

United Utilities Report on the flooding of 22nd / 23rd November 2017

Date : August 2018

1.0 Background to the flooding Event 22nd – 23rd November 2017

Rainfall

There had been considerable rainfall, leading up to the significant rainfall on the Wednesday evening, which ultimately led to the flooding in the north Blackpool and Wyre areas. The weather front first hit the Fylde coast, but also spread northwards with similar rainfall also being experienced in the Lancaster patch, to the north of the Blackpool / Fleetwood area.

In order to understand the extent of the rainfall, there is a need to look at a 48 hour period from Tuesday 21st November through to the early hours of Thursday 23rd November 2018. A rainfall event that took until Sunday 26th November, to drain down both the main Fylde Tunnel system, and the local watercourse systems on the northern Fylde Coast Peninsula.

Analysis of local raingauge information highlighted that the the greatest amount of rainfall, fell over the northwestern Blackpool / Wyre area, with a slightly lower rainfall event in the southern areas of Blackpool. The Fleetwood raingauge information proved to be the most representative of the impact upon these northern Fylde Coast area.

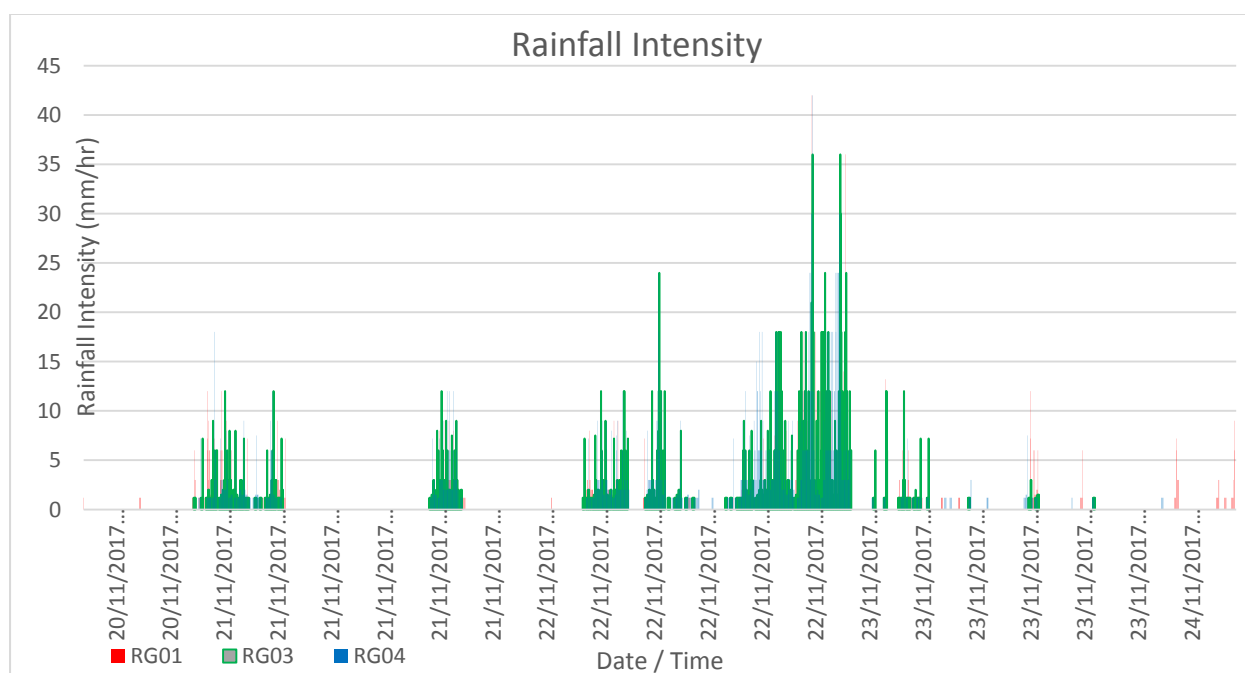


Figure 1.0 : RG04 Fleetwood raingauge, RG03 Poulton raingauge, RG01 Airport raingauge

Modelling reviews of the rainfall that fell, highlighted that the volume that fell, in the 48 hour period was equivalent to a 1 in 64 year rainfall event. This period being a reflection of the nature that on the 21st and 22nd November, significant rainfall had fallen, to fill the Fylde Coast tunnel and led to storm spills from the three outfall stations at Manchester Square, Anchorsholme and Chatsworth Avenue, Fleetwood. Additionally, the ground had become totally saturated and the local watercourses in both Blackpool and Wyre were already full ahead of the further rainfall on the Wednesday evening.

1.1 Fylde Tunnel sewer system

The Fylde tunnel system was constructed in 1996 when the Fleetwood WwTW treatment works was built to ensure first time treatment of foul and surface water sewage flows for the Blackpool, and the Fleetwood area. Historically, the three pumping station outstations of Manchester Square, Anchorsholme and Chatsworth Avenue all operated on a twice daily basis to discharge collected flows in the catchment out to sea, on an ebbing tide. Prior to 1990, these stations were managed by Blackpool BC and Wyre BC, but subsequently North West Water continued this discharge practice up until 1996.

The Fylde Tunnel was built as an interceptor sewer which collected flows upstream of these pumping stations and in the first instance transported foul flows up to the treatment works, but also large volumes of surface water from each of those three catchments (Manchester Square, Anchorsholme and Chatsworth Avenue/Fleetwood). The initial storage volume of the tunnel (circa 85,000 cubic metres) allowed some storage and retention of storm flows to reduce the frequency of operation of the pumping stations, which overnight changed their duties into one intermittent operation.

The construction of the tunnel and treatment works itself did not cause the immediate improvement hoped for to the bathing water quality off the Fylde Coast. As a consequence subsequent further investment in improving spill performance, has seen the addition of 64,000 cubic metres of storage at Bloomfield Road and 45,000 cubic metres adjacent to the treatment works at Fleetwood. Currently the system has circa 200,000 cubic metres of storage within its overall system.

The nature of the Fylde Tunnel, is that this runs at some 15 to 26 metre in depth and lies below each of the local sub catchments of Blackpool South (Manchester Square), Anchorsholme, and Chatsworth Avenue, Fleetwood.

