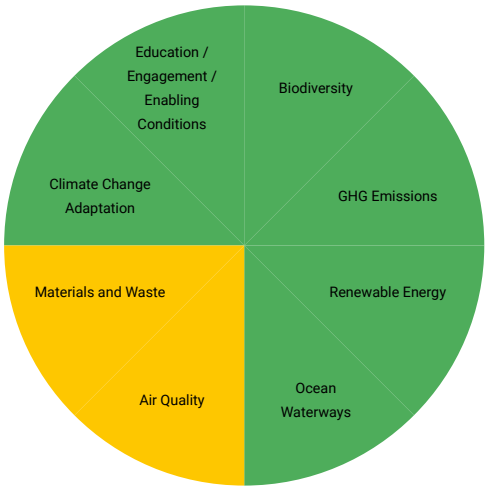
Plymouth Food Waste Service Implementation



Assessment ID: PLY439

Assessment Author: Rachel Hawadi

Project Summary:

The project is a legislatively driven initiative in accordance with section s45A of the Environment Act 1990 brought into legislation by The Environment Act 2021. The implementation of a city-wide food waste service is mandatory and scheduled to be implemented by 1 April 2026.

Summary of Assessment:

Biodiversity Score: 5

Biodiversity Score Justification: The project has indirect impact on Biological Diversity in the following ways.1. Habitat destruction and land use change. Growing and producing food requires a significant amount of land, water, and other resources. When food is wasted, all those resources go to waste as well. This land use change – most often, deforestation – can lead to the destruction of natural habitats. This project will a) In the long term encourage people to change their consumption which originally leads to food waste but also to be recycle food which can then be used for manure, renewable fuel to encourage biodiversity.2.Water pollution: Food waste can pollute water sources. When food waste is dumped in landfills, it decomposes and produces methane gas, which can seep into nearby water sources and contaminate them. Methane gas is a potent greenhouse gas that contributes to climate change. In addition, food waste can also contain harmful chemicals and pesticides that can pollute water sources and harm aquatic life. By treating food waste in this way there is a greater chance of a flourishing ecosystem that encourages bio-diversity.3. Loss of pollinators: Pollinators such as bees, butterflies, and birds are essential for maintaining plant biodiversity and food production. However, food waste can reduce the number of pollinators by destroying their habitats and reducing the availability of food sources. In addition, food waste can also contain harmful chemicals that can harm pollinators and other beneficial insects. By creating a food waste service the amount of uncontrolled food waste can eliminate this issue.

Biodiversity Score Mitigate: No

GHG Emissions Score: 5

GHG Emissions Score Justification: According to The United Nations Environment Programme (2021) Food Waste Index Report 2021. Food waste alone generates about 8% - 10% of global greenhouse gas emissions. Food waste emits more greenhouse gases than all single countries

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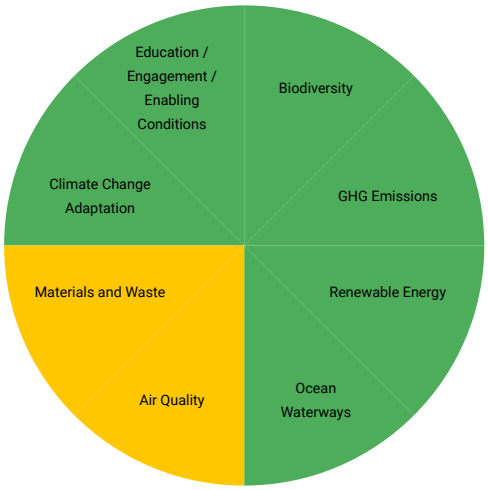

in the world except China and the US. Due to its quick decay rate, food waste in landfills contributes to more methane emissions than any other landfilled materials to produce methane. Methane is the most powerful greenhouse gas.An estimated 58 percent of the fugitive methane emissions (those released to the atmosphere) from municipal solid waste landfills are from landfilled food waste.By implementing a food waste service Plymouth will be reducing the amount of food that goes into landfills that produce methane gas.

