround, contract breaches, etc.

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the
SCIENCE
council

Awards this certificate to

Padraig Mulroy

in recognition of the award of

Chartered Scientist

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Consent of copyright owner required for any other use.

Signed this day

20 April 2009

Registration number

PSS/ 115/000198

Handwritten signature of Mr Rob Askew in black ink.

Mr Rob Askew, President

Institute of Professional Soil Scientists

Handwritten signature of the Chief Executive of The Science Council in black ink.

Chief Executive
The Science Council

Mr Padraic Mulroy
Project Manager
TES Consulting Engineers
Block 10 -3
Blanchardstown Corporate Park
DUBLIN 15



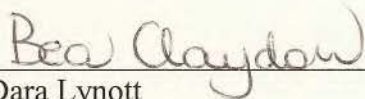
Monday, 8 May 2006


Re: Risk-based Approach to Enforcement Conference May 3rd 2006

Dear Padraic

Just a quick note to express my appreciation for your excellent contribution to the Risk-based Approach to Enforcement Conference on May 3rd 2006 in Newbridge. The level of interaction during the conference and the positive feedback afterwards gave a good indication of the importance of such conferences. Thank you for all your time and effort in making this conference such a success.

Yours sincerely



 Dara Lynott
Director
Office of Environmental Enforcement



CEEQUAL

Assessments & Award Scheme for improving sustainability in
civil engineering, infrastructure, landscaping and the public realm

This is to certify that

Padraic Mulroy

has successfully completed
the two-day CEEQUAL for
Projects Assessor
training course on
06 & 07 April 2016



CEEQUAL for Projects Version 5.2

**Technical Director
CEEQUAL Ltd**

CEEQUAL

Sustainability Assessment and Awards for civil engineering,
infrastructure, landscaping & the public realm

This is to certify that

Padraic Mulroy

has completed the
CEEQUAL International Assessor Update
E-Learning module
for Version 5.2 for Projects
on 20th April 2016



CEEQUAL for Projects Version 5.2

A handwritten signature in blue ink, appearing to read 'Ian R. Webb'.

Lead Tutor



HOME AGENDA SPEAKERS ASSOCIATIONS EXHIBITORS SPONSORS MEDIA REGISTER CONTACT CO-LOCATED EVENTS

Padraic Mulroy – Managing Director , Mulroy Environmental Ltd.



Padraic Mulroy – Managing Director , Mulroy Environmental Ltd.'s presentations

2018 – Presentation

Padraic Mulroy, has over 22 years' experience in contaminated land assessment, site remediation/bulk excavation supervision, environmental management of large construction projects, environmental impact assessment, planning, waste licensing and permitting, waste facility design and infrastructural projects. Padraic is a Chartered Scientist, a Member of the Institute of Professional Soil Scientists, Engineers Ireland and International Association of Hydrogeologists. Padraic has experience of working as an expert witness in court and at oral hearings, is a certified CPD trainer with Engineers Ireland and runs a 1-day Masterclass in Contaminated Land. He is a registered CEEQUAL Assessor and LEED Green Associate with the US Green Building Council.

Presentation Title: Contaminated Land & Soil Waste Management in the Construction Sector in Ireland

Presentation Synopsis:

My talk will cover environmental and waste legislation relating to soil waste acceptance criteria and disposal and best practice as it applies to land contamination. The content and suitability of site investigation, soil classification and remedial action plan reports for construction projects will be assessed.

Learning objectives

- Legislation in Ireland dealing with contaminated land and soil waste acceptance criteria in the context of construction projects;
- How regulators (i.e. local authorities and EPA) in Ireland enforce when dealing with brownfield development projects (we look at some Dublin case studies);
- We look at current soil waste management/disposal infrastructure in Ireland and its limitations (i.e. waste licence landfills, waste permitted infills and Article 27 Sites);
- We look at groundwater contamination, dewatering techniques, discharge licensing and common problems encountered; and
- We look at building contractor's requirements for sustainability certification systems (BREEAM, LEED, CEEQUAL, etc) with regard to contaminated land management.

