

Holiday Blue & Express Red (Zone Y and Z) Long-term Car Parks

The Holiday Blue Flood Risk Assessment (FRA)

daa

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Notice

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1. Introduction

Atkins were commissioned by the daa to prepare a Flood Risk Assessment (FRA) to accompany a planning application for The Holiday blue existing car park at Dublin Airport.

This FRA consists of the following:

- Stage 1 – Flood Risk Identification
- Stage 2 – Initial Flood Risk Assessment

The scope for Stage 1 is to identify whether there may be any flooding or surface water management issues related to the existing carpark that may warrant further investigation. If the results from the Stage 1 assessment concludes that no flood risks are identified, then this FRA is not required to proceed to Stage 2.

The scope for Stage 2 is to confirm sources of flooding that may affect the existing site, to appraise the adequacy of existing information and to scope the extent of the risk of flooding to the existing carpark. The potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures is to be considered. If required, the scope for a detailed assessment should be listed.

This FRA has been undertaken in consideration of the following guidance document;

- *'The Planning System and Flood Risk Management – Guidelines for Planning Authorities'* DOEHLG 2009.

2. Site Description

2.1. General

The existing Holiday blue Carpark is located south of Dublin Airport. The existing car park is bound to the north and east by the R108 which runs along the circumference of the Dublin Airport Airfield; to the west and south-east by Horizons Logistics Park internal trunk roads; to the south-west by a watercourse known as the Quinn's River, a tributary to the Santry River.

2.2. Existing Site Layout

The existing Holiday blue Carpark consist largely of permeable granular surfacing with ancillary infrastructure and facilities, such as the existing internal circulation road including bus turning circles, bus shelters, lighting, boundary fencing, car park barriers, electrical kiosks, CCTV cameras, bus layover area, internal car park signage, existing drainage network including existing surface water attenuation areas, and surrounding landscaping.

There is no proposal for works within the existing Holiday Blue car park. However, an updated Flood Risk Assessment is required in order to accompany a new planning application which will be made in relation to the Holiday Blue & Express Red (Zones Y and Z) long-term car parks.