GHG Emissions Score Mitigate: No

Renewable Energy Score: 5

Renewable Energy Score Justification: First, the food is separated from its packaging and to further sort plastic packaging/polymer type.The food is converted to energy using the anaerobic digestion process which generates heat, biogas (biomethane) and electricity. The electricity generated is fed into the national grid.What's left after the anaerobic digestion process is pasteurised into a nutritionally rich slurry and used as organic fertiliser.This process will be critical for producing a closed loop sustainability cycle.

Renewable Energy Score Mitigate: Yes

Renewable Energy Revised Score: 5

Renewable Energy Revised Score Justification: To ensure that there are contractual KPIs to demonstrate sustainability outputs from the Anaerobic Digestion process which will be delivered by a third party.

Ocean and Waterways Score: 5

Ocean and Waterways Score Justification: 1.Water Quality: Food waste is a huge contributor to water pollution. When food is discarded, it creates an excess of food waste that has to be disposed of in waterways. This can have a negative effect on the environment. This creates environmental problems such as the build-up of algae, which can cause flooding and contamination of drinking water.Leachate, a toxic liquid that forms when rainwater mixes with decomposing waste, can also contaminate nearby groundwater and surface water sources.In the long-term, awareness of the environmental impact of food waste in the household could lead to

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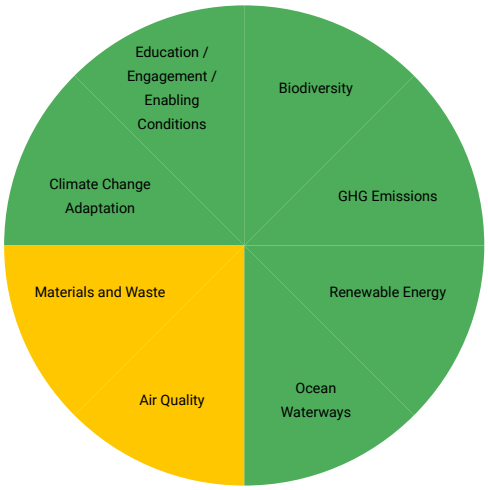

lower, more informed purchasing at the retail level which could lead to less food production at agricultural level. Every food item grown, produced, processed, cleaned and transported has its own ‘water footprint’, using up earth’s precious freshwater reserves. Rescuing food from waste also means rescuing water.2. Marine/aquatic habitats: Food is often treated with pesticides, insecticides, hormones, antibiotics, and preservatives. When human food waste finds its way to waterways and the ocean, it is consumed by marine life. The chemicals in that waste accumulate as they move up the food chain and cause elevated levels of toxicity. The bioaccumulation of pesticide and other chemicals from food waste will be reduced by implementing a food waste service In addition, nutrients from food waste irresponsibly deposited into the ocean can cause eutrophication, a process in which high nutrient concentration in water causes algal bloom. Algal bloom typically happens as a result of nutrients such as nitrogen or phosphorus entering an aquatic system and causing phytoplankton to grow and reproduce. The algal bloom disrupts the normal marine ecosystem in a number of ways: using all the oxygen in the water, blocking sunlight for photosynthetic marine plants, and producing toxins harmful to the food chain.

Ocean and Waterways Score Mitigate: Yes

Ocean and Waterways Revised Score: 5

Ocean and Waterways Revised Score Justification: Ensuring that the Council has visibility of the processes and or KPIs related to the disposal of leachate.Having a robust catchment tank to process leachate from the waste transfer site going to reservoirs and public waterways.

Air Quality Score: 2

Air Quality Score Justification: This project is likely to increase the number of diesel powered waste vehicles on the road which is negative.Emissions of particular concern are NOX andparticulates. NOX emissions arise primarily as nitric oxide (NO) which is rapidly oxidised to nitrogen dioxide (NO2). At high ambient concentration levels,NO2 has health impacts on sensitive people.Particulates arise from diesel vehicles and contain amixture of soot, unburned fuel and hydrocarboncompounds produced during incomplete combustion.They are now the major source of grime in towns andcities throughout the UK.Air Quality in Plymouth is monitored and deemed to be overall "good". Adding an an additional 10 diesel vehicles will add to the deterioration of air quality but at in incremental and insignificant level. (This could be mitigated by using Electrical Vehicles, however these are double the market price of diesel vehicles and