Similar Speakers



Eoghan Murphy- Minister for Housing, Planning and Local Government



Paul Cunningham - Editor, RTE's The Week In Politics
Editor, The Week In Politics, RTE Political Unit – Chairman



Colm McCarthy - Economist, University College Dublin
Economist and Commentator



Maurice Buckley - Executive Chairman , Office of Public Works



Tommy Drumm - Managing Director, Collen Construction



Loretta O'Sullivan - Group Chief Economist , Bank of Ireland

Organisers



Sponsors

Media Partners



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Organisation profile

Mulroy Environmental Training (MET) is a specialist provider of environmental training for the public and private sector. Mulroy Environmental prides itself in that it offers unique environmental courses designed to fit the practical needs of its participants. In each of its courses we place a strong emphasis on the 'day to day' regulatory environment of its clientele, public and private, and where possible, provide case studies which are pertinent to the subject matter.

Training aim

This course will describe current environmental and waste legislation relating to soil waste acceptance criteria and disposal and best practice as it applies to land contamination. The content and suitability of site investigation, soil classification and remedial action plan reports for construction projects will be assessed.

Learning objectives

- Legislation in Ireland dealing with contaminated land and soil waste acceptance criteria in the context of construction projects;
- How regulators (i.e. local authorities and EPA) in Ireland enforce when dealing with brownfield development projects (we look at some Dublin case studies);
- We look at current soil waste management/disposal infrastructure in Ireland and its limitations (i.e. waste licence landfills, waste permitted infills and Article 27 Sites);
- We look at groundwater contamination, dewatering techniques, discharge licensing and common problems encountered; and
- We look at building contractor's requirements for sustainability certification systems (BREEAM, LEED, CEEQUAL, etc) with regard to contaminated land management.

Course outline

This *Contaminated Land in Construction in Ireland MasterClass* is designed to provide attendees with a focused look at key contaminated land legislative issues and environmental risks along with providing a pragmatic guide to cost effective land investigations, risk assessment, soil waste characterisation, remediation and sustainable soil waste management practices. If you work with civil, structural, building or development work in any capacity, contaminated land can affect your construction project. This course provides an understanding of the legislation and science behind site investigation. It looks at the current soil waste management/disposal infrastructure in Ireland and its limitations (i.e. waste licence landfills, waste permitted infills and Article 27 Sites) and waste export options.

Trainer's profile

Padraic Mulroy, has over 22 years' experience in environmental consulting and has considerable project management experience in contaminated land assessment, site remediation/bulk excavation supervision, environmental impact assessment, planning applications, waste licensing and permitting, waste facility design and infrastructural projects.

Course duration

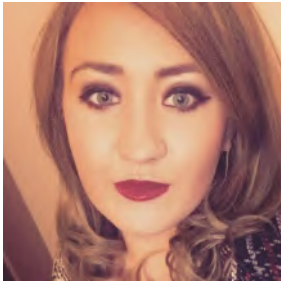
1 day

Assessment & certification

A certificate will be provided on completion of the course with Engineers Ireland Registered Training Provider status shown clearly.

Who should attend

Building contractor project managers, environmental regulators, environmental consultants, environmental, civil & geotechnical engineers, environmental scientists, 3rd level environmental course providers and land developers.

**PERSONAL DETAILS:**

NAME: ANDRENA MEEGAN

ADDRESS: 1 LISMORE PARK, CROSSMAGLEN, NEWRY, CO DOWN

TELEPHONE: WORK: 042-9384750

NATIONALITY: IRISH

STATUS: SINGLE

CURRENT OCCUPATION: PROJECT MANAGER

CURRENT EMPLOYER: MULROY ENVIRONMENTAL

QUALIFICATIONS:

DEGREE	COLLEGE / UNIVERSITY	QUALIFICATION	STANDARD ACHIEVED	DATE & YEAR OF AWARD
PRIMARY DEGREE	Liverpool Hope University	B.Sc. (Geography)	Honours 2.2	2014
POST GRADUATE	University College Dublin	M.Sc. (Environmental Engineering Technology/Environmental Technology) Thesis title: 'Human Health Risk Assessment of Lead found in Tap Water in Ireland.'	Honours 2.1	2015

DETAILED INFORMATION ON UNDERGRADUATE QUALIFICATION:

QUALIFICATION	TIME	FROM	TO	SUBJECTS																
BSc. (Geography) Liverpool Hope University 2014.	FULL	Sep 2011	Aug 2014	1 st Year																
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Geographic Information Systems	Passed																			
Overall Result = 2.2																				
<u>Thesis</u> : Recycling Patterns within Liverpool Hope University																				
<u>Academic Supervisor</u> : Paul Rooney																				