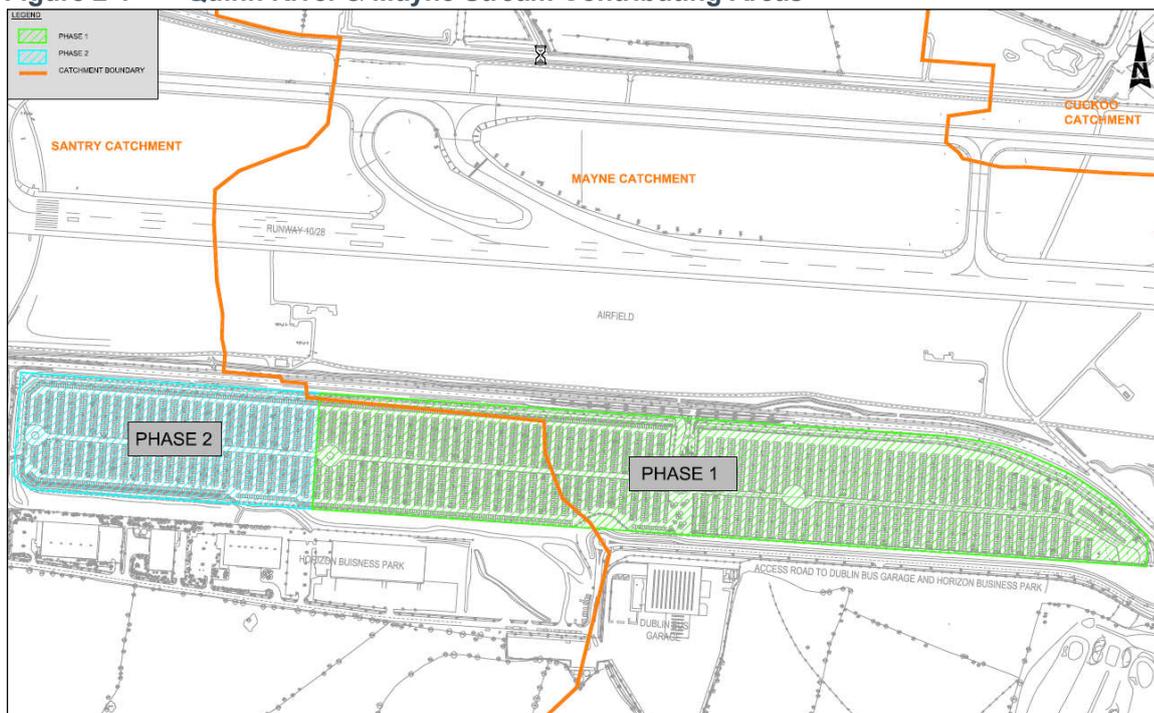
2.3. Existing Topographical Levels

The existing carpark and surrounding lands are slightly to moderate sloping in the general direction from north-west to south-east. The existing carpark drainage network consist of five sub catchments to accommodate the falls in different directions within the site boundary. The existing site elevations range from 64.000 to 70.900m.OD Malin.

2.4. Local Hydrology & Existing Drainage

The most immediate hydrological features in the vicinity of the site are the Quinn River and the Mayne Stream. The extent of both catchments within the existing carpark are shown in Figure 2-1 below:

Figure 2-1 Quinn River & Mayne Stream Contributing Areas



The Quinn River, which runs along the south-western boundary of the existing carpark, is a tributary to the Santry River. The catchment area upstream is approximately 2.5km², which consist largely of agricultural lands, single developments and the western portion of Holiday blue Carpark. The Quinn River runs from north-west to south-east to where it discharges into the Santry River approximately 2.5km downstream. The Santry River flows to the south east through Santry and outfalls into Dublin Bay at Raheny adjacent to St. Anne's Park approx 8.5 kms away.

The Mayne Stream, which runs along the northern and eastern boundary of the existing carpark, flows eastwards and ultimately discharges into Baldoyle Bay along the Mayne Road approximately 8.6 km downstream. The Mayne River drains the eastern portion of Holiday blue Car park, a large portion of the nearby Runway 10/28 and surrounding green spaces.

The existing carpark drainage areas are largely permeable granular surfacing which allows for storage and partial infiltration to ground. The existing carpark also consists of 3 No. attenuation areas designed to capture the excess rainfall run-off within the site boundary via overland flow prior to discharging the adjacent Quinn River and Mayne Stream.

3. Initial Flood Risk Assessment

This flood study for the site is undertaken in three principle stages, these being 'Step 1 – Screening Assessment', Step 2 – Scoping Assessment' and 'Step 3 – Assessing Flood Risk'.

3.1. Possible Flooding Mechanisms

Table 3-1 below summarises the possible flooding mechanisms considered for the site;

Table 3-1 Possible Flooding Mechanisms

Source/Pathway	Significant?	Comment/Reason
Tidal/Coastal	No	The site is not at a coastal location.
Fluvial	Possible	Two watercourses adjacent to the existing carpark.
Pluvial (urban drainage)	Possible	The existing carpark are largely covered open graded compacted clause 804 material.
Pluvial (overland flow)	No	The existing carpark is not surrounded by elevated lands.
Blockage	Possible	The Quinn River consist of a culvert located immediately downstream of the existing carpark.
Groundwater	No	There are no significant springs or groundwater discharges recorded in the immediate vicinity of the site.

The primary flood risks to the site can be attributed to pluvial (urban drainage) and fluvial flooding, Secondary flood risks can be attributed to blockage of a culvert on the Quinn River immediately downstream of the site.

4. Screening Assessment

The purpose of this screening assessment is to establish the level of flooding risk that may exist for a particular site and to collate and assess existing current or historical information and data which may indicate the level or extent of any flood risk.

The following information and data was collated as part of the screening assessment carried out for the site.

4.1. OPW / EPA / Local Authority Hydrometric Data

The OPW, EPA and local authority hydrometric data were investigated, and no existing hydrometric stations were identified for the Quinn River and Mayne Stream at the vicinity of the existing carpark.