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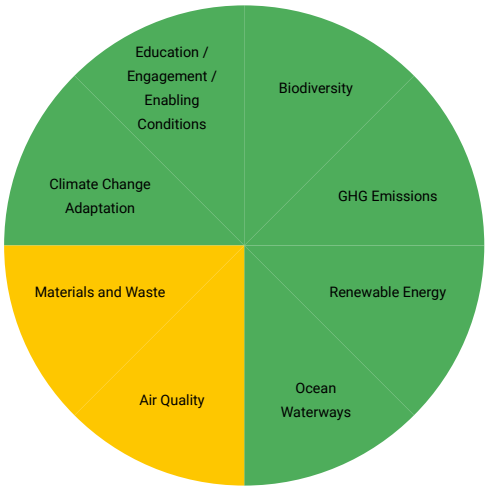

have a lower life span).Air emissions from food waste should lead to an overall decrease in emissions, however this will be negated by the increase in emissions from food waste vehicles and haulage trucks which will be even more if the Anaerobic Digestion site is at a long distance from Plymouth.There will be no particulates produced as the digestate will be converted to slurry, biogas, heat and electricity.During the creation of this Climate Impact Assessment an initial conversation Tony Norton from Exeter University in partnership with the Net Zero team who estimated based on various assumptions that 5,000 tpa of food waste would mean 38% of organics being removed from the landfill and therefore the corresponding GHG.

Air Quality Score Mitigate: Yes

Air Quality Revised Score: 2

Air Quality Revised Score Justification: 1. Procuring an Anerobic Digestion Site within close proximity to reduce the impact of using Diesel vehicles.2. Procuring some or all electrical waste vehicles.3. Cost v Benefit Analysis on procurement of hydrogen vehicles

Materials and Waste Score: 2

Materials and Waste Score Justification: Indicative food waste studies conducted in 2022 by a “Local Partnerships” study estimates a yield of a little over 10,000 tonnes per annum of food waste for Plymouth in 2026/2027. Frith RM Consultants working with the project estimated in 2024 food waste for Plymouth to be around between 4,483 tonnes (FRM ‘top down) to 6,736 tonnes (WRAP yield) The food waste project would mean that in due time (depending on participation rates) the tonnage of food waste going to landfill/recycling/incineration or to the Energy for Waste plant will be taken to an Anaerobic Digestion site which will produce slurry that goes back to the earth as fertilizer for plants and for renewable energy to be produced..There is however a plastic footprint disbenefit of providing more than 200,000 plastic containers where potentially 60-80% may not be used for food waste recycling.

Materials and Waste Score Mitigate: No

Materials and Waste Revised Score Justification: 1. A robust public Education and Engagement from the start2. Engagement with Green Communities and CICs3. A robust Schools programme to educate children who could be powerful messengers to adults at home.4. To undertake roadshows5.To have councillors actively engage with residents in their jurisdiction.6.To have a

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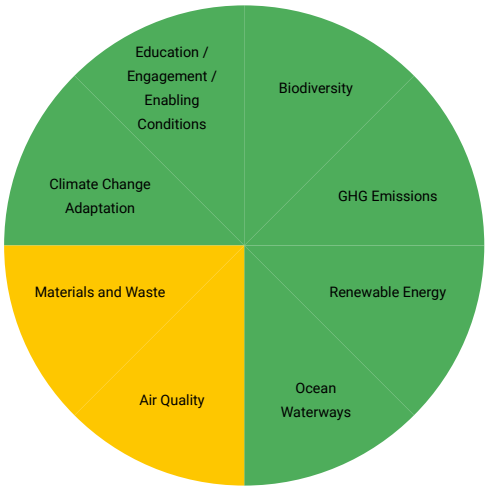

robust interactive Social Media campaign across all platforms.7. To have a solid FAQ section.8. To pilot the service and gain a deep understanding of potential issues before rolling out.

