FLOODING ON THE LOWER RIVER INCH, WEXFORD

INTRODUCTION

At the request of Ms Karen Dubsky and Ms Cathy Lee of Ballymoney, I was pleased to visit the lower reaches of the River Inch at Ahare Bridge and at the shoreline, in order to understand the possible causes of flooding and to recommend mitigation measures, particularly at Ahare Bridge. On the day (1st Nov), I also met briefly with local councillors and residents at the Golden Anchor near the Bridge including Messrs Pat Kinsella, Pat O'Keefe and Sean O'Shaughnessy.

The River Inch (fig.4) has a reported length of 40km, draining via Ahare Bridge and a flood plain, to the sea at Clones. The L1003 road crosses the floodplain and river via a low embankment and masonry arch at Ahare Bridge (fig.2). The mouth of the river (at Clones/Kilgorman) is affected by the presence of a large sand bar (fig.1) which diverts the river northwards before it connects to the sea. The current geography of the flood plain and sand bar is clear from the satellite image (Google Earth, fig.5) of September 2019.

AHARE BRIDGE

There is considerable concern at the reported increase in the frequency of flooding conditions at the bridge where the embankment and road comes under water, causing dangerous driving conditions. While the frequency of flooding may in part have been affected by an increase in storm rainfall under the influence of climate change, the presence of the low embankment suggests that flooding of the road was not a frequent occurrence historically. In short, the design of the road would have been expected to accommodate occasional flood events on the river as it is known to cross the entire width of the flood plain at that location. However, under current conditions, it appears that the embankment/road is acting as a partial *barrier* to the river flow draining towards the sea. Figure 3 shows the damming effect on the upstream side of the embankment.

Normally, a flood plain is a natural attenuation device for flooding as it acts as storage and causes a reduction in flow velocity. That might also have been the case here but for the current barrier effect of the road. However, it was reported by local residents that there are up to 7 culverts under the embankment but most are silted up or blocked. These would have served to allow most flood waters to pass readily under the road. Thus, it is suggested that opening these and restoring their function in order to fully utilize the flood plain downstream would go a long way to reducing the flooding risk at the road. Moreover, it would help to restore the floodplain as a natural wetland, as a refuge for wildlife with characteristic vegetation and, indeed, as an amenity. Such re-establishment of a floodplain for flood control is increasingly seen internationally as a sustainable 'natural solution' for mitigating flood risk and it is clearly of benefit here, provided it is carefully managed. Raising the road would be an ad hoc solution but would not mitigate the flooding of land upstream of Ahare Bridge.

The extent to which this restoration would prevent flooding on the road can only be assessed through observation and measurement. While water quality has been regularly monitored upstream at Castletown Bridge and Clonough Bridge (fig.6), there are no reliable, regular measurements of river *flow* and any assessments of the catchment response to rainfall. It would be desirable, if not essential, to install a proper gauging station (measuring water level) on the river from which discharges could be estimated on a daily and seasonal basis. Even a temporary station to measure water level at a suitable location upstream of Ahare Bridge would give an idea of how the catchment/river is behaving under current meteorological conditions. Such monitoring would also provide a basis for determining whether raising the road to reduce flooding risk is, in fact, necessary or worthwhile (after, or if, culverts were restored).

RIVER MOUTH

The river's course is strongly affected by the presence of a large sand bar at its mouth, diverting it northwards until it is forced, by the shape of the coast, to break through and discharge to the sea. This is a common pattern for a number of rivers on this part of the east coast, as the sediment forming the sand bar/spit is moving northwards under the prevailing southwest winds, causing longshore drift. While it is almost certainly a naturally formed landscape/shorescape, local residents reported that, for years, a channel had been created across the sand bar allowing the river direct access to the sea. It was suggested that this might reduce flooding risk upstream but also assist in facilitating access to the river for migratory fish.

Conditions have deteriorated in recent years with a failure to maintain the channel along with a significant reduction in fish populations. Although under historical, natural flow conditions in the river, it is doubtful that fish numbers would have been affected, a significant factor in recent years has been the deterioration in water quality (eg ammonia, fig.7) as measured by the EPA upstream, probably related to agricultural practice. The effect of a channel through the spit on flooding levels upstream is likely to be small but a proper monitoring of flows, as suggested above, would be needed in order to resolve these issues.