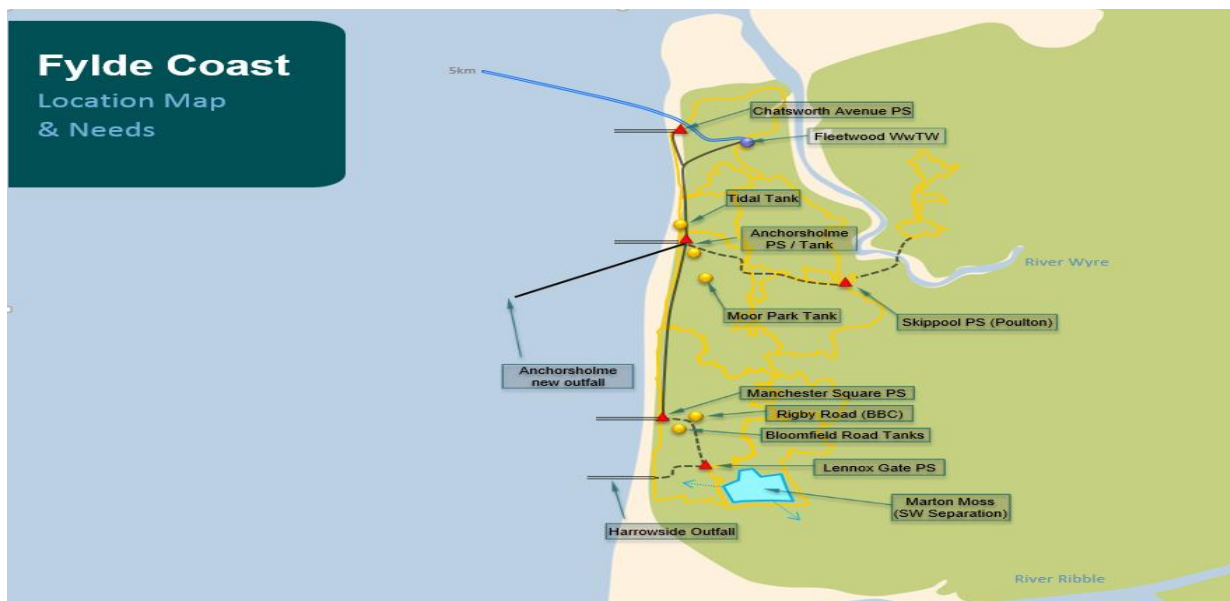


Figure 2.0

1.2 Rainfall from the evening of 20th November / 21st November 2017

1.2.1 Impact on the Fylde Tunnel Trunk sewer system

The rainfall which fell from the evening of the 20th November led to the above Fylde Tunnel system completely filling and giving rise to spill operation from all three pumping stations from the early hours of Tuesday 21st November ahead of the, additional rainfall at 16.00pm on the 22nd November 2018.

Site	Times of spill	Pump duration
Manchester Square PS	17.25 21 st Nov – 16.00 22 nd Nov (intermittent)	600 minutes of 1 – 3 pumps operating as required
Anchorsholme PS	4.50am 21 st Nov – 16.00 22 nd Nov (intermittent)	1210 minutes of 1 – 3 pumps operating as required
Chatsworth Avenue PS	17.00 21 st Nov – 16.00 22 nd Nov (intermittent)	760 minutes of 1 – 3 pumps operating as required

Table 1.0 : ***Storm spills to sea ahead of the Wednesday evening rainfall*

The requirement of these three stations to pump out to sea, when the system is already full, is a flood prevention measure for each of the three catchments upstream of these facilities, some of which, have areas of land below high tide sea level.

The routine practice, undertaken throughout the above pumping operation, is to provide personnel at all times of storm at the Manchester Square and Anchorsholme pumping stations, to ensure continued operation of these sites to pump screened storm flows out to sea. This is gauged by a combination of weather forecast and monitoring tunnel levels being half full. The Chatsworth Avenue pumping station, being of newer construction is manned as required but generally is more able to operate in automatic. The station being near to the Fleetwood WWTW allows a greater ability to get personnel to this site at shorter notice.

These stations are only able to pump as and when there is a storm overflow spill from the system into these pumping stations, and cannot be used to drain individual catchments deliberately of all sewage, as this would lead to a breach in the discharge permits we have for each site with the Environment Agency.

As you can see from Table 1.0 above, the Anchorsholme pumping station ran on and off throughout the day using two pumps to predominately discharge the surplus storm sewage flows. (despite there being five outfall pumps within the station). On the 22nd November, the pumping station had been running from 4.05am in the morning and operated all day, and subsequently ran for days after the flooding.

Manchester Square pumping station similarly had intermittent storm spills throughout the Tuesday, but operated all day on the 22nd November 2017, highlighting that the trunk sewer system remained full.

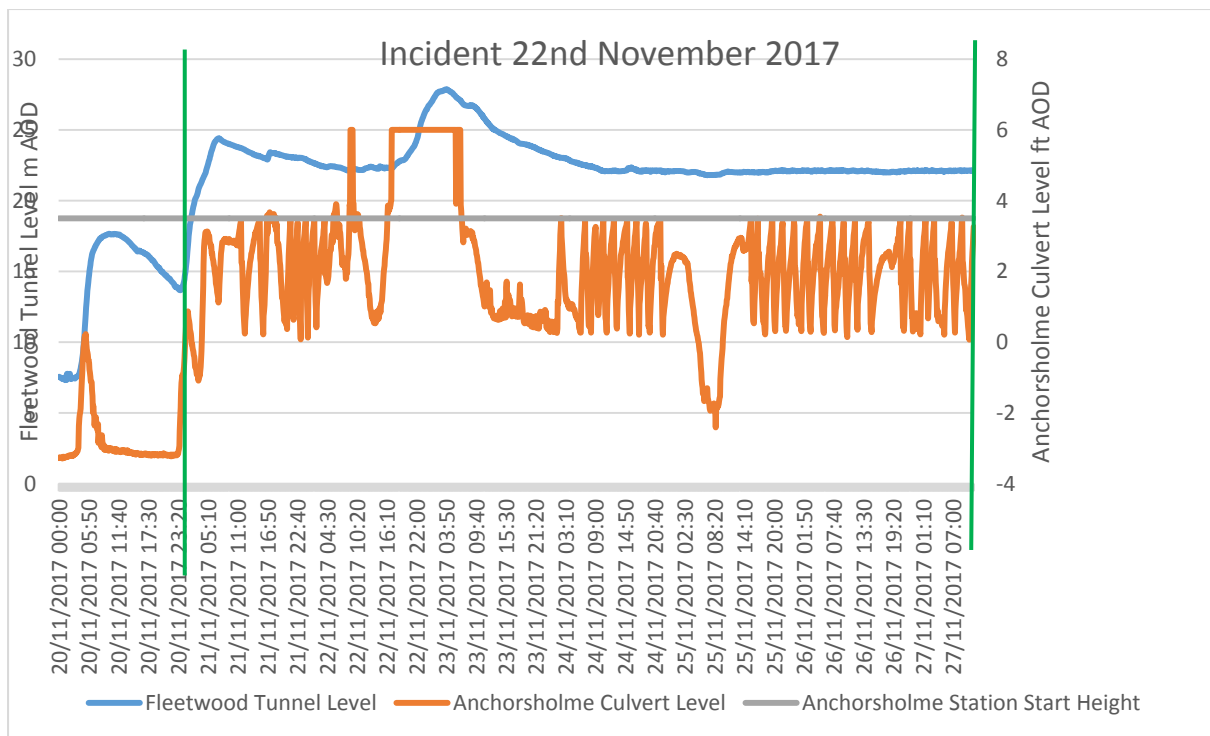


Figure 3.0: **Key :- Green Lines highlight the period of operation of the Anchorsholme pumps

The summary from above is that the Fylde tunnel level rose sharply up to a fill situation (23metres) by about 5am on the 21st November 2017, and remained substantially full all day.

The orange line of the upstream culvert level, demonstrating that the pumping station has been draining the upstream catchment on and off throughout the days prior to the flooding but then subsequently for days after the rainfall.

