

Prepared by:

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Report date:

July 4th 2012. Amended July 10th 2012.

Summary.

This report relates to flooding of a number of locations in the River Bride catchment. I visited Blackpool Village, the Commons Road, & Watercourse Road and observed the aftermath of flooding in those locations, and spoke to a number of people affected by flooding there, on the morning of June 28th. Flooding was also reported to me by personnel in Cork City Council as having occurred in Kilnap & Ballyvolane. A person I spoke to in Blackpool village reported the flooding of a number of houses in Dublin Street.

About 155 properties were affected by flooding in all of these flood events.

Further information came to my attention on July 6th relating to the events recorded in this report. A further site visit was carried out on July 9th and this led to the revision of this report

Location of flood event.

There are eight locations referred to in this report. All of these locations were flooded by or are located in the catchment of the Bride River (or its tributaries), to the north of Cork city. The location listed below for Balyvolane is merely intended to indicate the Ballyvolane area in general and not a specific location where flooding occurred as this is not known to me at this time. Approximate indications of the locations are as listed on the following table, using ING references.

Location Name	Easting	Northing
Commons Road (North Point Business Park Area and Kilnap Viaduct)	166,265	74,750
Commons Road (Commons Inn to Sunbeam Site)	166,550	74,400
Blackpool Village	167,450	73,250
Watercourse Road (South of O Connell Street)	167,400	72,850
Dublin Street	167,700	73,700
Ballyvolane	168,540	73,525
Spring Lane	167,700	73,520
Lower Killeens Rd. (west of Mallow Rd)	166,035	74,690

Date of Flooding.

Flooding occurred in the early hours of the morning on June 28th 2012.

Sources and Causes of Flooding.

- **Commons Road (North Point Business Park Area and Kilnap Viaduct).** Watercourse, known as the Glenamought River. The cause of flooding is believed to be the large volume of flood water being significantly in excess of the capacity of the watercourse, resulting from intense rainfall. This was exacerbated by old and new culverts on this water course which are both inadequate for the volume of water in this flood event.

Flooding of the Killeens Road (under and to the north of the N20) and the new business park to the north of the N20 (but west of the North Point Business park) may have been contributed to by the Glenamought River, as well as from a stream flowing into the area from the Rathpeacon & Killeens areas.

In the North Point Business park, flood waters entered the park as a result of over flowing upstream of the culvert under the entrance to the park (see photo later 7BR1_0). Some flow may have entered the park from the public road outside the entrance which might have been a combination of pluvial run off and run off from the Glenamought River which overflowed its banks upstream of the next culvert upstream from the entrance to the park (see further photo later 7BR1_91). It is clear from flood debris on the boundary fence between the park and the Bride River that flow was from the park to the river and not vice versa.

- **Commons Road. (Commons Inn to Sunbeam Site).** Primarily from the River Bride, possibly with some contribution from surface water run off, or overflow from storm water retention tanks from Fair Hill (as labelled on OSI Discovery scale mapping). The cause of flooding is believed to be the large volume of flood water being significantly in excess of the capacity of a small two arched bridge under Fitz's Boreen, possibly with some contribution from surface water run off from Fair Hill to the west. This caused the flooding of one large commercial premises (a hotel). Downstream of that, the Commons Road itself flooded, and it was the overflowing of the footpaths on the road, possibly worsened by traffic on the road, that caused flooding of residential properties. I was advised by occupiers of the residential properties that The Bride river did overflow its banks adjacent to the properties, but it did not flood as far as the buildings on the properties themselves.

However, closer to the city in the flood extent here, persons advised that commercial properties were flooded both from the road and from the river. It is clear from debris marks on the ground that the River Bride overflowed its banks in this area, commencing at a point about 260m downstream from Fitz's Boreen

- **Blackpool Village.** Flooding was from the River Bride. The cause of flooding is considered to be culverts both at Orchard Court and south of Blackpool Church that were not capable of conveying the flood waters in the Bride River. It is not considered that there were any blockages in these culverts during the flood. This opinion is based on video footage of the flood at both culverts that was made available to me by a member of the public as well as a discussion with senior engineer who witnessed the floods at these locations at what is believed to be about the time of the peak flood level. The video footage was recorded about 5.00am to 5.20 am while the engineer witnessed the flooding at about 4.00am to 4.30am. (It is possible that flooding here could have been contributed to by the flow from Spring Lane along Thomas Davis Street.)