At the meeting, it was agreed that a channel across the sand bar could be re-instated on a trial basis but it would need maintenance and would only be of value if appropriate monitoring (before and after construction) were undertaken in order to establish its benefits.

CONCLUSION

There is clearly a natural flood plain on the lower reaches of the River Inch. As an initial (partial?) solution to flooding of the road at Ahare Bridge, the function of the flood plain should be restored by re-opening existing culverts, thereby lowering flood levels and, indeed, re-creating an amenity wetland along the banks of the lower reaches of the river (as the existing vegetation already indicates has existed).

A monitoring station for water level should be established to indicate how the river responds to rainfall and to indicate how effective any changes might be, and to show how beneficial other construction (such as raising the road) might be. OPW or the EPA might be willing to establish such a station as the river at the moment is ungauged.

It was noted that the quality of the river water is erratic, and less than 'good' at times, a characteristic which may have caused a significant impact on fish stocks. The sand bar and the pattern of discharge at the river mouth is a natural result of coastal processes. Notwithstanding this pattern, if a channel is to be cut through the sand bar on a trial basis, monitoring should be undertaken to determine its effect on flooding risk and on fish migration – in order to establish its ongoing benefit.

Paul Johnston,
December 2019

Photos and images taken by local residents

Fig. 1 Sand bar or spit at the mouth of the Inch River, looking south

Fig. 2 Inch River at Ahare Bridge in summer conditions, looking south; flow from right to left

Fig.3 Inch River at Ahare Bridge in flooding conditions; road acting as a dam; looking south

