

N4 Collooney to Castlebaldwin, Proposed Road Development

APPENDIX No. 4.4

Outline Construction and Demolition Waste Management Plan

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1 Introduction

1.1 Status of Construction & Demolition Waste Management Plan

This document has been drafted in order to initiate the Construction & Demolition Waste Management Plan for the N4 Collooney to Castlebaldwin *Proposed Road Development*. It is preliminary in nature as it has been prepared at a stage (Phase 3/4 of NRA PMG) when exact quantities and volumes of waste material cannot be determined. This is due to the fact that the type of contract that will be used for the project will be that of Design/Build (DB). In the event of waste being produced, it will therefore ultimately be the responsibility of the appointed contractor in accordance with the contract documents to:

- Identify methods for dealing with the Waste;
- Comply with all necessary planning, environmental and waste legislation;
- Apply for and obtain all necessary approvals, consents and licences in accordance with *inter alia* the provisions of the Waste Management Acts (1996-2011) and Regulations (1996-2011) and also with regard to the *NRA Guidelines on Waste Management from National Road Schemes (2009)*; and to
- Liaise with and secure consent from the relevant landowner where suitable lands are required/identified outside the CPO.

Having regard to the above; the Outline Construction and Demolition Plan will be a **Live** document and will be developed to form the Project Construction and Demolition (C&D) Waste Management Plan which will be incorporated into the Environmental Operating Plan. The obligation to develop, maintain and operate a more detailed Construction and Demolition Waste Management Plan will form part of the contract documents for the project.

This document has been prepared with reference to the following guidance documents:

- *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition projects*, (DoEHLG);
- *Guidelines for the Management of Waste from National Road Construction Projects*, (NRA);

Quantities and volumes of materials presented in this report are subject to detailed design and should not be taken as definitive. Regard should also be had to the Spoil Management Report contained within Appendix 4.3 of the EIS which is referred to later in this report.

On commencement of detailed design a Waste Management Co-ordinator (WMC) will be appointed by the contractor who will be responsible for the management of wastes during the course of the project.

The waste material considered within this Outline (or Preliminary) C&D covers the waste generated by the *Proposed Road Development*; this can be defined as the material generated which does not satisfy the exclusions set out in the Directive on Waste (elaborated upon in section 3.1 of this report).

1.2 Requirement for plan

A Construction & Demolition Waste Management Plan is required as there may be potential for the project to exceed the thresholds set out in the DoEHLG publication '*Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects*', which are set out below.

Figure 1-1: Thresholds for the preparation of a Construction and Demolition Waste Management Plan

1	New residential development of 10 houses or more;
2	New developments other than (1) above, including institutional, educational, health and other public facilities, with an aggregate floor area in excess of 1,250 m ² ;
3	Demolition/renovation/refurbishment projects generating in excess of 100m ³ in volume, of C&D waste;
4	Civil Engineering projects producing in excess of 500m ³ of waste, excluding waste materials used for development works on the site.

The NRA Guidelines for the Management of Waste recommends that the drafting and implementation of the C&D waste management begin early in the design process, thus the preparation of this document at Phase 3/4 of the NRA PMG's.

2 Description of the Project

2.1 Project

Chapter 4 of the EIS (Volume 2) provides a detailed description of the *Proposed Road Development*.

In general terms the mainline realignment will comprise two separate forms of Road Type with the change in cross section defined by a roundabout in the townland of *Castlebaldwin*.

The main part (c. 13.82km of c. 14.71km) of the proposal consists of a Type 2 Dual Carriageway between the townland's of *Toberbride* and *Castlebaldwin*. The *Proposed Road Development* will tie back into the existing N4 to the south of the aforementioned Roundabout with a Standard Single Carriageway alignment.

The Type 2 Dual Carriageway road consists of two lanes in both directions. For safety reasons a 4 lane undivided road is considered unacceptable on rural sections of the network where a 100kph speed limit applies. Therefore on this type of road it is proposed to use a segregating barrier within the paved median to separate the traffic streams.