4.2. OPW Draft PFRA Mapping

Draft Preliminary Flood Risk Assessment (PFRA) Maps have been produced for the whole country by the OPW. Figure 4-1 below, extracted from OPW PFRA Map number 2019/MAP/256/A, and illustrates predictive flood zones in the vicinity of the site

Figure 4-1 OPW PFRA Map - Quinn River

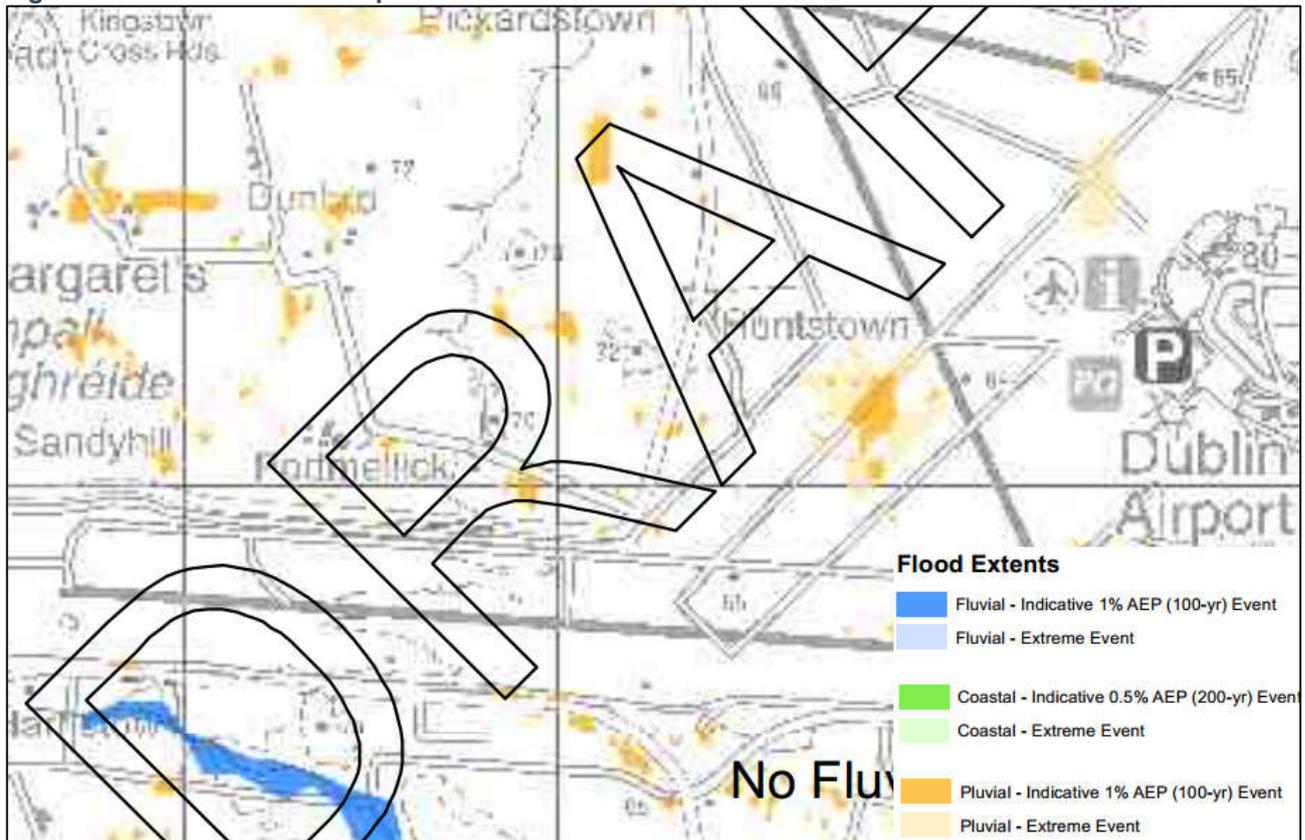


Figure 4-1 above indicate the predicted floodplain encroaching the southern boundary of the existing carpark. It should be noted that the predicted extent of the flooding shown on these maps was developed using low resolution digital terrain model (DTM) and the illustrated flood extents are intended to be indicative only.