DETAILED INFORMATION ON POSTGRADUATE QUALIFICATION:

QUALIFICATION	TIME	FROM	TO	SUBJECTS
M.Sc. (Environmental Technology) University College Dublin 2015.	FULL	2014	2015	<p><u>Thesis:</u> 'Human Health Risk Assessment of Lead found in Tap Water in Ireland.'</p> <p><u>Academic Supervisor:</u> Enda Cummins</p> <p>Universal access to safe drinking water is a global challenge with many governments putting in place regulations to ensure a safe drinking water supply.</p> <p>Within Ireland, in recent years a great interest has been aroused in the quality of water. The emerging pollutant of lead found in many water supplies within Ireland has caused increased concern.</p> <p>The aim of the paper is to evaluate the risk of lead, (a chemical hazard) to the human health population of Ireland. A quantitative risk assessment using Monte Carlo simulation will be developed with a framework model presented in this paper.</p>

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EMPLOYMENT RECORD:

Present or most recent employment:

Position Held: Project Manager at Mulroy Environmental **From - To:** January 2015 - present

Name & Address of Employer: Mulroy Environmental, 30 Lisroland View, Knockbridge, Dundalk, Co Louth

Duties and Responsibilities:

- Waste Management;
- Contaminated Site Risk Assessment;
- Water Quality Assessment;
- Water Quality and Dust Monitoring
- Construction Project Management

Reason for Leaving: Not applicable

Present or most recent employment:

Position Held: Intern **From - To:** - Mar 2014 – Mar 2014

Name & Address of Employer: B & M Waste Supplies

Duties and Responsibilities:

- Conducted research and audit of recycling and general waste bins at the university;
- Gather data at B&M waste services for the project, including evaluating and verifying waste, separating waste into DMR and general waste, weighing each waste bin and recording results.
- Coordinated student and staff questionnaires on their recycling attitudes
- Gained an introduction and background in Waste Management

Reason for Leaving: To finish write up of research thesis

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SOFTWARE EXPERIENCE:

SOFTWARE	EXPERTISE		
	EXTENSIVE WORKING KNOWLEDGE	GOOD WORKING KNOWLEDGE	BASIC KNOWLEDGE
Bruel & Kjaer noise monitoring		Y	
HoleBASE SI Professional	Y		
Contaminated Land Exposure Assessment Model (CLEA)	Y		
Autocad Land Desktop & Map			Y
HazWasteOnline	Y		
Microsoft Office	Y		
MS Access Power Point	Y		
Microsoft Project		Y	
MS Access, Excel & Word	Y		
GPS Pathfinder		Y	

FIELD SKILLS:

Groundwater sampling, surface water sampling, drinking water sampling, sediment and soil sampling, gas monitoring, Garmin GPS software, ecological surveying, basic land surveying, familiar with use of field instrumentation such as Bruel & Kjaer noise monitoring, ecoplast depth finder, GA 5000 Gas meters, groundwater dip meters and interface probes.

OTHER SKILLS:

- Full driving licence since March 2009
- Proficient in the use of various statistical packages such as RASP software
- Customer Service & Relations
- Problem Solving

REFEREES:

NAME:	Dr Enda Cummins	NAME:	Mona McEntee
POSITION:	Senior Lecturer in University College Dublin	POSITION:	Owner at McEntee's Food Store
ADDRESS:	School of Biosystems & Food Engineering Agriculture and Food Science	ADDRESS:	McEntee's Food Store
	Belfield Dublin 4		The Square, Crossmaglen, Newry, Co. Down
PH:	+353 1 716 7777	PH:	087 980 7458
EMAIL:	enda.cummins@ucd.ie	EMAIL:	mcenteecatering@gmail.com

Andrena Meegan

Andrena Meegan BSc., MSc.
Mulroy Environmental

**PERSONAL DETAILS:**

NAME: SORCHA SHANLEY
 ADDRESS: 10 EFFERNOCK MANOR, CO MEATH
 TELEPHONE: 0868422820 WORK:
 NATIONALITY: IRISH
 STATUS: SINGLE
 CURRENT OCCUPATION: STAFF SCIENTIST
 CURRENT EMPLOYER: MULROY ENVIRONMENTAL LTD.