On Type 2 Dual Carriageway road projects cyclists and pedestrians will be encouraged by signage to use an alternative route, for example the old national primary route. Nevertheless, for safety reasons, appropriate hard standings within verges will be provided for emergency breakdown usage. These hard standings will be a minimum of 1.0m wide and will be of light construction such as compacted granular material.

The road is designed so as to minimise the number of junctions and to provide drivers with straightforward junction layouts. There will be no gaps provided in the central reserve and there will be no direct access from land or houses onto the road.

The section of road which is proposed to be Standard Single Carriageway will be commensurate with the existing improved section of the existing National Primary route at *Cloghoge Lower Td*. This consists of a single carriageway and hard shoulder in each direction.

2.2 Contract Procurement

The Contract Procurement as outlined in Chapter 4 of the Main Report (Volume 2 of the EIS) is expected to be that of a Design/Build Contract. At the heart of the Design/Build approach is the concept that better value for money can be achieved through the utilisation of private sector enterprise due to the enhanced scope for innovation and by allocating the risk to the party best able to manage it. This type of contract places a responsibility on the appointed contractor to design and construct the project in accordance with the obligations of the EIS.

2.3 Ground Conditions

2.3.1 Soft Ground

Based on Preliminary Ground Investigation Contracts carried out for the *Proposed Road Development* and the subsequent preparation of a Geotechnical interpretive Report, it has been identified that there are areas along the route of the *Proposed Road Development* where soft ground conditions will be encountered which are unsuitable to support the weight of the road embankment. These areas are outlined in Table 2-1 and Fig. 13.4.1 to 13.4.8 (Volume 3 of this EIS) for indicative purposes. Although it will be a matter for the contractor to determine the appropriate construction techniques to deal with these ground conditions during the detailed design and construction stage, an assumption has been made that soft material unsuitable for supporting the weight of the proposed route would be dug out and replaced with suitable fill material. This allows the engineering, environmental and monetary impacts of the *Proposed Road Development* to be determined and in particular to facilitate the Environmental Impact Assessment to be completed on a reasonable basis reflecting general practice within the industry.

The volume of soft materials expected to be encountered within these soft ground areas are described in section 2.3.2 of this report.

Table 2-1: Indicative locations of soft ground conditions anticipated to be encountered

Chainage location (indicative limits only)		Preliminary Ground Investigation/Geotechnical Interpretive Report observations
From	To	
1,280m	1,600m	Potentially soft material underneath the existing road foundation. However, the design process assumes that this will be left in place.
2,120m	2,360m	Indicates a localised area of c. 2m at c. Ch. 2,300m Potentially soft material underneath the existing road. Excavation may be required for the south bound embankment in this area.
3,430m	3,730	Indicates a localised area of c. 2m at c. Ch. 3,510m
4,250m	4,770	Indicates a maximum depth of c. 5m between c. Ch. 4,590m and 4,690m
5,000m	5,760	Indicates a maximum depth of c. 4.1m at c. Ch. 5,400m
6,760m	7,690	Indicates a maximum depth of c. 4.5m at c. Ch. 7,250m
9,480m	9,500m	Indicates a localised area of a maximum of 1m underneath the south bound embankment.
9,590m	9,630m	Indicates a localised area of a maximum of 1m underneath the south bound embankment.
10,080m	10,270	Indicates a depth of c. 1m throughout
10,620m	10,900	Indicates a maximum depth of c. 6.3m between c. Ch. 10,290m and 10,790m
11,900m	12,420	Indicates a maximum depth of c. 3m at c. Ch. 12,280m
13,670m	13,980	Indicates a maximum depth of c. 4.5m at c. Ch. 13,920m
Eastern Parallel Link (c. Ch. 500m to 800m)		Indicates a depth a maximum depth of c. 2.5m throughout
Eastern Parallel Link (c. Ch. 2,220m to 2,480m)		Indicates a depth a maximum depth of c. 2m throughout
Sections of the L-55016-0 at Knocknagroagh		Indicates a depth of c. 1.5m throughout
Sections of the L-5502-0 at Drumfin		Indicates a maximum depth of c. 6m
Sections of the realigned L-1404-0 at Castlebaldwin and Cloghoge Upper		Indicates a depth of c. 1m throughout