- **Watercourse Rd (South of O Connell street)**. There were two separate flooding incidents here. Firstly there was a surface water run off flood from the North Monastery Road area, and later, there was flooding of Watercourse Rd. from the Bride River that over flowed its walls and banks further north in Blackpool Village. Photographs of the Surface Water run off flood were made available to me by a member of the public and these were taken between about 1.40 am and 2.15 am. Flooding of the Watercourse road extending on to the Blackpool Bypass (North Link Road) at Brewery Corner was reported to me as having been observed at 5.30am to 5.45am.
- **Dublin Street**. Surface water runoff.
- **Ballyvolane**. Flooding was from the Glen River. The cause was reported to be pipes (Culverts) which were inadequate to convey the flow in the watercourse.
- **Spring Lane**. Flooding was observed flowing out of a commercial coal, sand & gravel yard on Spring Lane. On inspection, (believed to be about 8.00am to 9.00am) water was seen flowing from The Glen stream (also labelled as “Back Water Course” on OSI 1:5000 mapping), through a stone wall underneath a concrete capping of the wall. Given report of times of flooding elsewhere in the area, flooding could have been at a higher level earlier in the morning. Flow in this yard was described as flowing out the gate when yard staff arrived for work in the morning. It was noted that there were sandbags at doors of houses across from the entrance to this yard on Spring Lane

Flood data.

Has flooding occurred at these locations before? Where I asked this question, the answers I obtained were as follows.

Blackpool Village. This occasion, (June 2012) is the third or fourth time that such a flood has occurred in the past 8 to 10 years. At least one of the previous floods was exacerbated by a blockage in the culvert at Orchard Court. The church was flooded on this occasion and was flooded to a similar but slightly lower level about 10 years ago.

It was pointed out to me that on this occasion both the culverts at Orchard Court and adjacent to the church were clearly overwhelmed by the flood, but that on a previous occasion in about 2001, the culvert at the church clearly had spare capacity while the culvert at Orchard Court was overwhelmed. (It may have been the case there was a blockage in the Orchard Court culvert on the previous occasion.)

Commons Road. Two people I spoke to separately advised me that this was the worst flooding they had experienced at their properties in 25 years. I understood this to mean that they were occupying their properties for 25 years and this was the worst flooding they experienced in that period, rather than that they had experienced worse flooding about 25 years ago.

At the city end of the flood extent on the Commons Road personnel I spoke to there advised that flooding of the yards adjacent to the buildings had been observed before but that they had never observed flooding entering the buildings before. Peoples' period of knowledge of these properties varied from 2 years to 20 years to 30 years.

At Lower Killeens Rd, I was advised that a property there floods on average every 3 to 4 years. Generally the flood affects storage or shed type buildings on the lower part of the site, but the flood has in the past gone into the residence on the site on one occasion. A comment was made that if you can see the top of the pipe (conveying the Bride River under the Mallow road) things are ok, but if

the flood level exceeds that of the top of the pipe, the flood will be into the property.

Impacts of Flooding.

Property.

Impacts on numbers of properties are estimated as listed in the following table.

<i>Location Name</i>	<i>Number of Properties flooded (Approximate estimate)</i>
Commons Road (North Point Business Park Area and Kilnap Viaduct).	2 residential and 6 Commercial
Commons Road (Commons Inn to Sunbeam Site)	12 Commercial plus about 8 Residential
Blackpool Village	About 90 total, including church.
Watercourse Road (South of O Connell Street)	About 8 total, plus an Underground car park.
Dublin Street	3 residential.
Ballyvolane	25-30 residential.
Spring Lane	1 Commercial.
Lower Killeens Rd (west of Mallow Rd.)	1 property.

Roads.