1.2.2 Impact on the watercourses around the Fylde Coast

There are very few watercourses which are able to drain from the Fylde Peninsula to the large rivers of the River Ribble and the River Wyre, particularly at high tide times. The land is very flat and the flow of the watercourse does need supporting with lift pumping stations into the River Wyre and River Ribble.

The rainfall over the catchment will have led to a similar situation to our tunnel system, in that the rainfall had filled the local watercourses and led to the ground across the whole of Blackpool / Wyre area to become saturated.

Wyre area rivers

There are two main Rivers managed by the Environment Agency in the Thornton area to the east of the Blackpool north area. This was proven to be the case by the Wednesday evening for the Wyre rivers of Hilylaide Brook and Royles Brook, which discharge to the River Wyre via the Stannah “third party” pumping station.

Blackpool South area watercourses

There are lots of small dykes in the Blackpool South area, but no major watercourses which are managed by the Environment Agency north of the Blackpool / Fylde Council boundary.

The watercourses in the area are predominately in riparian ownership, with Blackpool Council owning some lengths in question.

The watercourses in the northern Blackpool area all are directly connected into the combined sewer system, which may lead to future opportunities in storm separation.

The southern Blackpool area all drained into the combined sewer system at the time of the November storms, however some of these watercourses are now removed from the combined sewer system by the alterations achieved by the Blackpool South surface water separation scheme.

Over the period of 20 – 22nd November 2018, these slow flowing watercourses would have continued to top up the Fylde tunnel system during any lull in rainfall over the Tuesday, Wednesday of that week.

Blackpool Central / North area watercourses

The watercourses in the area are riparian owned watercourses, with little to no ownership with the Environment Agency. Locations in Blackpool owned land as a consequence would be the responsibility of Blackpool Council for such lengths of watercourses. However, there are probably long lengths of other riparian owned watercourses.

The nature of these watercourses in the Blackpool central / north area, discharge directly to the combined sewer system but again are believed to have been full on the Tuesday. There is little control on the discharge rate of watercourses to the public sewer, making such discharges uncontrolled and having significant impact upon the downstream catchment sewers in the Anchorsholme area.

The volume of flows in the watercourses will have had an impact upon the amount of flooding. Lack of maintenance of watercourses may have led to some of the upstream flooding, however the direction of the connection, with no restrictions will have led to the large volumes of flow in the trunk sewer systems running down to the low lying areas of Fleetwood Road North / Mossom Lane, Warren Drive.

Drainage from the Network rail line is unclear, it would be useful to investigate the drainage of the Network rail lines as it does not appear to have any alternative means of drainage other than the combined sewer system.

Legacy of the drainage system operated by Blackpool BC

Whilst there are watercourses in the Wyre BC area which are classed as “Main River”, and are the responsibility of the Environment Agency. There are no lengths of watercourses identified as Main River in this northern Blackpool area. This is predominately due to there not being any river system running through the Blackpool area in a westerly direction towards the Irish Sea.

This is as a consequence, of the drainage of the area pre 1996 (the time of the Fylde Coast Interceptor tunnel), when all drainage from the area was pumped out to sea. This included all foul flows and surface water flows collected by the public sewer system and routed.

2.0 The Anchorsholme Catchment

Having previously highlighted the operation of the Fylde Tunnel system and its operation ahead of the Wednesday evening, it would be useful to now highlight the drainage system around the Anchorsholme sewer catchment and how it operates both in dry weather and how that changes as

the system goes into a storm situation with the filling of the Fylde Tunnel system and ultimately leading to storm discharges to sea.

The Fylde tunnel connection point for the Anchorsholme Catchment drains four regional areas:-

1. The Cleveleys catchment to the north
2. The Thornton, Poulton, Hambleton and Stalmine area
3. The Blackpool Central area (higher ground)
4. The Anchorsholme / Warren Drive bowl area – (The Anchorsholme gravity catchment)

2.1 The Cleveleys catchment to the north (flooded Wyre BC area but also impacting upon Blackpool area)

This area is low lying with possible areas which are also below sea level during high tidal conditions.

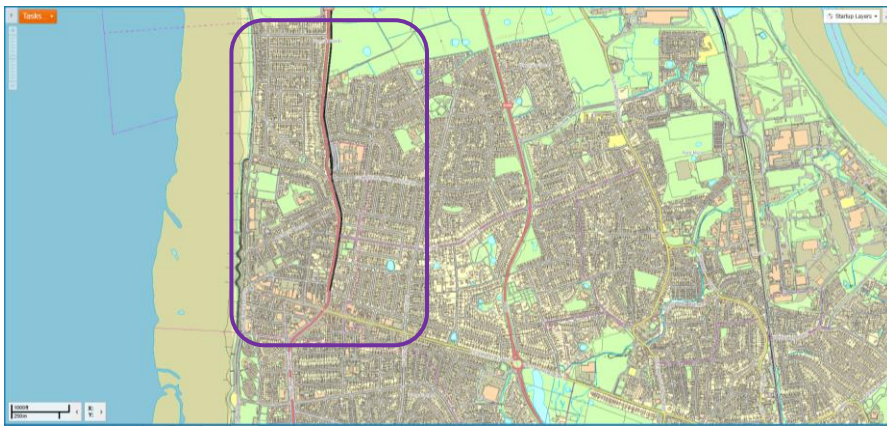


Figure 4.0

The foul flows from the catchment is pumped by a variety of one or more pumping stations into the Anchorsholme gravity catchment which drains to the Fylde Tunnel. There is some surface water also connected to this system, although there is a separate system which allows some surface water flows to head via culverted watercourses towards the Fleetwood docks area to the north of this urban area.

The foul pumping stations continued to operate in line with local wet well levels but are unable to take into consideration of any downstream flow conditions in the Anchorsholme gravity catchment. There are very few overflows on these pumping stations to allow pumps to be turned off should there be information regarding downstream surcharge conditions within Anchorsholme catchment.

During dry periods the pumped flow discharges via gravity through the connection point to the tunnel, alongside the Anchorsholme outfall pumping station located on the headland at the end of Anchorsholme Lane West.

During the events of the 20 – 24th November, the pumping stations remained operational causing foul flows to continue to be pumped into the Anchorsholme gravity catchment. Storm flows from the intense rainfall did collect in this area causing flooding internally and externally due to the capacity of the surface water sewers, together with the downstream culverts (3rd party) we believe to be full.

The consequence of flood water in the area, will have led to additional flows being pumped during the event into the foul pumping station passing flows into the Anchorsholme gravity connection.

The model predicted the flood situation in this area given a free discharge of surface water into downstream culverts.

2.2 The Thornton, Poulton, Hambleton and Stalmine area (flooded Wyre BC area but also impacting upon Blackpool area)

This area is low lying with possible areas being below sea level during high tidal conditions.