2.3.2 Earthworks Balances

The design stage of the *Proposed Road Development* has identified that earthworks balancing (Cut : Fill) when applied exclusively to the material won and generated in the course of the various design elements would lead to a significant deficit of fill material and a significant surplus of spoil material generated. This is mainly as a consequence of:

- The fill design requirements for:
 - o Underbridges, overbridges, and watercourse culvert crossings;
- The undulating topography;
- The environmental need to avoid cutting into the groundwater table (and saturated bedrock) in sensitive locations;
- The characteristics of the drumlin deposits which the *Proposed Road Development* intercepts, insofar as the preliminary Ground Investigation results indicate that the material excavated from the upper surfaces of road cuts generally appears to be unsuitable for road construction purposes;
- The interception of areas of soft ground along the route which will require to be excavated from underneath proposed road embankments and replaced with suitable fill material;

An examination of how this material can be managed on site has been considered in detail in the aforementioned Spoil Management Report (Appendix 4.3, Volume 4 of this EIS); this will be expanded upon further in section 5.2.1.2 of this report. The material generated in the aforementioned instances has been initially termed “Spoil” which is a shorthand definition used for the purposes of this EIS for material which is excavated during the construction works. The term has been selected on the basis that it is essentially neutral and free from any of the connotations associated with the word “waste”.

The spoil material estimated¹ to be generated as a result of the aforementioned characteristics consists of Subsoil² (c. 177,000m³), Peat (c. 307,000m³) and Organic Clays (c. 223,000m³).

¹ Best on best available information relevant to the current stage of consent

² Which is considered unsuitable for road construction purposes.

3 Waste Arising

3.1 Exclusion from the Legislation for Excavated Material Re-used at a Construction Site³

The Directive on Waste contains a number of exclusions which make clear that certain materials are not subject to its requirements. A key one affecting construction projects such as this development is set down in Article 2(1)(c). This states that the requirements of the EU legislation do not apply to:

uncontaminated soil and other naturally occurring material excavated in the course of construction activities where it is certain that the material will be used for the purposes of construction in its natural state on the site from which it was excavated

This provision is repeated in the Waste Management Act, as Section 3(1)(c)⁴. Should materials generated by construction activities fall within this provision, they are not then subject to the other requirements of the EU or national waste legislation. This means that, for example, such materials are not defined as “waste”, do not need to be handled by duly authorised waste collectors and do not need to pass to disposal or recovery facilities that are subject to waste licences or other equivalent form of statutory authorisation. In addition, the requirements of the Waste Hierarchy (explained in the next section) do not apply.

The Spoil Management Report contained within Appendix 4.3 of this EIS outlines where the threshold is expected to lie in the context of this *Proposed Road Development*.

3.1.1 The Waste Hierarchy

Besides the requirements that the off-site handling of waste generated by this project are subject to the required statutory authorisations under the Waste Management Act, there is also a necessity that it conforms to the Waste Hierarchy. This is a requirement of Article 4 of the Directive on Waste, being transposed as Section 21A of the Waste Management Act⁵. As explained above, the Hierarchy only applies to material that is defined as “waste”. This means that it does not apply to the proportion of the spoil that is handled on-site in conformity with the statutory exclusion discussed above.

The Waste Management Hierarchy will become activated for any material which does not satisfy the aforementioned exclusion; in this regard the contract documents for the detailed design/construction project will clearly set out the staged approach which the contractor will be required to adhere to through the use of the Hierarchy.

In order of priority, the hierarchy sets out the most desirable approaches to Waste management as comprising:

- (a) Prevention;
- (b) Preparing for re-use;
- (c) Recycling;
- (d) Other recovery (including energy recovery); and
- (e) Disposal;

The Waste Hierarchy is examined in more detail in section 5 of this report.

³ Based on an interpretation by Duncan Laurence Environmental.

⁴ As amended by the European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011)

⁵ As amended by the European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011)

4 Waste Handling

4.1 Outline

Wastes should they be generated by the *Proposed Road Development* will be managed in accordance with the Waste Management Legislation and the principles of the Waste Hierarchy.