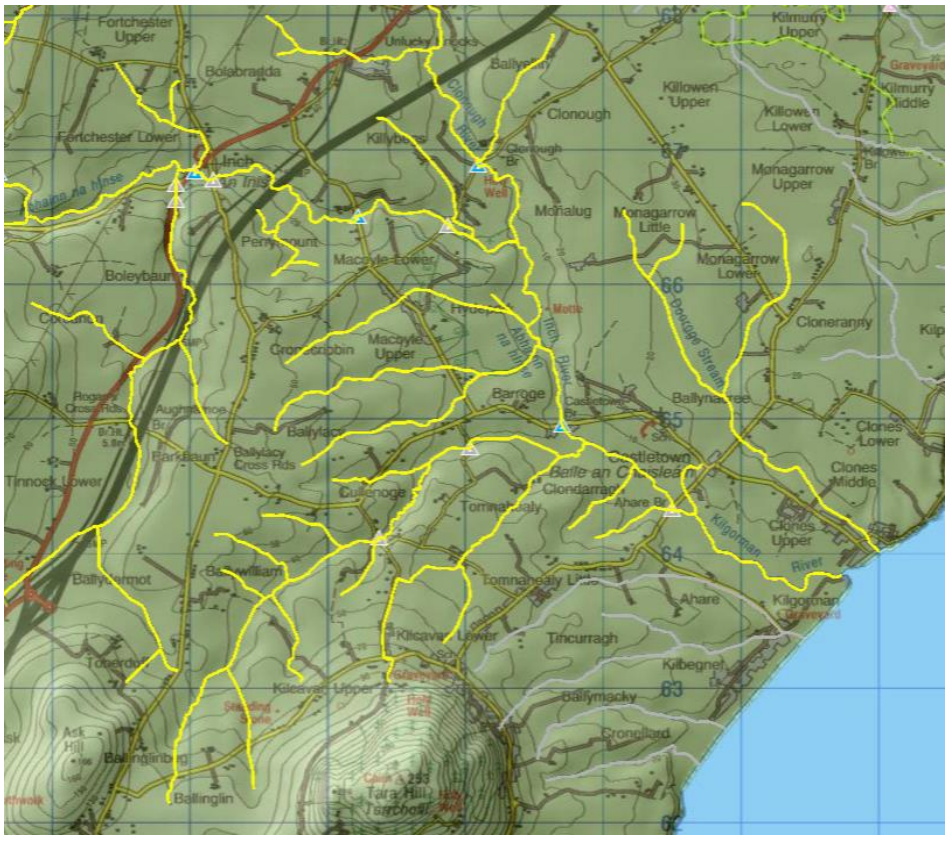


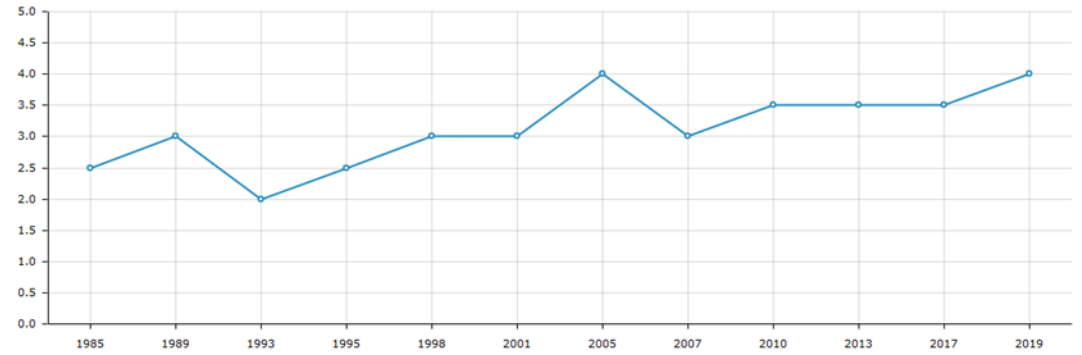
Fig.4 : Inch river catchment, Wexford (main river 40km in length)

Fig. 5: Satellite image 17 September 2019
showing the flood plain of the Inch above its mouth
Ahare Bridge at arrow, mid-left

Monitoring Station: RS11C010300

Code	RS11C010300	Monitoring Type	RIVER_STATION
Station	Clonough Br	Easting	321090.96
Station Type	Operational	Northing	166891.28

Q Value - Chart



	1985	1989	1993	1995	1998	2001	2005	2007	2010	2013	2017	2019
Result	2.5	3	2	2.5	3	3	4	3	3.5	3.5	3.5	4
Classification	Poor	Poor	Bad	Poor	Poor	Poor	Good	Poor	Moderate	Moderate	Moderate	Good
Q-Value	2-3	3	2	2-3	3	3	4	3	3-4	3-4	3-4	4

Fig. 6: **Water quality at Clonough Bridge**, upper Inch (Data : Ruth Hennessy, EPA)

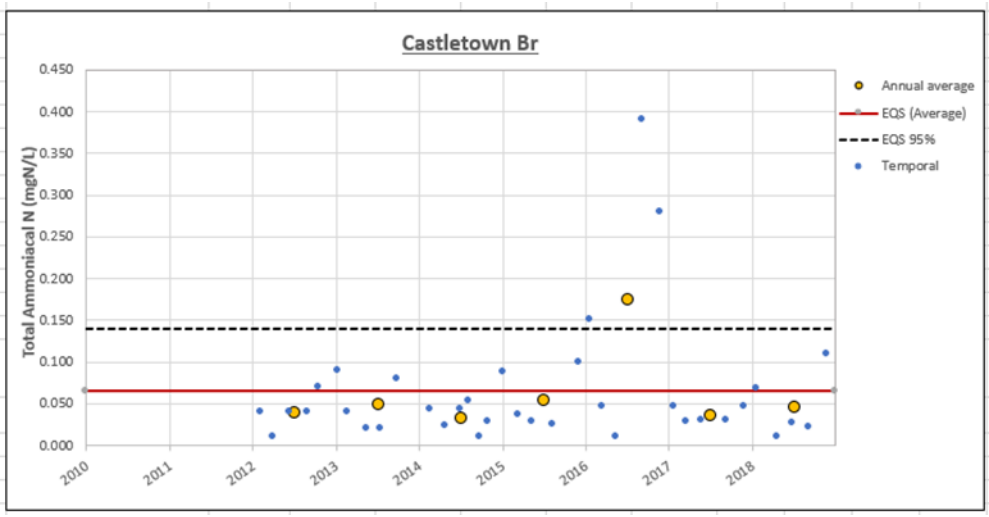


Fig. 7 : **Ammonia at Castletown Bridge**: high values have been recorded, but not consistently (Data : Ruth Hennessy, EPA)