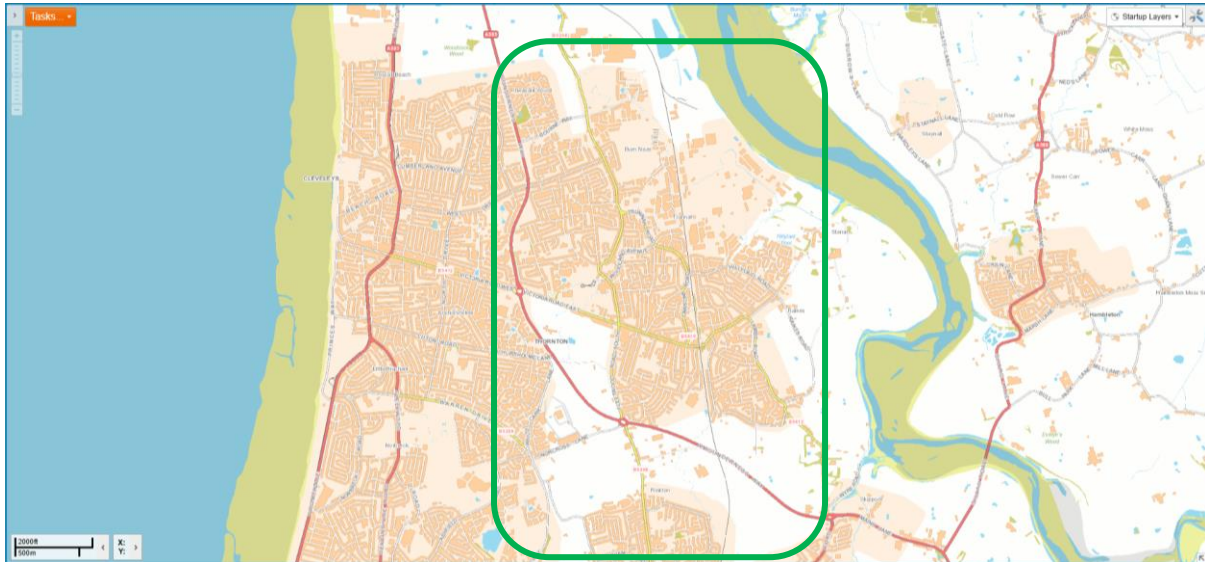


Figure 5.0

There is a significant separate system in the Thornton area which sees foul flows being pumped in a westerly direction by one or more pumping stations into the downstream Anchorholme gravity catchment.

The surface water system for the area has locations where it picks up lengths of third party riparian owned culverted watercourses, and ultimately discharges surface water flows into the Hillylaide and Royles Brook watercourses. These brookcourses are slow flowing and do require the operation of a downstream 3rd Party pumping station at Stannah to lift the flows to discharge during medium to high tides. This particular station, on the banks of the River Wyre, has large pumps, but is only effective for lengths of about 300 metres of watercourse, before draining the local sump and then subsequently waiting for the upstream watercourse to replenish the sump. This is predominately an issue with the flat nature of the watercourses as opposed to any shortcomings with the pumping station.

A simple summary for this area, is that foul flows head westwards through a string of pumping stations towards Anchorholme and the sea front area, the surface water heads eastwards to ultimately drain to the River Wyre.

During the events of the 20 – 24th November, the pumping stations remained operational causing foul flows to continue to be pumped into the Anchorholme gravity catchment. Storm flows from the intense rainfall did collect in this area causing flooding internally and externally due to the capacity of the surface water sewers.

However, this was exacerbated by known hydraulic problems on the two watercourses of Royles Brook and Hillylaide brookcourse due to a combination of issues including blockage, overgrown lengths of watercourse, the overall flat nature of the watercourses leading to slow flows and with the struggle of the build up of the two days of rainfall prior to the Wednesday evening, which had led to

the system being full and the ground saturated. Whilst there is the downstream Stannah PS which operates to pump these watercourses out during high tides, the ability of the pumping station is believed to be good for only draining the immediate local length of watercourse, requiring subsequent flow in the watercourses to enable further pumping to take place.

This led to the inability for our surface water sewers to discharge to the already full watercourses, which resulted in the systems backing up and bursting out of manhole covers on what customers would appear to see as being part of the public sewer system.

The model predicted some but not all of the flood situations in this area. However, the sewer model will allow for a free discharge to the downstream watercourses for the surface water sewers, but in the case of last November that was not the case, as all the watercourses and tributaries of Hillylaide Brook and Royles Brook were also known to be inundated leading to localised flooding in the Thornton area. With effectively little to no surface water discharge from the surface water public sewers into the watercourses this will have resulted in the apparent flooding during the Wednesday evening period.

The consequence of flood water in the area, will have led to additional flows entering the foul system and being pumped during the event into the foul pumping station passing flows into the Anchorsholme gravity connection.

Additionally along the boundary of this area (White Carr Lane and Anchorsholme Lane West) blocked culverts and poorly flowing local watercourses, will have led to overspill into the Blackpool area to back up and cause further overspill onto the highways and flooding to property in the Warren Drive, Sevenoaks Drive areas, in addition to the two named highways above.

2.3 The Blackpool Central area (higher ground)

It is difficult to highlight a specific southern point to the catchment draining through the Anchorsholme connection point into the Fylde Tunnel. However, the highway of Talbot Road leading to Poulton Road is approximately the southern boundary of the gravity sewer catchment. In this area, all foul, surface water, watercourses, land drainage and probably network rail drainage ultimately discharge into the combined sewer system from all areas just to the north of the town centre area.

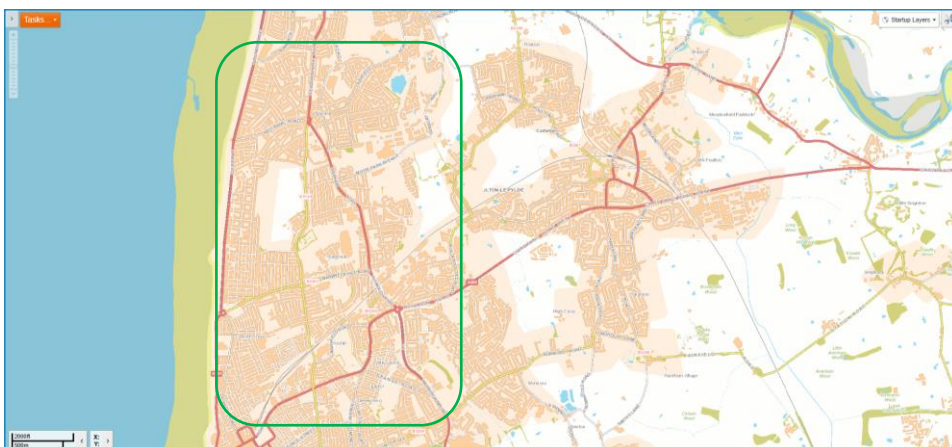


Figure 6.0

The ground level of the southern end of the catchment is circa 10 – 12 metres higher than the lower lying Warren Drive, Anchorsholme area of Blackpool BC (area covered below as 2.4), which does allow this catchment to drain all by gravity.

The long section in Figure 10, highlights that the catchment in the Moor Park Avenue area is some 8 metres higher than the downstream area. The downstream area being very little above sea level, previously been highlighted as being at risk from sea flooding, before the recently constructed sea defences were put in place.

Working from the highest points in the catchment, flooding experienced in both Bromley Close and under the railway bridge of Devonshire Road, highlight that the sewer system was already inundated with both foul and surface water, other land drainage and watercourses flows. With no evidence of any alternate drainage systems in this area, it is safe to highlight that the area will see 100% run-off from properties, highways, saturated ground and probably the railway.