QUALIFICATIONS:

DEGREE	COLLEGE / UNIVERSITY	QUALIFICATION	STANDARD ACHIEVED	DATE & YEAR OF AWARD
PRIMARY DEGREE	Trinity College Dublin	B.A. (Zoology)	Honours 2.1	2016
POST GRADUATE	University of Essex	M.Sc. (Marine Biology) Thesis title: ' <i>Growth responses of toxic and non-toxic strains of Prorocentrum minimum to temperature and hydrogen peroxide</i> '	Honours 1	2018

DETAILED INFORMATION ON UNDERGRADUATE QUALIFICATION:

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				<u>Thesis</u> : Habitat complexity and the abundance and species richness of nudibranchs in the coral reefs of Hoga Island, Indonesia.																						
				Academic Supervisor: Dr. Ian Donohue																						

DETAILED INFORMATION ON POSTGRADUATE QUALIFICATION:

QUALIFICATION	TIME	FROM	TO	SUBJECTS
M.Sc. (Marine Biology) University of Essex 2018.	FULL	2017	2018	<p><u>Thesis</u>: Growth responses of toxic and non-toxic strains of <i>Prorocentrum minimum</i> to temperature and hydrogen peroxide”</p> <p><u>Academic Supervisor</u>: Dr. Richard Geider</p> <p>In recent decades, the expansion of Harmful Algal Blooms (HABs) has become a global societal and research concern, causing environmental degradation and economic losses related to coastal fishing, aquaculture and tourism, as well as posing a threat to human health through biotoxins such as paralytic shellfish poisons.</p> <p>This study examined whether there are differences in the temperature responses of non-toxic and toxic strains of the same species of the geographically widespread, HAB-forming dinoflagellate, <i>P. minimum</i>. Such information is important in trying to predict future biogeographical distributions, with potential implications in a global warming scenario.</p>

EMPLOYMENT RECORD:**Present or most recent employment:****Position Held:** Office Assistant, Xerox Matheson **From - To:** December 2019 – March 2020**Name & Address of Employer:** Xerox Matheson, 70 Sir John Rogerson's Quay, Dublin 2, Ireland**Duties and Responsibilities:**

- Bulk printing, copying and scanning and use of finishing equipment for binding, guillotining and folding printed materials.
- Customer facing role answering call/email requests and queries about services.
- Worked under pressure handling multiple time critical tasks while responding to changing priorities.
- Communicated with team to document requests and comply with company procedures.
- Use of printing/finishing equipment and Microsoft office applications.

Reason for Leaving: Covid 19 Lockdown**Present or most recent employment:****Position Held:** Scuba Diving Instructor **From - To:** - Feb 2017 – Sep 2017**Name & Address of Employer:** Tenerife Diving Academy, Abades, Tenerife, Spain**Duties and Responsibilities:**

- 45 certifications, 300+ Dives, Coltri and Bauer compressor qualified
- Planned, managed and led dive training from beginner to Divemaster.
- Mentored resident interns and oversaw accommodation.
- Organised Project AWARE "Dive Against Debris" citizen science programme.
- Dive centre general administration and equipment management and sales.

Reason for Leaving: To complete MSc degree**SOFTWARE EXPERIENCE:**

SOFTWARE	EXPERTISE		
	EXTENSIVE WORKING KNOWLEDGE	GOOD WORKING KNOWLEDGE	BASIC KNOWLEDGE
Microsoft Office	Y		
MS Access Power Point	Y		
Microsoft Project		Y	
MS Access, Excel & Word	Y		
GPS Pathfinder	Y		

FIELD SKILLS:

Ecological surveying and identification of key species, evaluation of abiotic habitat variables, mapping and habitat classification, benthic sampling of freshwater macro and micro invertebrates and Q Value Scoring, dive and snorkel based marine surveys, marine environmental impact assessments, marine sediment core sampling.