Lengths of a National route (N20) and local roads or streets were flooded as apparent on the flood extents later in this report.

Photographs.

Watercourse Road and O Connell Street.

The following photographs were made available to me by a member of the public and were taken between 1.40 am and 2.15am approximately. These photographs show flooding from Surface Water run off from the North Monastery road area to O Connell Street and Watercourse Road.



View looking east towards Watercourse Rd, on O Connell Street.



View from front door of property, looking across footpath to parked cars on O Connell Street



View looking south on Watercourse Rd from junction with O Connell Street.



View looking down footpath on O Connell Street towards Watercourse Road.



View looking up O Connell Street.

Blackpool Village

The photographs below which were taken during the flood were made available to me by a member of the public and they were taken between 4.00am and 5.00am. I took the photographs showing the aftermath of the flood on the morning of June 28th.



View showing depth of flooding in a house in Thomas Davis Street, (just over 0.5m).



View showing depth of flood debris caught in railing along River Bride in Orchard Court (about 0.6m)



View showing debris indicating depth of flood at exit from Orchard Court car park to Thomas Davis Street.



Flooding on Great William O Brien Street at about 5.00am



Flooding on Great William O Brien Street at about 4.15am



Entrance to Culvert adjacent to Blackpool Church. This view is a still from a video taken about 5.00 am. I was advised by a Senior Engineer from Cork City Council that the flood at this location was observed earlier at the level of the graffiti on the headwall of the culvert (ringed in red). This would be about 1.2m above the soffit level of the culvert, or at a level of about 8.7m O.D. Malin, based on Lee CFRAMS Channel & Cross Section Survey (7BRI_0). See following photo for clarification.



View of culvert at Blackpool Church with flood level reduced. Note staff in right of photos used to give estimation of height of Graffiti mark above soffit.



Entrance to culvert at Orchard Court. This view is a still from a video recorded at shortly after 5.00am. As with the culvert at the Church, I was advised that the flood had been observed earlier at a level of 10 blocks down from the top of the wall. See following photo.



View of entrance to Orchard Court culvert after flood level reduced. Red line indicates level described as observed earlier. Based on Lee CFRAMS (7BRI_93) survey drawing this approximates to a level of about 9.4m OD Malin, and it is about 1.1m higher than the soffit level of the culvert entrance.

Commons Road. (Commons Inn to Sunbeam Site)

I took the following photographs late in the morning and in the afternoon of June 28th. Some photos were given to me by members of the public and this is indicated for each photo.



Photo showing tide line at about 0.27m on staff on inside of wall at exit from hotel grounds near north end of flood extent



Photo showing flood debris on far side of security fence. This is located just north of Topaz filling station. The Bride River is just the other side of the yard inside the fence, but this side of the yard with the cars.



Large culvert on River Bride to east of Topaz filling station and Mc Donalds. Note tide line in left foreground and debris gathered on right bank.



Photo showing small two arched bridge downstream of large culvert in previous photo. Note debris gathered on pipes. Based on the Lee CFRAMS Channel & Cross Section Survey (7BRI_1425), the flood level indicated by this debris would be about 18.1m to 18.2m OD Malin, but this would be a rough estimate and would need to be surveyed before being relied on.



View along Bride River downstream from the two arched bridge on Fitz's Boreen. There were no signs of flooding visible from this bridge looking downstream.

