

The Innovation in Waste Resource Products or Service Award

Integrated Materials Solutions & Greenstone

Section 1: Background/Overview of Entry

Organisation Description

Integrated Materials Solutions (IMS) was established in 2016 with the aim to change the way construction and residual wastes are managed in Ireland. IMS is committed to responsible waste management and Circular Economy principals are at the core of the business. The company offers a range of services and products specifically for the construction sector. The company's main site is the Hollywood Facility which includes a construction waste recycling plant and engineered landfill that is regulated under Waste Licence W0129-02. The facility is located c. 25km from Dublin City Centre and accepts a range of materials from many parts of the county.

Outline the chosen category and rationale for entering

The chosen category IMS which to enter is ***Innovation in waste resource Products or Service Award***. Since 2018 IMS have been working on recycling concrete waste and in late 2019 were the first Irish company to be granted an End of Waste (EoW) decision from the EPA for their recycled aggregate products collectively known as Greenstone. Greenstone are recycled aggregates which are certified by the NSAI and can be used in civil engineering and roads projects. The product was brought to the market in early 2020.

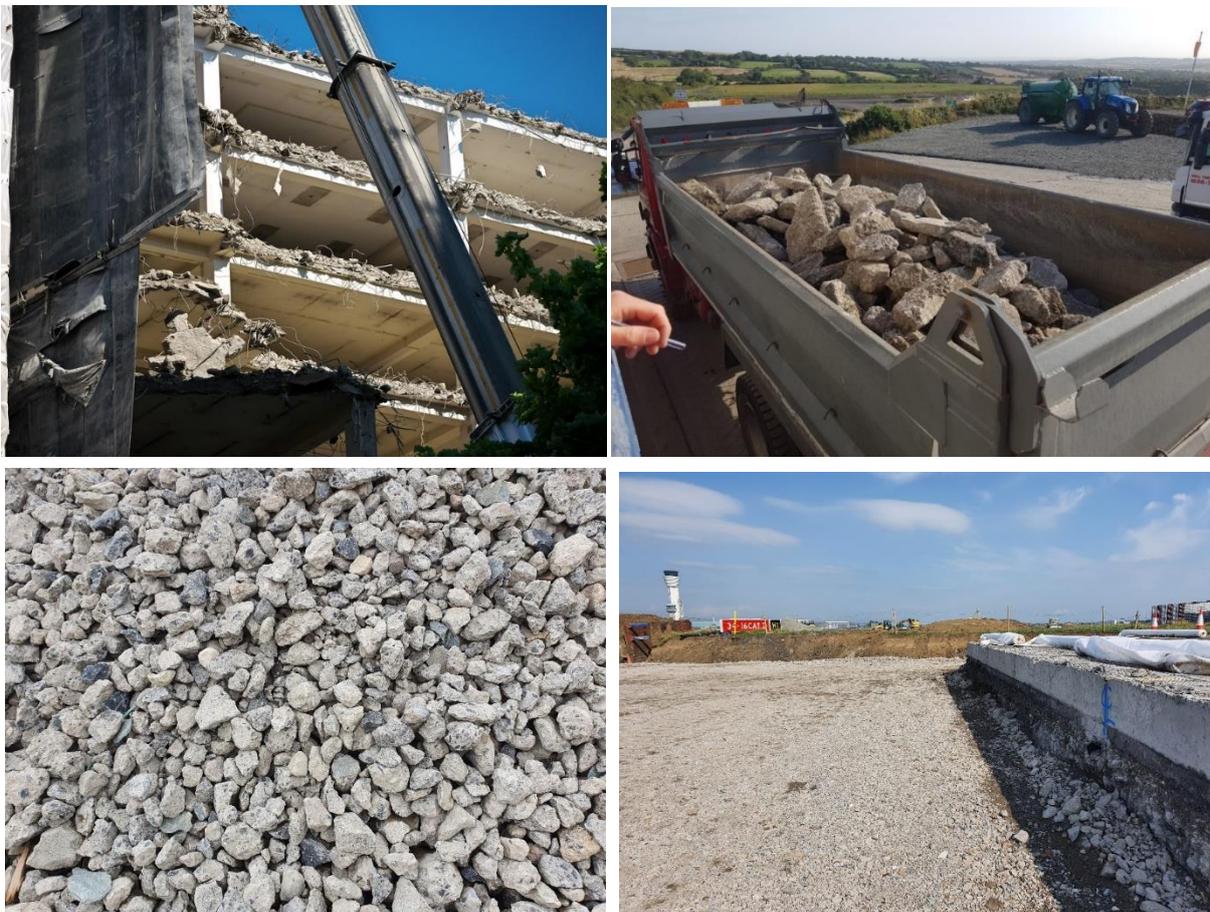


Figure 1 (top left; demolition College House Dublin, top right; concrete rubble arriving at IMS Hollywood, bottom left; processed Greenstone, bottom right; material placed in Dublin Airport runway extension)

Under the European Green Deal and the National Waste Management Plan for a Circular Economy Ireland has made good progress in defining our path to a more sustainable future via the Circular Economy framework. Construction and Demolition waste has been prioritised at EU and national level as one sector which has the greatest opportunity for improvement. Up until recently there were little or no options for construction waste producers to recycle their material. IMS are focused on providing economical, compliant and practical solutions in this area.

Section 2: Description of Initiative/Project

Provide a detailed description of the steps involved in the set up and running of the project/initiative

The EoW process is governed under Article 28 of the Waste Framework Directive which requires four pillars to be satisfied in order for a waste to be considered to have achieved end of waste status and become a recycled product:

1. The substance or object is commonly used for specific purposes;
2. There is an existing market or demand for the substance or object;
3. The use is lawful (substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products);
4. The use will not lead to overall adverse environmental or human health impacts.