4.2 Waste Handling Procedures

During the detailed design and construction phases of the *Proposed Road Development* the appointed contractor will have responsibility for the development and management of appropriate waste handling procedures in accordance with the relevant legislation. In effect this will mean identifying and segregating wastes encountered into their appropriate categories and designating Waste Storage Areas (WSA's) within the *Proposed Road Development* CPO for the storage of waste prior to transport for recovery/disposal at suitably licensed/permitted facilities.

Notwithstanding the foregoing, an overview of the expected methods to handle the expected waste elements is described below:

4.2.1 Excavated Geological Material

Excavated waste geological material (material which does not satisfy the exclusion outlined in section 3.1) principally including soft subsoil and peat will typically be loaded directly/indirectly onto vehicles for reuse/recovery or disposal within (or outside) the CPO boundary. Temporary stockpiling of this material is therefore not anticipated onsite.

4.2.2 Hazardous Wastes

There are no hazardous wastes expected to be encountered during the construction phase of the *Proposed Road Development*.

4.2.3 Waste Removal

Any removal of waste material shall be done so in accordance with the legislation already quoted in section 1.1. It shall undergo a comprehensive waste assessment and classification by a suitably qualified person, in accordance with the Waste Management Catalogue and shall be disposed of/treated in a suitably licensed facility.

5 The Hierarchy

5.1 Outline

The following sets out how the Waste Hierarchy has been applied during Phases 3 and 4 of the NRA PMG and how it will be applied in Phases 5 and 6.

5.2 Waste Prevention

Waste prevention is the first tier of the Waste Management hierarchy and the most effective as it ensures that the waste is not created in the first instance.

5.2.1 Considerations given during NRA PMG Phase 3 and 4

5.2.1.1 Alignment Design

In terms of the *Proposed Road Development*, waste prevention has been implemented during the current phase of the project as follows:-

The alignment proposed is considered the most optimum design, insofar as detailed consideration has been undertaken during the geometric design process to:

- Avoid Environmental Impacts; and to
- Achieve the most economical design;

In this regard, consideration has been had in monetary terms to waste prevention during the design phase as various options have been compared both environmentally and economically against each other to obtain the most robust design, e.g.:

- Cut *versus* fill assessment;
- Overbridge *versus* underbridge assessment;
- Property acquisition and demolition *versus* alternative alignment;

In addition, minor modifications have been made to the line of the Preferred Route as described in Table 5-1 below which outlines reasons for and locations of changes made to the horizontal alignment to avoid/reduce environmental impacts. These changes are outlined figuratively in Fig. 3.2. (Volume 3 of this EIS).

Table 5-1: Horizontal Alignment, changes to avoid/reduce environmental impacts

Location	Reason for alteration	Design measure adopted
<i>Doorly, Lackagh & Knocknagroagh Td.</i>	To avoid and reduce direct impacts on the undesignated ecological site described in the EIS as Lackagh Fen and attributed the ecological value of being important at the National scale. This design change also provides the dual benefit of reducing volumes of PEAT material generated by the <i>Proposed Road Development</i> .	The geometry of the alignment was modified to facilitate the moving of the road footprint to the west of the centreline of the Preferred Route; thereby significantly avoiding direct impacts on Lackagh Fen and reducing the volume of PEAT material generated.
<i>Drumfin & Cloonlurg Td.</i>	To reduce volumes of unsuitable subsoil and PEAT material generated by the <i>Proposed Road Development</i> .	The geometry of the alignment was modified to facilitate the moving of the road footprint to the west of the Preferred Route, thereby reducing volumes of PEAT generated by the <i>Proposed Road Development</i> .
<i>Kingsbrook & Aghalenane Td.</i>	To avoid and reduce direct impacts on the undesignated ecological site described in the EIS as Ardloy & Aghalenane Loughs and attributed the ecological value of being important at the International scale. This design change also provides the dual benefit of reducing volumes of PEAT material generated by the <i>Proposed Road Development</i> .	The geometry of the alignment was modified to facilitate the moving of the road footprint to the west of the centreline of the Preferred Route, thereby avoiding direct impacts on Ardloy & Aghalenane Loughs and reducing the volume of PEAT material generated.