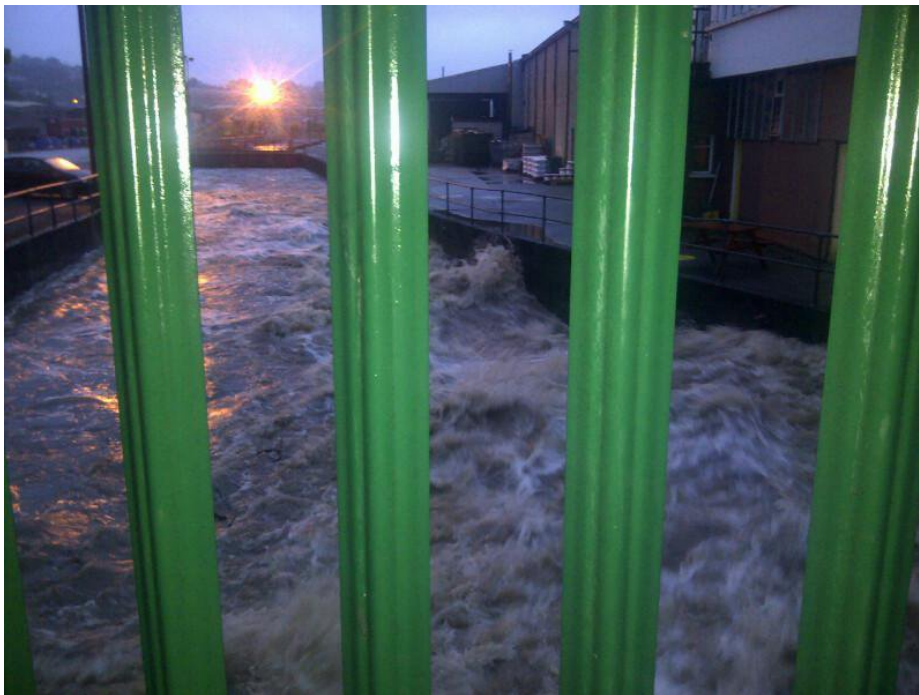


Photo given to me by a member of the public taken from the same location as the previous photo at about 4.30am or so.

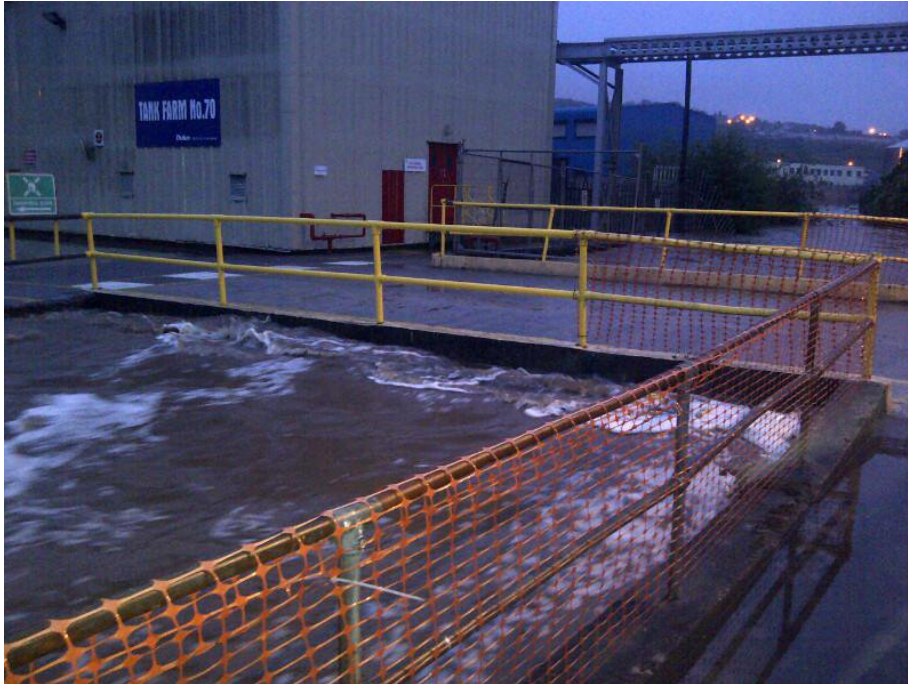


Photo given to me by a member of the public showing flood level shortly after 4.30 am. This bridge is located about 260m downstream from Fitz's Boreen. Based on the Lee CFRAMS Channel and Cross Section Survey (7BRI_1175), the flood level here at this time is about 15.85m OD Malin