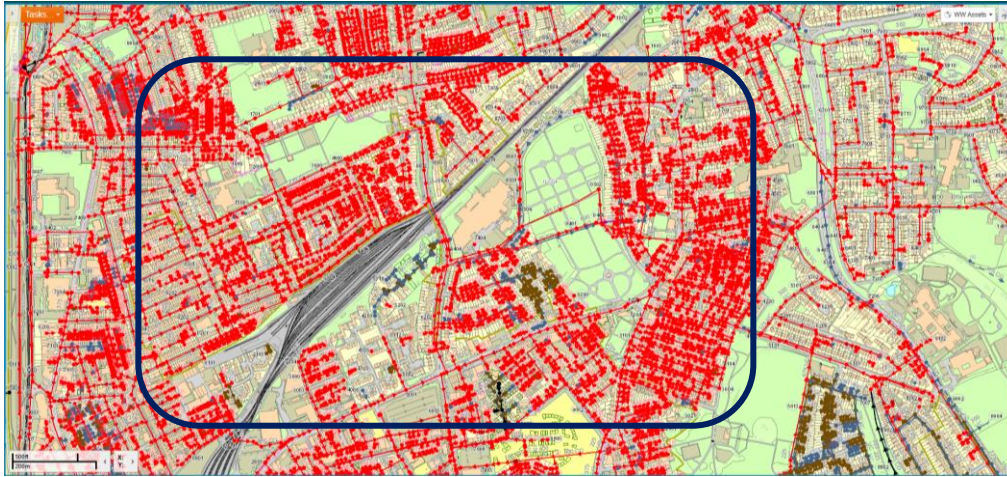


Figure 7.0 : ***Sewer Records : Combined sewers highlighted in red, surface water in blue, but still connected into combined sewers.*

Main trunk sewer (serving the central route of this third catchment)

Further downstream, small lengths of open watercourses connect into the combined sewer system in Bispham Road and run-off the Blackpool North golfcourse would have also added to the total run-off in the combined sewers upstream of where the ground level starts to fall down to the low lying Fleetwood Road North / Warren Drive / Sevenoaks Drive.

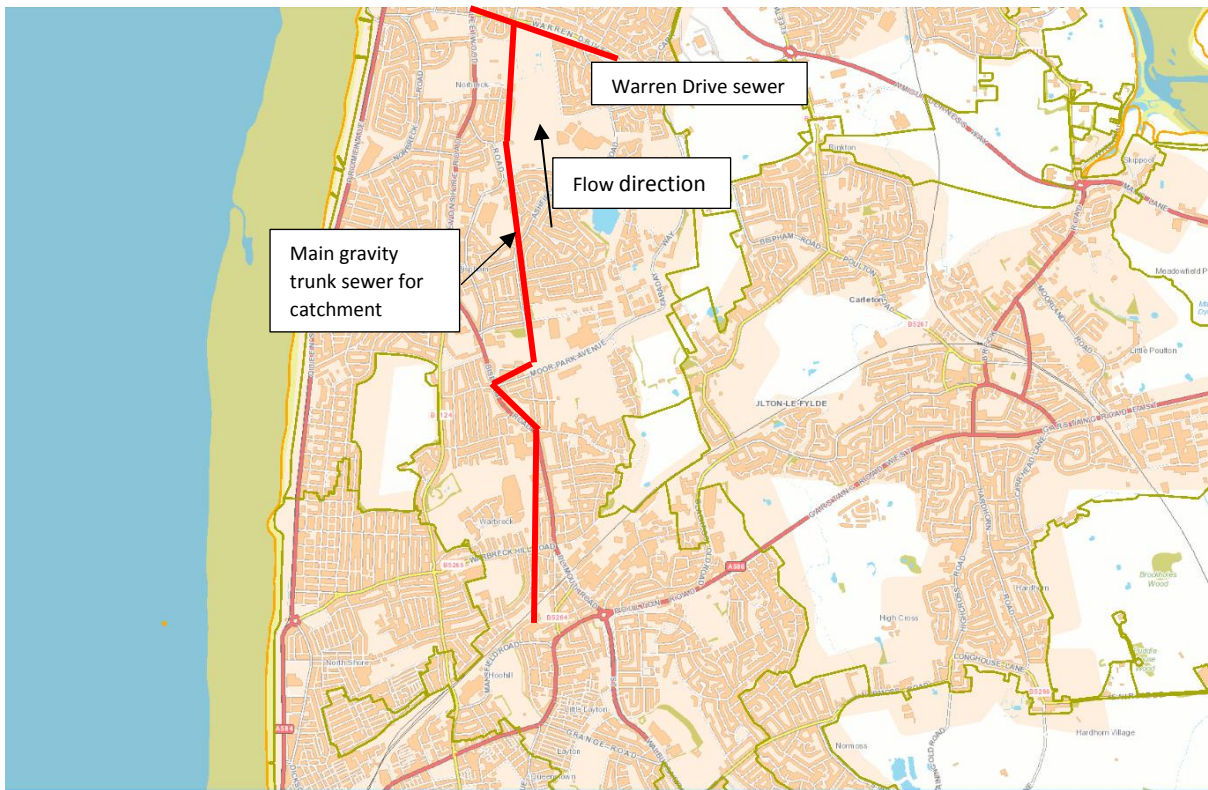


Figure 8.0

Ahead of the flows falling into the bowl, there is a further on line 6,000 cubic metre storage tank at Moor Park, which was constructed by Blackpool Council, at the time as a drainage agency to North West Water.

As the sewer falls to lower lying land it passes through open fields and underneath further lengths of watercourse, which we believe will have already been flooded ahead of the Wednesday evening storm. Whether this particular unnamed watercourse effectively tried to drain through manhole covers or otherwise at downstream connection points to the combined sewer system again in Fleetwood Road North is fairly immaterial. However what is known is that this trunk sewer will have been completely full, surcharged and either spilling from manholes or preventing connection sewers from Mossom Lane and Guildford being able to drain.

Eastern trunk sewer (serving as suggested the eastern edge of the urban area in this catchment)

In addition to this main trunk sewer route through this catchment, a further eastern trunk sewer exists, picking up all flows from the Bispham Dyke into the sewer and then subsequently seeing further possible major connections of more recent developments down this fringe western side of the Blackpool Urban area. (recent referring to development which appears to have been added to the catchment area post the flood events back in 2000 and 2003).