5.2.1.2 Spoil Management Report

5.2.1.2.1 *Outline*

Considering initially the spoil material generated, a Spoil Management Report was prepared by the design team. The principle purpose of this report was to establish a method which would allow the requirements of section 50(3) (a) and (c) of the Roads Act, 1993 (as amended) to be met; which relates to the information which is to be contained in an Environmental Impact Statement as already discussed in Chapter 1 of the Main Report (Volume 2 of this EIS).

The report which is contained as appendix 4.3 of volume 4 adopted a screening approach whereby a series of predetermined stages allowed for a broad initial investigation to be refined gradually with the objective of eventually establishing the most appropriate approach and techniques to deal with this material.

The approach was initiated with the development of a broad Range of Options which were considered suitable in principal to accept this spoil material. This concluded that the most viable option to deal with this material appeared to be spoil repositories which were contained within the severed agricultural lands required for CPO, or, other lands which were contiguous to the *Proposed Road Development*. The suitable options established were based on initial characteristics including *inter-alia* landform, site topography, working characteristics etc. The various options included:

- Option 1: Spoil Repositories within those lands required for land severance reasons;
- Option 2: Ecological & Landscape Improvement Works on lands which are remote from but in proximity to those plots required for land severance reasons, including:
 - Existing conifer plantations of low ecological value;
 - Restoration of existing Cutover Bogs;
- Option 3: Spoil Repositories/ Borrow Pits;
 - Locations within those lands required for land severance reasons
 - Configuration Type 1 directly adjacent to those lands required for land severance reasons;
 - Configuration Type 2 directly adjacent to those lands required for land severance reasons;
- Option 4: Land infilling of low lying/low value agricultural lands which are directly adjacent to those lands required for land severance reasons

Upon examination of these options and following an assessment process, the optimum sites were considered to be those landscape infill sites contained within Option 1 and the Spoil Repositories/Borrow Pits contained within Option 3. There were a number of reasons for this including:

- (1) They are within or directly adjacent to the *Proposed Road Development*;
- (2) The material is stored below ground level, therefore:
 - a. There is no risk of impacting on flood plains;
 - b. There is no risk of a material slide;
- (3) Considering the depth of material which they can accept, they have a much smaller land area requirement when compared with the other options;

Additionally and equally as important; in terms of the Spoil Repositories/Borrow Pits the report examined the need for such infrastructure in terms of material resource requirements. This revealed, based on cost comparisons which included fuel consumption considerations, that there was a very justifiable need for borrow pits to be included within the limits of the *Proposed Road Development* and as such the limits of the CPO were extended to include their provision thus providing what is effectively a maximum envelope on the nature of this *Proposed Road Development*, its impacts and mitigation. The intention is that the contractor can later select from within that envelope. This is done, notwithstanding the fact, that it will be the contractor's prerogative to design and quantify such areas as part of the detailed design and construction stage.

Based on an interpretation of the appropriate Waste Legislation provided to the design team, it is considered that the aforementioned material used in Spoil Repositories/Borrow Pits identified and assessed within the CPO of the *Proposed Road Development* would comply with the exclusion described in section 3.1 of this report (and expanded upon in the Spoil Management Report). Considering the perceived relevance of the exclusion, material used for these purposes are also considered a form of Prevention.

5.2.1.2.2 *Balance Remaining*

The Spoil Management Report through analytical calculations outlines that if the sites which have been included wholly within the confines of the *Proposed Road Development* transpire to maximise the extents described in the report, there may remain potential that a surplus balance of organic clay material could remain.

It may be a case that the vertical limits of the borrow pits described are maximised further by the contractor during the detailed design/construction phase of the project thus reducing such quantities. Notwithstanding this, in recognition of the aforementioned balance and the assumptions contained within the report (which are reflective of the stage of design and consent), other considerations are provided (within the Spoil Management Report) including alternative construction techniques and the potential application of the Waste Hierarchy which would in such instances be examined at Detailed Design stage by the appointed contractor. The application of such alternative construction techniques is also considered a form of Waste Prevention.