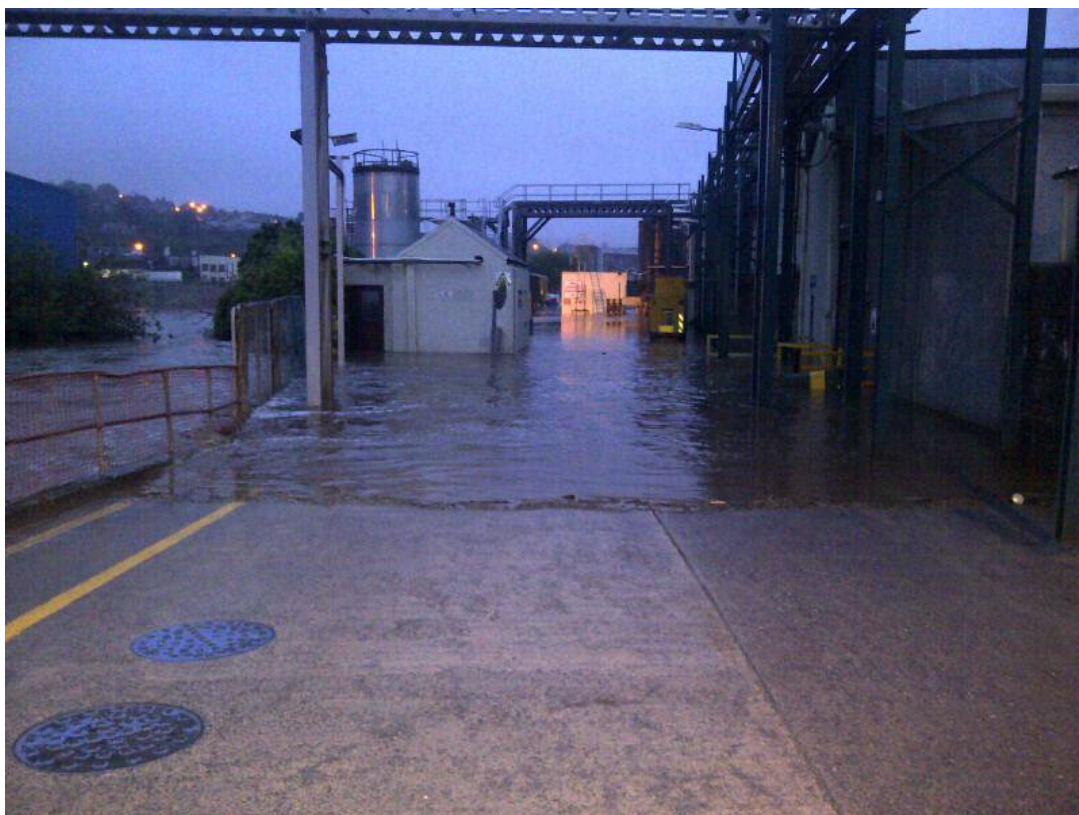


Photo given to me by a member of the public showing flood inundation on property about 10m or so downstream of bridge in previous photos.



Photo Given to me by member of the Public. Based on the Debris level in this photo & the Lee CFRAMS Channel & Cross Section Survey (7BRI_1072), the flood level upstream of this footbridge would have been about 15.6m OD Malin. This should be regarded as a rough estimate, needing to be confirmed by survey, as the whole structure is not recorded in the Survey.



Photo looking downstream toward entrance to Culvert at Rear of Millfield Industrial Estate. Lee CFRAMS channel cross section 7BRI_991 is just upstream of the culvert entrance beyond the trees in the photo. Estimated level of flood here about 15.7m OD Malin. Again, this to be taken as a rough estimate only.



This photo is of the bridge at the entrance to the Blackpool Shopping Centre from the Commons Road. Based on the debris mark in the photo and the Lee CFRAMS Channel Cross section and Structure Survey (7BRI_548) the flood level here would appear to have been about 12.3m OD Malin or so.

Commons Road (North Point Business Park Area and Kilnap Viaduct).



Photo showing upstream side of culvert at entrance to North Point Business Park on Glenamought River. Estimated flood level, based on debris marks, shown by Red line in photo. Based on lee CFRAMS survey of this structure (7BR1_0), flood level would have been about 24.3m OD Malin. It seems likely that flow into the North Point Business park would have been through the railing to the left of the photo.