4.3. OPW Flood Hazard Website

The OPW Flood Hazard Mapping website (www.floodmaps.ie) was consulted in relation to available historical or anecdotal information on any flooding incidences or occurrences in the vicinity of the site. Figure 4-2 below shows mapping from the Flood Hazard Mapping website in the vicinity of the study area:

Figure 4-2 OPW Flood Hazard Map

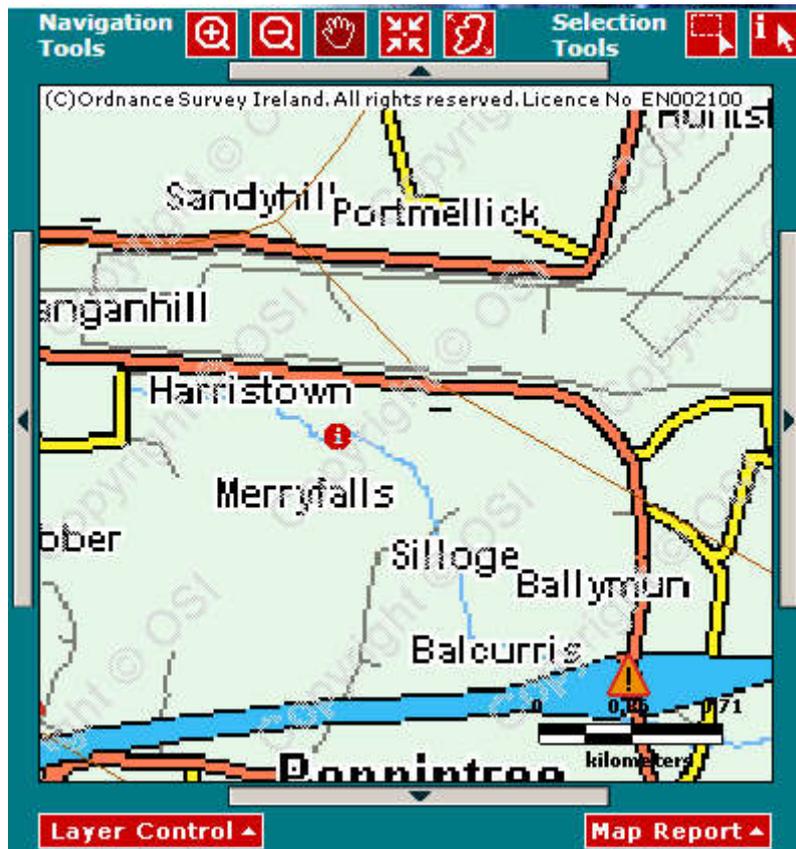


Figure 4-2 above does not indicate flooding in the immediate vicinity of the existing carpark. The nearest reported flood event identified was at the South Parallel Road Junction with the M50 approximately 1.5km downstream of the existing site. This reported flood event occurred over the period of 13th-15th November 2002 and was exacerbated by a culvert on the Quinn River surcharging which contributed to the flooding of adjacent greenfield sites. There was no flooding at the existing carpark during this event.

4.4. Ordnance Survey Historic Mapping

Available historic mapping for the area was consulted as this can provide evidence of historical flooding incidences or occurrences. The maps consulted were the pre-1900's historic 6-inch colour and 25-inch maps. The flood maps layer was investigated to identify any potential flood plains within the environs of the site.