5.2.2 Potential options during NRA PMG Phase 5 and 6

Waste prevention shall be the appointed contractor's responsibility during the detailed design/construction stage. Options may include but are not limited to the following:

- Use of alternative construction options described above which is examined (in a preliminary nature) in Section 9 of the Spoil Management Report (Appendix 4.3 of this EIS);
- A careful balancing of the materials being ordered against what is required to carry out the works;
- Avoidance of poor quality material specification which leads to unnecessary and potentially un-useable materials arriving on site;
- Careful management of materials after they have arrived on site, i.e. storage and handling procedures;
- Use of pre-formed or pre-manufactured elements which would reduce the onsite generation of scrap metals.

5.3 Waste Reuse, Recycling and Recovery

Potential options the appointed contractor may consider for the reuse, recycling and recovery of waste arising from the *Proposed Road Development* include the following:

5.3.1 Geological Materials

In relation to the soft subsoil material generated it has been assessed in the Geotechnical Interpretive Report prepared for the *Proposed Road Development* that this '*material could be processed into acceptable Class 2C fill by air drying or lime stabilisation*'⁶.

Such a process could be considered as '*Reuse*' or '*Recovery*' in accordance with the Directive on Waste and the Waste Management Acts, obligations will thus be placed on the Contractor within the Contract Documents to deal with this material in compliance with the provisions of the relevant legislation.

Moving material offsite could in some instances be considered Recovery; however it is more likely that section 5.4 of this report will apply in relation to Waste Disposal.

5.3.2 Concrete

Waste concrete is expected to arise principally during bridge construction works. It is likely that where possible this waste concrete shall be returned to the supplier for reuse, otherwise it may be incorporated into the permanent works where it considered suitable to do so.

5.3.3 Metals and Timber

Metals and timber waste as with the concrete outlined above will typically arise during bridge construction works and will principally be rebar reinforcement and structural shuttering. Best practice for dealing with this excess waste metal and timber includes segregating into appropriate skips/containers and transferring to metals and wood recycling facilities.

⁶ N4 Cloonamahon to Castlebaldwin, Geotechnical Interpretive Report; AGL Consulting

5.3.4 Packaging and Plastics

A concerted effort should be made on site to reduce the amount of packaging and plastics generated by site deliveries, this could include; requesting suppliers to collect their own packaging for recycling. The remaining waste packaging remaining onsite should be segregated into separate containers for collection and distribution to waste packaging and recycling facilities.

5.3.5 Canteen Waste

Receptacles shall be provided at staff canteens to allow for the segregation and storage of individual waste streams. These shall include receptacles for food waste, dry recyclables, and residual bin.

5.4 Waste Disposal

Waste Disposal shall only be considered by the appointed contractor once all options have been exhausted within the principles of Waste Prevention, Reuse and Recycling.

5.4.1 Geological Materials

As outlined previously, the principle waste material is likely to be that excavated subsoil material which does not satisfy the exclusion in section 3.1 of this Report. There is potential depending on the quantities generated (determined at detailed design stage), that it may not be economical to treat all of the waste within the first three tiers of the hierarchy.

In such an instance the Spoil Management Report has considered a range of potential options⁷ a contractor might consider to deal with this material offsite. Broad environmental assessments have been carried out within the Spoil Management Report which confirms the sites to be suitable for such a purpose.

This option shall only be considered once the waste management hierarchy has been exhausted.

⁷ Some options may fall into the category of Recovery.

6 Demolition Plan

In general the *Proposed Road Development* has sought to avoid existing dwellings and properties where possible. However, there remains the result that fifteen residential properties will be acquired as part of the *Proposed Road Development*; this is principally as a result of the upgrade works being carried out on the online section. It is expected that thirteen of these properties will be demolished as part of the *Proposed Road Development*. In addition numerous old ruins and farm sheds will require demolition.

A coherent Demolition Plan shall be prepared by the appointed contractor and included as an integral part of the Project C&D Waste Management Plan.