Photo showing upstream side of culvert on private access road on Glenamought River. Based on debris observed in the area and the Lee CFRAM Structure survey (7BR1_91), the estimated flood level, indicated by the red line is about 25.3m OD Malin. This may be conservative, (low) as there was considerable debris evident upstream along the road to the left of the picture

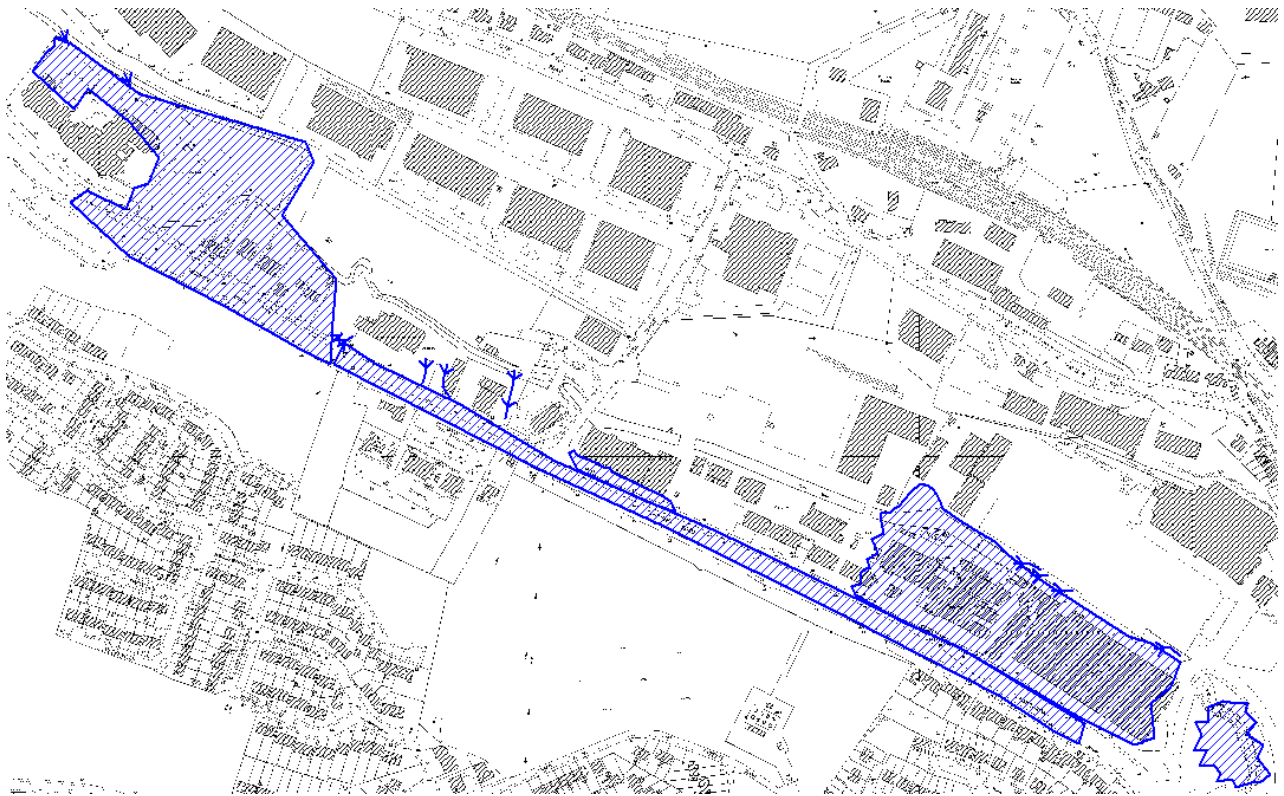
Flood Extents.

The following flood extents are intended to be indicative and merely to indicate the general broad extent of where the floods impacted on properties and roads. They are not intended to be precise indications of the extents and should not be used for surveying levels or any other similar purpose.