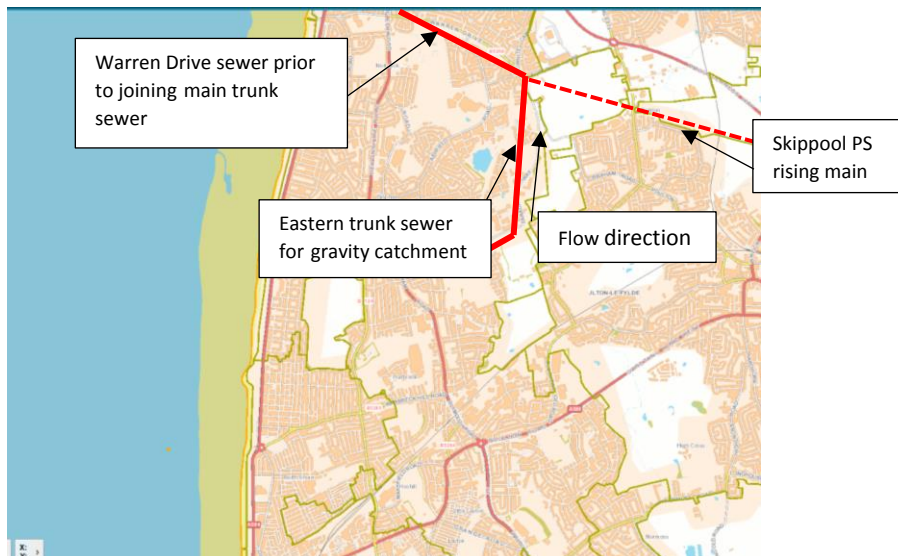


Figure 9.0

Ultimately this eastern trunk sewer connects to the Anchorsholme catchment at the top end of Warren Drive, in the vicinity of Snowhill Crescent, Sevenoaks Drive.

There are further small potential watercourses connecting to the public sewer at this location, together with the high risk that the top end of the Royles Brook (in White Carr Lane) was also overtopping onto the highway with subsequent potential drainage through the combined sewer system.

A further point of note, is that the connection of the Skippool Pumping station also discharges into the top end of the Warren Drive sewer system. This pumping station facility manages flows from Poulton Le Fylde and the Stalmine and Hambleton areas from across the River Wyre.

With the collection of the various flows into the top end of the system making this a very critical location on the sewer system.

The model predicted some of the flood situations in this area.

It is believed that this will have been a consequence of “other local factors” contributing to the flooding.

Additionally, the model, which was re-verified in 2003, is now again under-estimating the volume of run-off created by the area, which suggests that further connection of surface water appears to have taken place over the last 14 years since the model was updated.

This could be development growth in the eastern area of the site, which suggests that surface water goes to the watercourse for new connections, this ultimately discharges in the combined sewer system. There could be further changes as the re-development of the rail lines suggest that improved drainage has occurred to the lines coming out of the Blackpool North station.

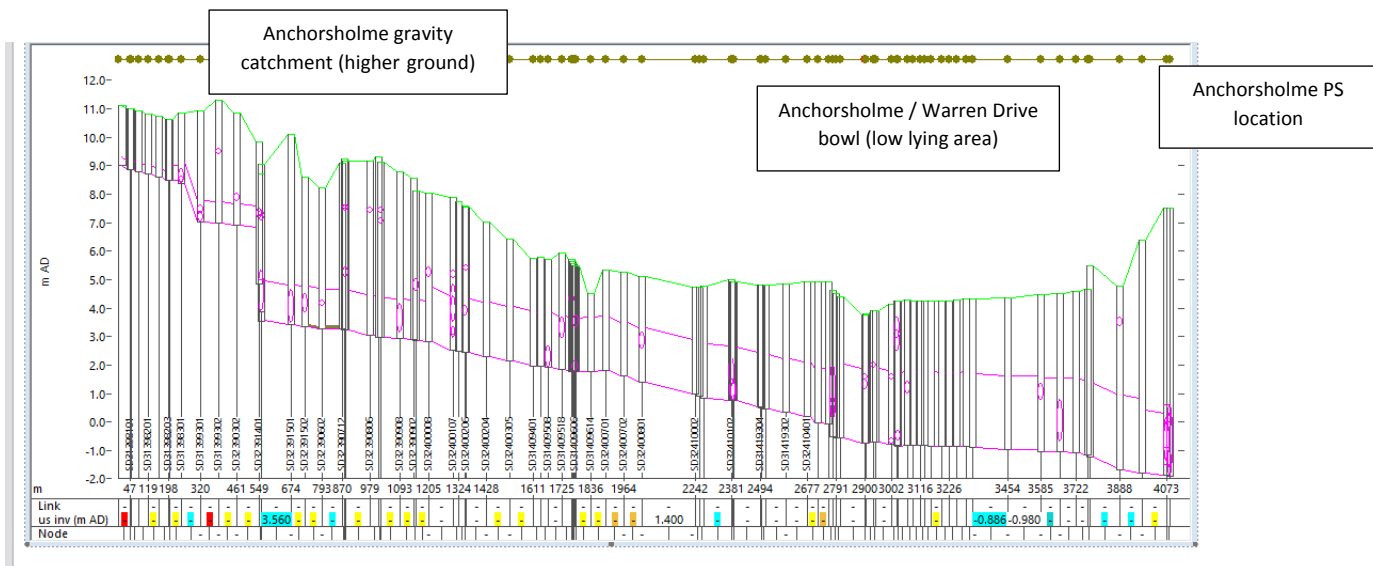


Figure 10.0: ***Long section highlighting the varinae in ground level between Warren Drive and the upper catchment around Valentia Road, Moor Park Avenue*

2.4 The Anchorsholme / Warren Drive bowl area – (The Anchorsholme gravity catchment)

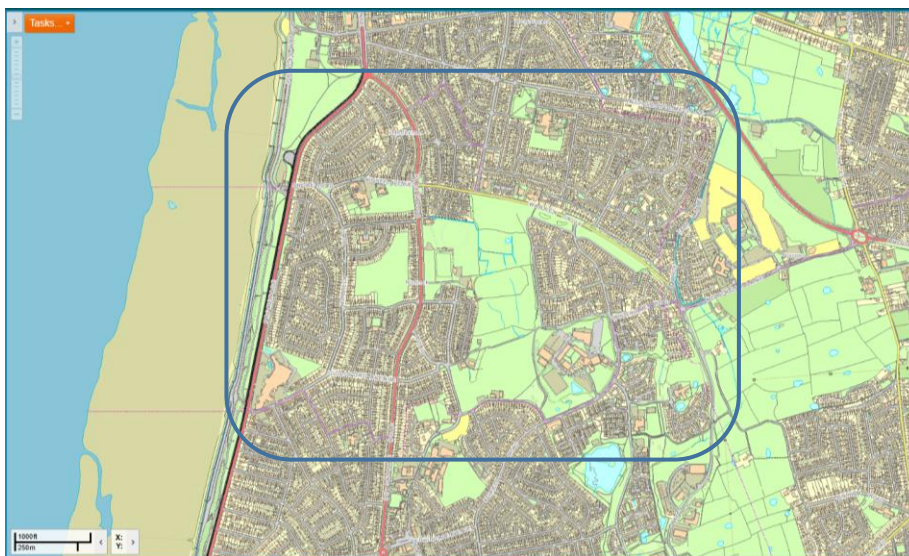


Figure 11.0

As highlighted from the previous three described catchments, Figure 11 presents the receiving area for all flows that are to pass through the Anchorsholme tunnel connection point to the Fylde tunnel under normal flow, but in significant rainfall events such as last November, the system requires the operation of the pumping station to drain an area which is close to being at or below sea level for periods of time during significant rainfall events. (A high tide was recorded at 2.00am on the 23rd November 2017)

The northern Cleveleys catchment predominately drains to the downstream end of the Anchorsholme catchment along the sea front top the north of the pumping station via our South promenade PS. Similarly other areas in the Wyre / Thornton area drain via this promenade pumping station. This is

again, probably a legacy issue of that station at one time also having tidal tanks, suggesting historic discharge straight out to sea.