One of the main elements which required most input was the environmental risk assessment to ensure any new product would not lead to overall adverse environmental or human health impacts. IMS worked with Golder Associates to carry out detailed quantitative environmental risk assessments to model the impacts on groundwater for various scenarios applicable to Irish geology. The modelling exercise took a number of months and included several potential contaminants of concern which could be contained within crushed concrete waste. In addition to the modelling exercise 14 no. samples were obtained from building sites and natural rock quarries around the country. The technical information were presented to be EPA in order for them to make an assessment and reach a decision.

Following on from the environmental assessments, the new materials were assessed against existing product standards. An application was made to the NSAI in order for the established procedures to be audited. IMS were the first company in Ireland to undergo an audit for the production of recycled aggregates and System 2+ certification was granted in February 2020.



Fig 2: Process of turning waste concrete to a useable aggregate

In order to run the production the requirements of both the EPA and NSAI have to be met continually in order to produce a certified product which is fit for purpose. The waste acceptance and control element is governed under IMS's EPA Waste Licence. The processing of material is carried out by crushing equipment using the only specialised recycling crusher in the country. Waste input material and product output material is continually checked, sampled and analysed to ensure a quality conforming product. The steps involved in the process are illustrated on Figure 2.

Showcase evidence of how the project/initiative was effectively communicated to all parties involved

From start to finish, IMS led meetings with all stakeholders from Staff onsite to consultants and indeed the EPA. IMS also presented our initiative to the Chartered Institute of Waste Management and local authorities.

The steps involved in bringing Greenstone to market have involved a collaborative approach between environmental regulators, waste producers, material specifiers, demolition contractors and environmental scientists. A series of meetings were held to ensure stateholders requirements were addressed during the development phase.

Once the approvals were issued by the EPA and NSAI a series of public talks were given including:

- Chartered Institute of Waste Management C&D Event, Nov 2019
- Regional Waste Planners Producer Responsibility Event, November 2019
- Federation International du Recyclage Annual Meeting, June 2020
- IGBC Green Innovations Series, May 2021
- National Waste Training Programme May 2021
- Chartered Institute of Water and Environmental

IMS are also involved in a number of national committees including the Construction Waste Resource Group, National End of Waste Working Group and steering group for MSc in Circular Economy Leadership for the Built Environment GMIT.

Describe how the project/initiative aligns to the overall sustainability strategy of the organisation/community group/school/individual

IMS is committed to the Circular Economy Strategy and the company is continually investing in research and development in the areas of recycling and End of Waste. The company is currently working on several applications and studies to increase recovery and recycling activities at the Hollywood facility which will play an important part in Ireland's sustainable development and improve waste recycling levels nationally which will help meet our EU waste recycling commitments.

Section 3: Achievements to Date

Outline achievements to date and the effects of the project/initiative

The benefits of Greenstone are manifold and include:

- Waste producers can have their concrete recycled on or off site of generation;
 - EoW decision allows for recycling onsite of generation as long as waste permissions in place (e.g. mobile crusher permit)
 - Material can be reused on the site (e.g. replacing new roads etc)
 - Can significantly reduce truck movements of waste out and material in.
- Prevents landfill or backfill of waste concrete;
 - Over 150,000 tonnes of concrete diverted to date.

- Keeps materials and their embodied carbon in the loop.
- Reduces the need for extraction of primary materials;
 - Reduces environmental impacts associated with extraction inc. biodiversity loss, landscape, traffic etc

Provide examples of elements of the project/initiative that have exceeded expectations and highlight the organisation/community group/school/individual's overall commitment to sustainability/recycling excellence and waste management

In addition to accredited quality assurance certification, Greenstone has undergone an independent Life Cycle Assessment (LCA) to measure the Carbon dioxide equivalent (CO₂ eq) / 'carbon footprint' of the materials. Following detailed assessment and independent verification, our materials have been certified to have a carbon footprint which is up to 95% less than that of primary aggregates (Greenstone = 0.21kg CO₂ per tonne).

An Environmental Product Declaration (EPD) is now available for Greenstone through the Irish Green Building Council. The EPD allows project designers to calculate the overall carbon footprint for their project by assessing the EPD's of all materials they use in the development as well as factoring in transport, project life span and second life the constituent materials.

One of the key factors in reducing a products carbon footprint is for the truck that is transporting the waste concrete from a customers site to be reloaded with Greenstone at IMS and go back to same site. One project we worked on was for Dublin Airport where the waste concrete was transported to the IMS facility, processed and loaded back into the same truck for use on the client's site. This saved c. 1,100 truck movements and provided significant carbon savings in transport and off set those that would be incurred from virgin materials.

Section 4: Future Focus

Detail what future goals are in place for the project/initiative, if applicable, or provide an outline of future plans for the organisation/community group/school/individual's overall sustainability strategy

Recycling of materials is more sustainable when it is done close to the source of waste generation. In the near future IMS are planning on offering Greenstone recycling on a national level on a number of large project planned for the Munster region.

During 2021 IMS have carried out several trials to investigate producing new low carbon concrete utilising the Greenstone aggregates as well as a number of low carbon cement alternatives such as GGBS. IMS are continuing to collaborate with material specifiers, engineers and academic institutions to look at new and innovative uses for low energy materials.

There are lots of more opportunities for improvement in the recycling of construction and other waste types. IMS are also currently investigating a number of other waste types which may be suitable as input materials for the Greenstone process and they hope to have a number of new services and products to bring to market over the coming months.

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