OTHER SKILLS:

- Full driving licence
- Proficient in the use of various statistical packages such as R software
- Customer Service & Relations
- Problem Solving

REFEREES:

NAME: Pete Hamby	NAME: Prof David Smith
POSITION: Master Instructor	POSITION: Lecturer, University of Essex
ADDRESS: Tenerife Diving Academy Abades	ADDRESS: University of Essex,
Tenerife Spain	Colchester, England
EMAIL: pete@tenerifedivingacademy.com	EMAIL: djsmit@essex.ac.uk

Sorcha Shanley BSc., MSc.
Mulroy Environmental

**PERSONAL DETAILS:**

NAME: HANNAH CLERKIN
ADDRESS: GLENVALE HOUSE, TIRKEENAN, MONAGHAN, CO. MONAGHAN
TELEPHONE: WORK: 086-8927940
NATIONALITY: IRISH
STATUS: SINGLE
CURRENT OCCUPATION: STAFF SCIENTIST
CURRENT EMPLOYER: MULROY ENVIRONMENTAL

QUALIFICATIONS:

DEGREE	COLLEGE / UNIVERSITY	QUALIFICATION	STANDARD ACHIEVED	DATE & YEAR OF AWARD
PRIMARY DEGREE	IT Sligo	B.Sc. Environmental Science	Honours 2.2	2019

DETAILED INFORMATION ON UNDERGRADUATE QUALIFICATION:

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BSc. Environmental Science IT Sligo 2019.	FULL	Sep 2015	Aug 2019	1 st Year																		
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				Overall Result = 2.2																		
				Thesis: A study on the Wild Atlantic Way using the European Tourism Indicator system complemented with the use of GIS																		
Academic Supervisor: Guy Marsden																						

EMPLOYMENT RECORD:**Present or most recent employment:****Position Held:** Staff scientist at Mulroy Environmental **From - To:** January 2020 - present**Name & Address of Employer:** Mulroy Environmental, 30 Lisroland View, Knockbridge, Dundalk, Co Louth**Duties and Responsibilities:**

- Waste Management;
- Contaminated Site Risk Assessment;
- Water Quality Assessment;
- Water Quality and Dust Monitoring

Reason for Leaving: Not applicable**Present or most recent employment:****Position Held:** Intern **From - To:** - June 2018 – Sept 2018**Name & Address of Employer:** Monaghan Mushrooms**Duties and Responsibilities:**

Monitor and audit environmental control systems on site daily
 Generate summary reports for the site on a weekly basis
 Daily sampling of compost for analysis
 Keep all analysis up to date on the database
 Ensure the compost site is audit ready with regards to systems, processes and documentation
 Ensure good housekeeping in all areas of the site

Reason for Leaving: To finish write up of thesis**SOFTWARE EXPERIENCE:**

SOFTWARE	EXPERTISE		
	EXTENSIVE WORKING KNOWLEDGE	GOOD WORKING KNOWLEDGE	BASIC KNOWLEDGE
Bruel & Kjaer noise monitoring		Y	
HoleBASE SI Professional		Y	
Contaminated Land Exposure Assessment Model (CLEA)		Y	
Autocad Land Desktop & Map			Y
HazWasteOnline		Y	
Microsoft Office	Y		
MS Access Power Point	Y		
Microsoft Project		Y	
MS Access, Excel & Word	Y		
GPS Pathfinder		Y	

FIELD SKILLS:

Groundwater sampling, surface water sampling, drinking water sampling, sediment and soil sampling, gas monitoring, Garmin GPS software, ecological surveying, basic land surveying, familiar with use of field instrumentation such as Bruel & Kjaer noise monitoring, GA 5000 Gas meters, groundwater dip meters and interface probes.

OTHER SKILLS:

- Full driving licence since October 2019
- Customer Service & Relations
- Problem Solving

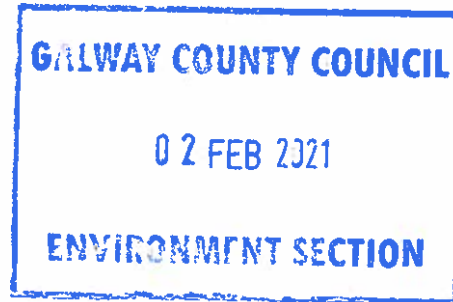
REFEREES:

NAME:	Stephen Mc Quillan	NAME:	Darren Kelly
POSITION:	Site Manager of Applegreen service station Monaghan	POSITION:	Laboratory Manager at Monaghan Mushrooms
ADDRESS:	Clones Rd. Monaghan, Co. Monaghan	ADDRESS:	Tullygony, Tyholland, Co. Monaghan, H18 FW95
PH:	+353 87 7934993	PH:	
EMAIL:	Stephenmcquillan@gmail.com	EMAIL:	Darren.Kelly@monaghan-mushrooms.ie

Hannah Clerkin BSc.
Mulroy Environmental

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Mr. Colin Ryder,
Landfill Manager,
Galway County Council,
Áras an Chontae,
Prospect Hill,
Galway.