The third southern catchment area drains via gravity through principally the two trunk sewers previously identified. The Eastern trunk sewer draining to Warren Drive at the most easterly location away from the pumping station.

The second main trunk sewer discharging into the gravity system approximately 1 kilometre upstream of the station. With the exception of Skippool Pumping station there is little ability to stop flows arriving at the catchment without risk of flooding, as any existing overflow locations would have become restricted from high water levels. The Skippool Pumping Station did give that opportunity to pump into the River Wyre, but still needed careful manning on that night to ensure that switching pass forward pumps did not lead to extensive additional flooding in the Poulton area.

2.5 Anchorsholme Pumping Station

The pumping station can be seen from earlier graphs to be managing flows on a combination of one to three pumps, dependent on the level of flows being received through the sewer system to the pumping station. On the evening of Wednesday 22nd November, around about 5pm, further rainfall was experienced on the whole catchment, which provided further storm water run-off in the catchment. The further deluge led to more storm water being seen to arrive at the Anchorsholme storm sump, triggerring the need for further pumps to operate. The graph shows the build up from 2 pumps operating to 3 and then 4, ultimately calling on the fifth pump to be called into operation. This pump tripped, but with specialist mechanical and electrical personnel on site, and along the Fylde coast this fifth pump was brought into operation for short periods over that evening/ night.

The operation of the pumping station is shown in the graph below.

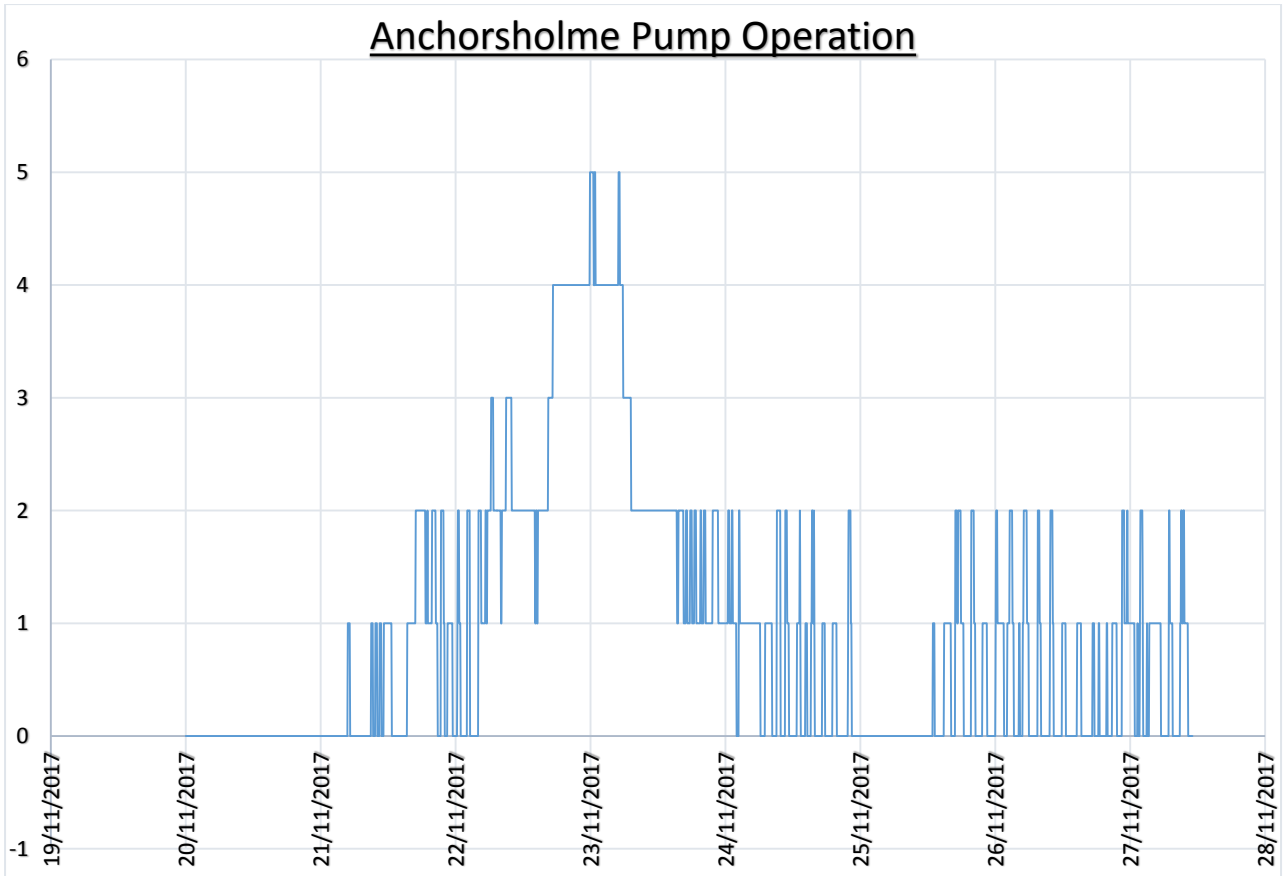


Figure 12.0

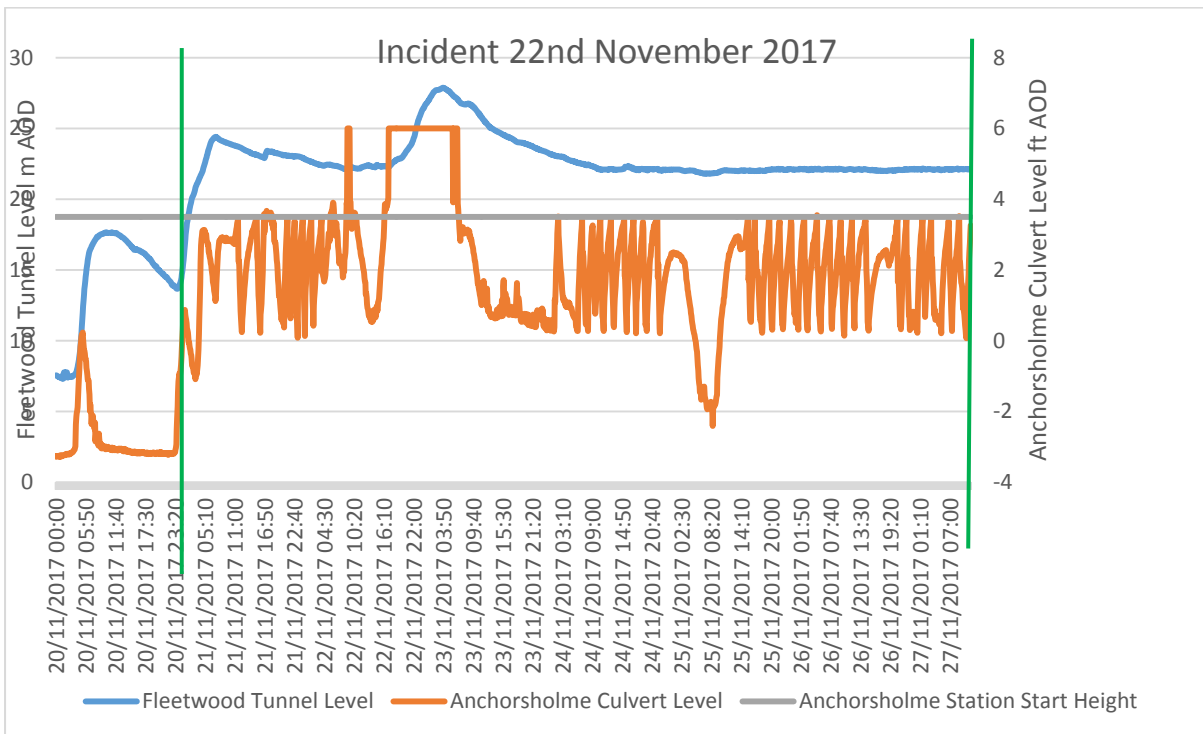


Figure 13.0 **Culvert level highlighting how the pumping station drains down the sump reducing the level of the immediate upstream culvert.

