

Potential Implications from a Site Flooding Event

LENZING FIBERS, GRIMSBY

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1 INTRODUCTION

1.1 Purpose of this Document

This preliminary document has been prepared as an indication of potential risk of damage to plant and equipment associated with the Waste Water Treatment Plant if the proposed construction area were to flood.

1.2 Site Location

The proposed WWTP is adjacent to the existing Lenzing Fibres Plant at the following address.

Lenzing Fibres Grimsby Ltd, Energy Park Way, Healing, Grimsby, DN31 2TT.

The new facility will be constructed on land already owned by Lenzing fibres to the east of the current plant, set back approximately 250m from the new through road, Energy Park Way.

Figure 1: Location diagram

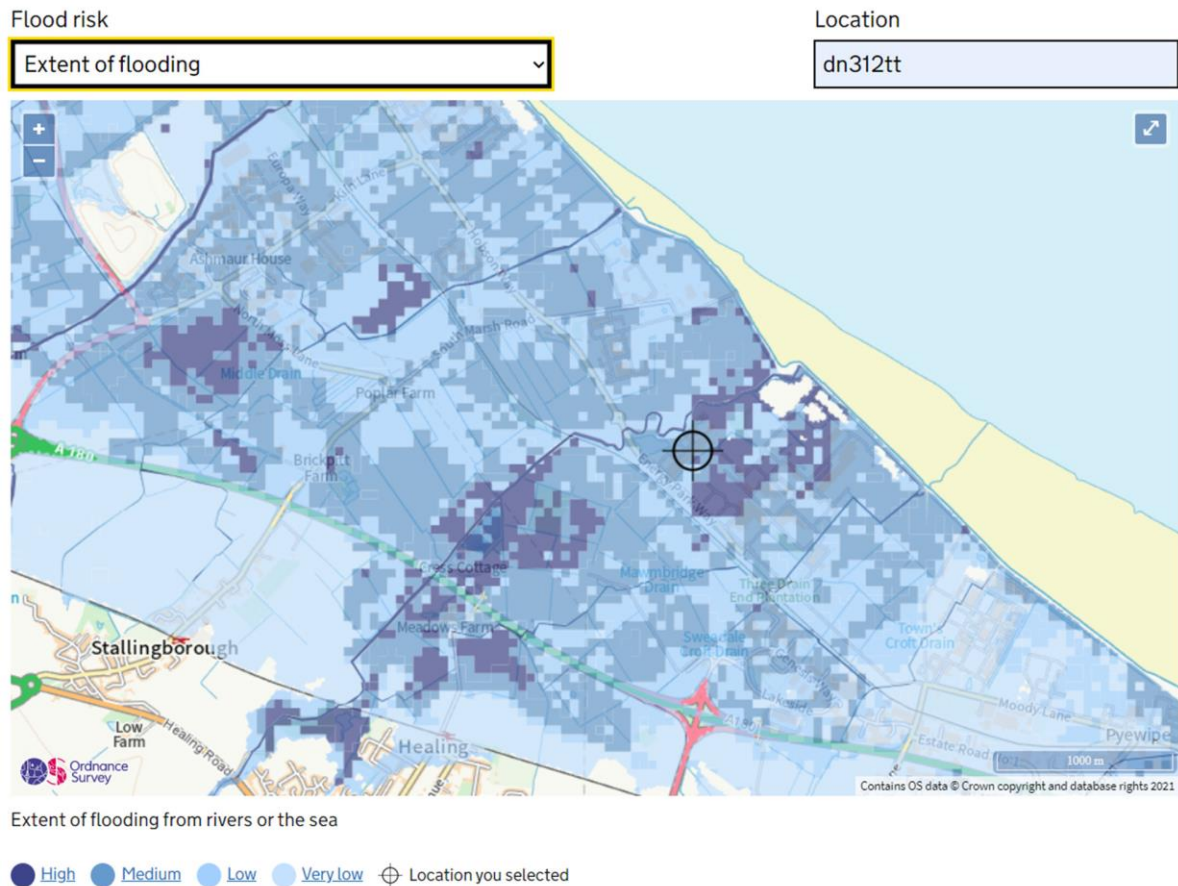


Source: Imagery: Google Earth

2 FLOOD RISK SUMMARY

The following information has been collected from - [flood-warning-information.service.gov.uk/long-term-flood-risk](https://www.flood-warning-information.service.gov.uk/long-term-flood-risk) (UK Government Website) which indicates the following:

2.1 Flood Risk from the River or the Sea



Flood risk from rivers or the sea

Although there are both low and high risk areas located adjacent to the Lenzing Facility (Located indicated by Target Symbol – DN31 2TT), the main factory and adjacent construction area falls mainly within the medium risk band.