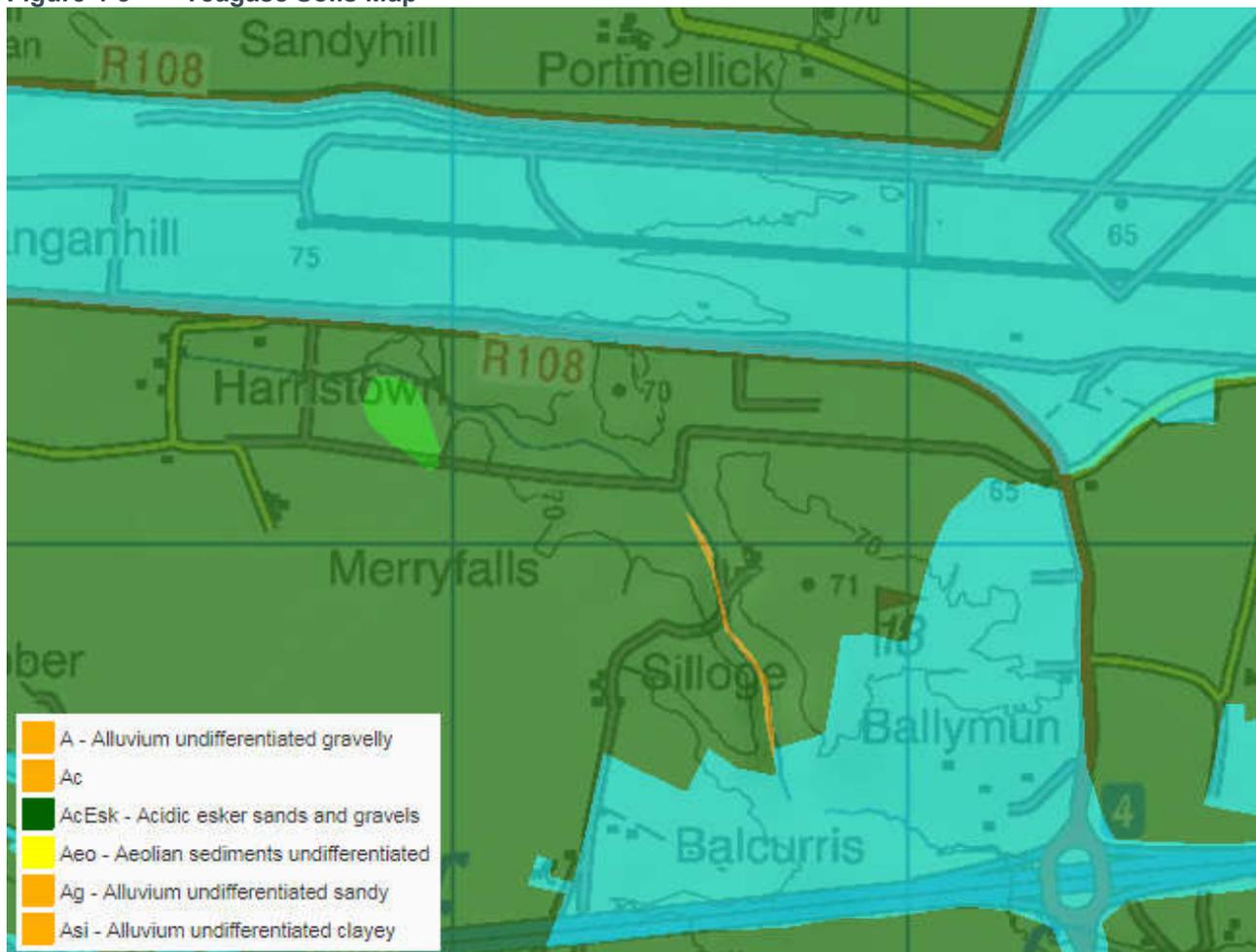
The maps consulted showed no indication of historical or anecdotal instances of flooding within the environs of the existing carpark.

4.5. Teagasc Soils Mapping

The Teagasc Soils maps were consulted to determine the presence of alluvium deposits in the vicinity of the site. Deposition of alluvium deposits can be an indicator of areas which have flooded in the recent geological past.

Figure 4-3 below show the sub-soils mapping for the site of which does not indicate alluvium deposits within the immediate vicinity of the existing carpark.

Figure 4-3 Teagasc Soils Map



4.6. Fingal East Meath CFRAM Study

The Fingal East Meath Catchment Flood Risk Assessment Management (CFRAM) Study was undertaken by the Office of Public Works (OPW) and its Partners. This study involved detailed flood studies into the areas recommended for further assessment from the Fingal East Meath District, which included the Quinn River, as part of the PFRA study.

A detailed flood risk extents map produced for Quinn River adjacent to the southern boundary of the existing carpark is shown in Figure 4-4 below.

Figure 4-4 Fingal East Meath CFRAM Study - Quinn River



Figure 4-4 above show the 1 in 100 year and 1 in 1000 year predicted flood extents encroaching the southern boundary of the existing carpark.

4.7. Holiday blue Carpark Drainage Review Report

A drainage review study was completed for the existing Holiday blue Carpark in February 2011. The report consisted of an appraisal into the drainage requirements for the existing surface water drainage infrastructure, which involved surveys, site investigations and detailed hydraulic modelling.

The results of this study indicated that the existing drainage infrastructure then was inadequate to accommodate the extreme rainfall events. Hence further assessments were carried out as part of this study determined the mitigation measures recommended to provide flood protection for the existing Holiday blue Carpark for up to a 1 in 100 year return period. The measures recommended listed below;

- Installation of new Flow Control Devices at outfall locations to control discharge from the site including no un-controlled discharge of storm water from the carpark.
- Construction of attenuation areas to cater for storm events up to 1 in 100 year events. Attenuation areas located at low levels.
- Petrol interceptor prior to all outfalls.
- Replacement of damaged pipework and the removal of blockages.
- Replacement of the existing 450mm diameter damaged culvert on the Quinn's River with a 1200mm diameter pipe in accordance to the OPW and Fisheries requirements.
- Construction of new outfalls to replace the submerged outfalls.
- Replacement of the 'non-performing' drainage network at the eastern end of the site.
- Raising existing circulation road levels to maintain access during extreme flood events.
- Relocation of turning circle from a designated flood plain
- Designated flooding zones with associated earthen berms to contain the run-off for up to the 100 year event with a minimum freeboard of 500mm.