A principal objective of the Demolition Plan will be to ensure that where a building or structure requires demolition, the sequence of operations to be followed is predetermined and documented, thereby ensuring that an appropriately selective dismantling/demolition methodology is employed.

Special attention should be paid to the sorting/segregation arrangements employed to separate the demolished structure into individual material fractions. In addition, the transportation and reception arrangements associated with the movement of materials to other construction sites for reuse or reprocessing should also be considered.

Health and Safety procedures should be adhered to in accordance with the requirements of the relevant authorities in the removal of hazardous waste material during the demolition process. The procedures and processes for removal of hazardous waste material will be identified in the Project C&D Waste Management Plan by the appointed contractor.

Special or hazardous wastes should be retained in isolation from other wastes to avoid further contamination. Certain C&D materials are hazardous e.g. lead, tars, adhesives, sealants. Asbestos containing construction materials are classified as hazardous (see European Waste Catalogue Codes in Appendix 2 of the '*Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects*' for a schedule of hazardous construction materials).

If such materials are mixed with non-hazardous materials e.g. lead-based paint tins discarded onto a stockpile of brick and concrete, the entire quantity of material becomes hazardous and must be managed as hazardous waste.

7 Roles including training and responsibilities for C&D waste

A Construction and Demolition Waste Manager shall be appointed by the contractor prior to the detailed design of the *Proposed Road Development*. This Manager will have overall responsibility for waste management onsite. The role will include the important activities of conducting waste checks/audits and adopting construction and demolition methodology that is designed to facilitate maximum reuse and/or recycling of waste.

The Plan shall make provision to ensure that the C&D Waste Manager is appropriately trained and is assigned the authority to require measures to be taken to fulfil the Plan's objectives and targets for each stage of the project.

The role of the C&D Waste Manager should ensure that the opportunity is taken to educate all colleagues (at the planning and design phases of the Project), site staff, including external contractors and suppliers, about alternatives to conventional construction waste disposal. The Plan should make provision for the C&D Waste Manager and site crew to be trained in materials management thereby being in a position to:

- Distinguish reusable materials from materials suitable for recycling;
- Ensure maximum segregation at source;
- Co-operate with site manager on the best location's for stockpiling reusable materials;
- Separate materials for recovery; and
- Identify and liaise with operators of recovery outlets.

8 Record Keeping Procedures

The contractor shall develop a record keeping system that will ensure that details of all arising's, movement and treatment of C&D waste are recorded. All materials being transferred from the site, whether for recycling or disposal, shall be subject to a documented tracking system which can be verified and validated.

9 Waste Auditing Protocols

Waste auditing protocols shall be the responsibility of the Waste Manager who shall carry out auditing in accordance with an Audit Plan for the project to be included in the developed Construction and Demolition Waste Management Plan.

The self audit should cover the following elements:

- A systematic study of all waste management practices which have been adopted on-site;
- Special attention should be dedicated to obvious opportunities for waste reduction, but all areas and stages within the project should be reviewed;
- Details of raw material inputs and the quantity, type and composition of all waste from the site should be identified;
- The audit findings should highlight corrective actions that may be taken in relation to management policies or site practices in order to bring about further waste reductions;
- A tracking system shall be stipulated to determine the success or failure of corrective actions.

Summary audit reports outlining types, quantities of waste arising's and their final treatment method shall be sent to the Environmental Assurance Officer who will be appointed by the client in accordance with Chapter 4.10.10 of the Main Report (Volume 2 of this EIS). These summary reports shall be prepared and issued on the last Friday of each calendar month for the duration of the Construction Project.

10References

- (1) *NRA Project Management Guidelines*: National Roads Authority (2010);
- (2) *NRA Guidelines on Waste Management from National Road Schemes*: National Roads Authority (2009);
- (3) *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects*: DoEHLG;
- (4) *Guidelines for Construction and Demolition Waste*: Sligo County Council;
- (5) *NRA Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan*: National Roads Authority (2007);
- (6) *S.I. No. 126 of 2011; European Communities (Waste Directive) Regulations*: Statutory Office (2011);