High risk means that each year this area has a chance of flooding of greater than 3.3%. This considers the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.

Medium risk means that each year this area has a chance of flooding of between 1% and 3.3%. This considers the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.

Low risk means that each year this area has a chance of flooding of between 0.1% and 1%. This considers the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.

2.2 Surface water

Surface water flooding, sometimes known as flash flooding:

- happens when heavy rain cannot drain away
- is difficult to predict as it depends on rainfall volume and location
- can happen up hills and away from rivers and other bodies of water
- is more widespread in areas with harder surfaces like concrete

The areas located adjacent to the Lenzing Facility (Located indicated by Target Symbol – DN31 2TT), the main factory and adjacent construction area are identified as Very Low Risk which means that each year this area has a chance of flooding of less than 0.1%.

3 WASTE WATER TREATMENT PLANT

With the initial risk of flooding indicated as medium Risk - 1% to 3.3% Risk/year. What are the potential implications if the site were to be flooded in respect too:

- The Potential Release of Chemicals
- Effluent Contamination
- Damage to Plant and Equipment

It must be pointed out that the WWTP design does not include for any specific defences against flash, River or Sea flooding. The design does however as part of good engineering practice elevate plant and equipment by way of concrete plinths, building bases and steelwork to provide limited protection to flooding (subject to the ultimate depth of the flood water).

3.1 Potential Release of Chemicals

All chemicals used as part of the waste water treatment process are held in suitable non-degradable storage tanks which in turn are housed on either mobile chemical bunds or within their own integral bunds providing protection (minimum depth of flood water required to breach integral bunds - >1.1m AFGL).

All chemical interconnecting transfer pipework are dual contained and located on appropriate tray works located >1m AFGL. Please note the chemical transfer pumps would be located in free standing chemical cabinets >1.2m AFGL.

Overall risk of potential release of chemicals during a flood event is Low.

3.2 Effluent Contamination

The risk of effluent contamination is limited to that of the effluent collection, transfer and drainage sumps which have a finished coping level of approximately 0.3m AFGL. All sumps have limited storage volume limiting the risk of effluent contamination. All large process storage tanks are constructed from glass coated steel requiring flood levels >8.0m AFGL.

Overall risk of potential effluent contamination to flood water is limited to sumps during a flood event.

3.3 Mechanical Plant and Equipment

All plant and equipment would be located on either supporting steel frames or concrete plinths providing limited protection from potential flood events up to 0.35m AFGL.

3.4 Power and Control Systems

Unless specifically stated, all Power and Control systems would be at risk from failure if the flood level were to exceed 0.4m AFGL. Even though most enclosures including MCC's and other switchgear have some protection from water ingress that does not usually include immersion during a flood.

There is likely to be increased corrosion which weakens the materials, supports etc and also causes moving parts to seize up, such as relays and contactors as well as switches and MCCBs.

There is also the likelihood of temporary or permanent conductivity between live parts which causes leakage, overloads and ultimately a short circuit fault.

Although of course after flood water has abated and the equipment has been dried and hopefully tested things may seem okay, they cannot be relied on as there will likely be corrosion and probably mold from water impurities.

We would not advise putting any flooded MCC or switchgear back into service long term even if it has been tested for the simple reason that the switchgear cannot now be relied on to operate correctly over the long term. It will fail at some indeterminate time, probably when it is most inconvenient, so should be planned to be replaced as soon as possible.

Over time, if not replaced, damaged equipment will become more and more dangerous and will fail in unpredictable ways. The most obvious is that a protective device mechanism will seize in the closed position and not open when required. It is also possible that mould or other growth will actually cause an internal short circuit directly.

With transformers there are two enclosures. The windings are resin filled which is used both as insulation as well as a media for transferring heat to the outer surface for dissipation. So the windings are generally fairly well protected other than pressure relief or other ventilation that may be there. The other enclosure is the part containing the incoming and outgoing conductors and termination points. These items will be subjected to possible submersion damage in most cases. We would not recommend reuse of the transformer if it had high water inside without thorough testing by specialists first. Larger transformers may be tested in place, smaller ones are often replaced and the old one is sent off for testing/reconditioning.