The Holiday blue carpark has a total of 7No. outfalls. Each outfall location has a flow control to limit the discharge rate to previously agreed rates which are as follows;

- *Combined Discharge rates to Santry River = 46.17 l/s*
- *Combined Discharge rates to Mayne River = 58.41 l/s*

The total discharge rate from the carpark is 104.58l/s during a 1 in 100 year storm event.

The above measures including maximum discharge rates were reviewed by detailed hydraulic model analysis to confirm adequate flood protection for up to a 1 in 100 year return period including 10% for climate change. All of the above measures have been implemented as set out and agreed in the planning compliance submission to Fingal County Council on the 15th June 2015 in response to storm drainage items set out in An Bord Pleanála planning reference: PL06F.PA0022.

4.8. Conclusion of Screening Assessment

The purpose of the screening assessment is to establish whether a flood-risk issue exists or may exist in the future. If there is a potential flood risk issue then this procedure should move to “Step 2 – Scoping Assessment” or if no potential flood risk is identified from the screening assessment, then the overall assessment can end at Step 1.

Based on the findings of the screening assessment, this flood study is required to proceed to “Step 2 – Scoping Assessment”.

5. Scoping Assessment

The purpose of the scoping assessment is to identify possible flood risks and to implement the necessary level of detail and also to assess these possible risks, and to ensure they can be adequately addressed in this study. The scoping assessment should also identify whether sufficient quantitative information is already available to complete this study.

The potential flood risks identified at the initial flood risk assessment stage are listed below:

- Fluvial
- Blockage of Culvert
- Pluvial (urban drainage)

The OPW and Fingal East Meath CFRAM maps indicate a potential fluvial flood risk to the existing Holiday blue carpark from the Quinn River. Both maps show the predicted 1 in 100 year and 1 in 1000 year predicted flood extents breaches the boundary of the existing carpark. The existing carpark is classed as water compatible under the OPW guidelines “*The Planning System and Flood Risk Management – Guidelines for Planning Authorities*’ DOEHLG 2009”. Hence the fluvial flood risk posed by the Quinn River is deemed to be acceptable provided that in event of flooding the emergency measures are place to mitigate the impact on human health and environment.

The culvert located on the Quinn River immediately downstream of the existing carpark was recently upgraded from a 450mm to 1200mm diameter culvert to convey flows for up to a 1 in 100 year return period and to reduce impact of blockage as per the OPW requirements. Hence the upgraded culvert does not pose a risk of flooding to the existing carpark.

A detailed drainage study carried for Holiday blue carpark incorporated migration measures, which was confirmed by detailed hydraulic model analysis to provide flood protection from up to 1 in 100 year return period. The worst case scenario involving restrictions in discharge from the outfall locations to adjacent watercourses during high water levels was factored in the design of the mitigation measures. The mitigation measures recommended, as listed in Section 4.7, of this report have been implemented.

In consideration of the above scoping assessment, the potential flood risks identified is considered to be addressed sufficiently. Hence this flood risk assessment is not required to proceed to the “*Assessing the Flood Risk*” stage.

6. Conclusion & Recommendations

The results of this Flood Risk Assessment concluded that the risks from flooding at the existing Holiday blue carpark due to pluvial (urban drainage) and blockage of culvert have been addressed and are managed to acceptable limits.

The potential fluvial flood risk to the existing Holiday blue car park from the Quinn River was detailed as part the Fingal East Meath CFRAM Study. The study indicates the predicted 1 in 100 year and 1 in 1000 year flood plain breaches the boundary of the existing Holiday blue Car park. The existing carpark is classed as water compatible under the OPW guidelines as discussed in Section 5 above.

**Atkins
150 Airside Business Park
Swords
Dublin**

**info.ie@atkinsglobal.com
00353 1 810 8000**

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