Climate Change Adaptation Score: 4

Climate Change Adaptation Score Justification: 1. Will an assessment be conducted of the vulnerability of this project to climate change impacts? YesThe Net Zero Delivery team have been engaged at the discovery stage of this project and will form critical Stakeholders and form part of an Advisory Group who will be engaged throughout the delivery of this project and will assist and advise on all impact assessments to include vehicle procurement decisions, selection of an Anaerobic Digestion site and an overview of processes and public education and engagement to assess the vulnerability and also resilience of this project to climate change impact.2. Will this project contribute to making Plymouth more or less resilient to the anticipated effects of climate change? Yes The intention of this project is not only to implement food waste (therefore reducing GHG) but to undertake a robust public engagement programme to include all green communities and CICs, a schools programme, roadshows and to encourage Councillors to participate within their jurisdictions in order to increate higher participation rates which will be the true success of the project.3. Will an assessment be conducted of the vulnerability of this project to climate change impacts?Yes The Net Zero Delivery team have been engaged at the discovery stage of this project and will form critical stakeholders and form part of the Advisory Group who will be engaged throughout the delivery of this project and will assist and advise on all impact assessments to include vehicle procurement decisions, selection of an Anaerobic Digestion site and an overview of processes and public education and engagement. These impact assessments will be built into the project plan.4. Will this project contribute to making Plymouth more or less resilient to the anticipated effects of climate change? Yes The intention of this project is not only to implement food waste but engage in a robust public engagement programme to include all green communities and CICs, a schools programme, roadshows and to encourage Councillors to participate within their jurisdictions.5. Will this project lead to changes in the risk of flooding? NoWill this project lead to increased urban heat islands? NoSince Urban heat islands" occur when cities replace natural land cover with dense concentrations of pavement, buildings, and other surfaces that absorb and retain heat. This effect increases energy costs (e.g., for air conditioning), air pollution levels, and heat-related illness and mortality. It can therefore be concluded that this project will not be producing any heat islands.

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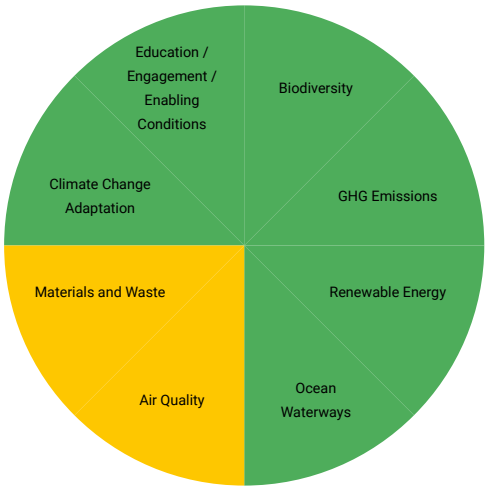

Climate Change Adaptation Score Mitigate: Yes

Climate Change Adaptation Revised Score: 5

Climate Change Adaptation Revised Score Justification: By continuously consulting with the Net Zero Delivery Team throughout the life cycle of the project.

Education / Engagement / Enabling Conditions Score: 5

Education / Engagement / Enabling Conditions Score Justification: This project is not just a technical delivery to meet legislative requirements. At the heart of the success of the project is winning the hearts and minds of the public through a robust, well managed, consistent, informed educational campaign. The message will likely need to be novel, innovative and collaborative and have long term climate awareness beyond food waste.. Public engagement will begin with learning lessons from other local authorities on what has and has not worked well in the past. This will be followed by a steady messaging vehicle to include1. Roadshows2. Engagement and collaboration with Green communities3. A schools programme4. Videos5. Targeting all social Media platforms6. Leaflets7. Press articlesThe overarching achievement of the education programme is to raise awareness of climate change and to change personal behaviour and personal responsibility towards climate change.

Education / Engagement / Enabling Conditions Score Mitigate: Yes

Education / Engagement / Enabling Conditions Revised Score: 5

Education / Engagement / Enabling Conditions Revised Score Justification: 1. Research what has worked.2. Collaboration.3. To have champions in problem areas.4. To have recycle officers.5. To undertake a through stakeholder Analysis.6. To understand stakeholder needs thoroughly.

Wheel Key

- Long lasting or severe negative impact
- Short term or limited negative impact
- No impact or neutral impact
- Short term or limited positive impact
- Long lasting or extensive positive impact