29th January 2021

Reg. No. H0176-01

Re: Tullyvogheen Historic Landfill – Notice in accordance with Regulation 7(4) of the Waste Management (Certification of Historic Unlicensed Waste Disposal and Recovery Activity) Regulations, 2008

Dear Mr. Ryder,

I am to refer to the above referenced application for a certificate of authorisation in relation to the above referenced historic landfill.

Having examined the foregoing, I am to advise that the Agency is of the view that the application does not comply with Regulation 7(2) of the Waste Management (Certification of Historic Unlicensed Waste Disposal and Recovery Activity) Regulations, 2008.

You are therefore requested in accordance with Regulation 7(4) of the Regulations, to take steps to supply the information detailed below:

REGULATION 7(2) COMPLIANCE REQUIREMENTS

1. The name of the site stated in Section C.1 of the Application Form is “Galway C.C. Roads Depot”. The cover page of ‘Tier 2 Site Investigation & Tier 3 GQRA Assessment’ Report refers to the site as “Tullyvogheen historic landfill”. State the name of the closed landfill.
2. Provide two documents that relate to the Qualified Person as required under Section 2.3 of the EPA Code of Practice – Environmental Risk Assessment for Unregulated Waste Disposal Sites.
3. Referring to Section 4.4: *Stormwater and Drainage Infrastructure* of the said report above, submit a drawing showing an overview of the land drains and manholes referred to in this Section. Include arrows showing water flow direction and indicate culverted stretches of the stormwater and drainage infrastructure.
4. It is noted that two leachate monitoring wells (LC1 and LC2) located within the waste body and three groundwater monitoring wells (BH101, BH102 and BH103), also located within the waste body, were monitored for the same set of parameters in 2014. Please repeat the monitoring carried out at all of these monitoring wells.
5. It is noted that gas monitoring was carried out at five locations within the waste body in 2014. Please repeat gas monitoring at these five locations.

6. Please provide a drawing showing the extent of the waste body within the closed landfill site and all of the monitoring locations referred to in points 4 and 5 above.
7. Considering the fact that municipal waste, including domestic, commercial and C&D waste, was deposited within the site and leachate is being generated, state the reason for not proposing an engineered cap for the closed landfill and a leachate management system.
8. State whether hazardous waste was deposited within the landfill. Classify any such waste in accordance with *EPA Waste Classification, List of Waste & Determining if Waste is Hazardous or Non-hazardous, applicable from 5th July 2018*.
9. As stated in Section 1.2 of the said report, the site is currently used by Galway County Council as a road depot and storage and heating of road bitumen. State whether the site is intended, by either the local authority or the private owners, to be used for other purposes.

Your reply to this notice should include a revised non-technical summary, which reflects the information you supply in compliance with the notice, insofar as that information impinges on the non-technical summary.

In the case where any drawings already submitted are subject to revision consequent on this request, a revised drawing should be prepared in each case. It is not sufficient to annotate the original drawing with a textual correction. Where such revised drawings are submitted, provide a list of drawing titles, drawing numbers and revision status, which correlates the revised drawings with the superseded versions.

Please supply the requested information within *four weeks* of the date of this notice. Please note that during Covid-19 there are new arrangements in place for the receipt of all correspondence in relation to applications for Certificates of Authorisation. Accordingly, any correspondence in respect of the above referenced application should be sent to the Agency via file transfer by emailing licensing@epa.ie, quoting the Register Number H0176-01 (each electronic file should be in a searchable .pdf format and not exceed 10MB).

Please also note, post Covid-19, you may be contacted to submit the hard copies and CD-ROMs for the submitted electronic correspondence.

Yours sincerely,



Ewa Babiarczyk
Inspector
Environmental Licensing Programme
Office of Environmental Sustainability