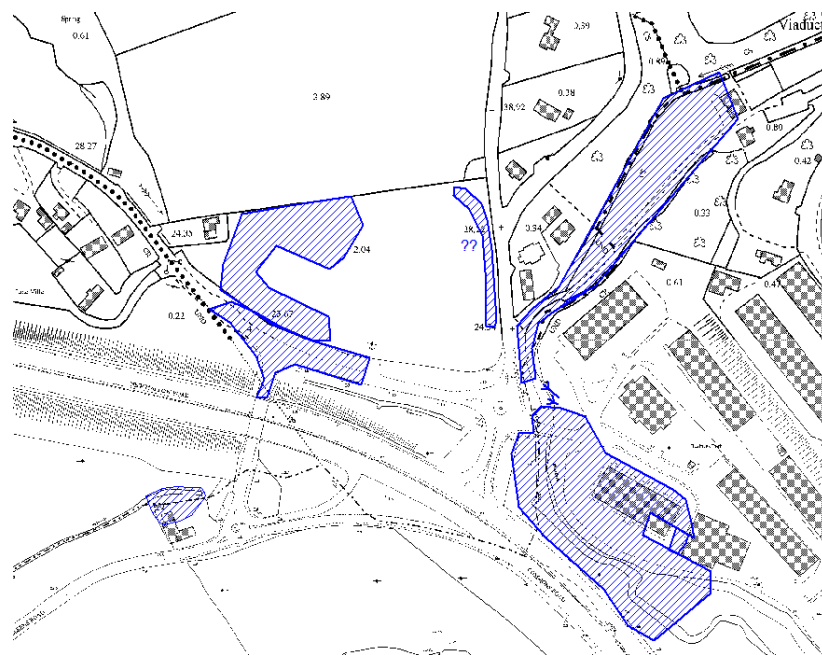
It should be noted that these flood extents would not be expected to be replicable by flood modelling in subsequent studies, because of their indicative nature. In most cases the actual flood outlines were not evident at the time of the site visits carried out.

In some cases an actual extent mark was noted or pointed out during the site visits and this may be indicated in the following mapped extracts

All are indicated on OSI 1:5000 scale mapping and North is towards the top of the page.



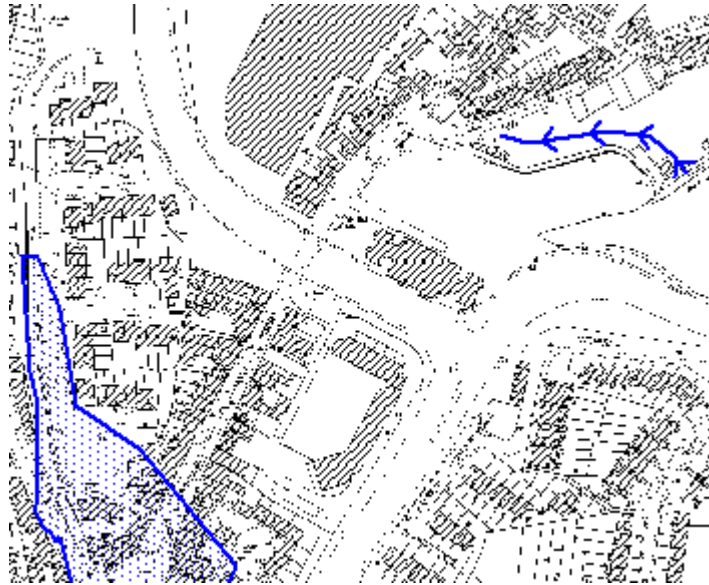
Commons Road. (Commons Inn to Sunbeam Site)



Lower Killeens Road (west of Mallow road) AND

Commons Road (North Point Business Park Area and Kilnap Viaduct).

Note. The 'C' shaped flood extent mark outline on the left, is to indicate that the flood here surrounded a building in this business park but the fluvial flood did not enter the building. The pair of question marks adjacent to the extent mark is because there was some flooding reported in this site, in the parking areas, that did not enter buildings, but no further information on the extent or location has been reported.



Spring Lane.

Note: Flood route described shown by line with arrows in upper right part of extract. Extent marked in bottom left of extract is part of that shown already for Blackpool Village.