Figure 13.0 above, highlights the continuous operation of pumps preventing levels from becoming higher, Any further increase would have caused the station to seek automatic close down to prevent itself from long term flood damage.

Over the course of the evening pumping out to sea would have become more difficult up until around 2.00am, as the tide started to recede and allow greater discharges to occur. Ultimately by 5am, a combination of the activities, shut down the pass forward flows from the Skippool Pumping Station, together with the increased pumping and reduction in rainfall did lead to the Anchorsholme catchment starting to recover in some of the locations.

Figure 12.0 above highlights how the station went back to operating on two pumps for the most part of the 23rd November, in line with the flow volumes that were arriving at the station.

Modelling did predict flooding in the Anchorsholme / Warren Drive catchment had the fifth pump being fully operational, with little difference if pump five was on for that start period.

At about 4 -5am, the rain all stopped allowing for the local catchment system to start to drain down and beat the volume of inflow.

This drain down, did not occur at all places at this time, some areas such as Sevenoaks Drive, Anchorsholme Lane remained flooded significantly longer, due to other factors linked to the overspill and full status of the watercourses particularly those linked to Hillylaide Brook and Royles Brook.



Figure 14.0

****Map highlighting surface water drainage in the Blackpool area draining to the east and the EA watercourses of Royles Brook and Hillylaide Brook**

2.6 The overall Fylde Tunnel system

Storm pumping operation continued to occur on the Thursday as flows in the tunnel and local catchment still remained high, and storm spills ceased by the subsequent Sunday (26th November) , some three days after the rainfall event. The tunnel system remained high throughout that period, due to the high volumes of watercourses and land drainage in the catchment providing a continued “slow response flow” which didn’t dry out the overall Blackpool and Anchorsholme catchments until the Sunday.

2.7 The Wyre BC watercourses

The Wyre BC watercourses remained full until Thursday / Friday. The exact timescales associated with the drain down of these flat gradient watercourses to the EA Stannah Pumping Station / River Wyre is not known by United Utilities. Until the levels dropped in the upstream tributaries there remained the risk of overspill into the Blackpool geographic area and the continued limited ability of surface water

sewers in the Wyre BC are being able to drain down into the receiving watercourses. The Environment Agency and Wyre BC will be best placed in respect of the capacity status of these watercourses, during that time period.

3.0 Summary

There was limited gravity and pumping, and the northern area of Blackpool and Thornton area of Wyre DC have limited drainage routes for all types of run-off.

Effectively there are two major outlets for all flows whether foul, surface water, land drainage, watercourses, highway and network rail drainage.

1. The Anchorsholme gravity sewer connection and links to Fleetwood for treatment and disposal, prior to the system being full, leading to storm pumping to sea from the Anchorsholme pumping station.
2. The slow flowing watercourses of Hillylaide Brook and Royles Brook which ultimately drain to the River Wyre during lower tides, but then require pumping from the EA Stannah Pumping stations during more onerous tidal and storm conditions. (clearly this is not an option for foul sewage)

Once the tunnel system was full early in the Tuesday morning the only gravity sewer option disappeared. Similarly the saturated ground and full watercourses effectively stopped the effective surface water gravity drainage. The preceding rain on the 21st and early 22nd November, together with the rainfall on the night ultimately providing a 1 in 64 year storm event. Unfortunately by the time the rain occurred on the Wednesday evening, most sewer and watercourse systems were already full.

Watercourse drainage across the Fylde Coast

The very significant amount of watercourses draining to a combined sewer system in the Blackpool area is unique to public sewer systems in both the North-west of England and possibly the country.

This will continue to create a significant risk of future flooding for the catchment, with the risk of such events becoming more common with climate change.

Whilst it is understood how this legacy occurred from historic operation for drainage in the Blackpool area, the continued approach of managing surface water more holistically is imperative.

In terms of planning applications, it is not sufficient to suggest “surface water to watercourse” for new developments, as this ultimately drains back to combined sewers.

Watercourse drainage in the Fylde area is predominately flat due to the low lying nature of the ground compared with the tidal impact of the Irish Sea on the River Wyre and the main Fylde Coast front. Whilst Sea Defences will protect low lying property from the impact of the sea, the need for surface water pumping to effectively drain against higher tides is imperative either round or over the Sea defence protection.

Investigations into improved surface water management

There is a need to better understand the volumes of surface water, watercourses and potential other drainage connected to the combined sewer system. Until some of this flow is removed there remains a high risk of future flood events, predominately from the longer duration storm events.

Ultimately there is a need for an increased amount of surface water pumping from the northern Blackpool / Wyre area into the sea. The existing recognised Stannah Pumping Station and watercourses were seen to struggle with the rainfall that landed on the Wyre area, without any further consideration of possible additional surface water and watercourse drainage from the

Blackpool area. Alternatively, if the areas remain difficult to drain through the Thornton area, then there is a need for the establishment of surface water pumping directly out to the Irish Sea off the Blackpool coastline.

Shorter term considerations would be to look at the areas of grassland flooded, adjacent to Moor Park Avenue and the cemetery area, and Fleetwood Road North, then there is a need to consider utilising these areas for greater surface water buffering (slowing the flow) of watercourses and the potential for only weiring over of flows to the existing combined sewers, rather than current uncontrolled direct connections.

In addition to work in the Blackpool area, both Wyre and the eastern fringes of the Anchorsholme area will benefit from improvement work associated with the flow and storing of surface water in the Hillylaide and Royles Brook. A project was commenced looking into the need for improvements of these watercourses a few years back by the Environment Agency, but presumably did not go ahead on the back of business cases not, at the time, demonstrating sufficient risks. I would think that given the impact of flooding last November, then this would be re-visited by the multi agencies.

Anchorsholme Pumping Station

The existing Anchorsholme pumping station, under the promenade at the end of Anchorsholme Lane West, is being replaced, with work well on the way to construct a new pumping station in the local park to ensure that station can discharge storm flows some 3.7 kilometres out to sea. The existing pumping station discharges down only down a 1 kilometre outfall.

Once the new pumping station is commissioned, given its intermittent nature of operation (ie. only when there is major rainfall event that fills the tunnel and causes a storm spill to occur), there is a need to maintain the operation of the existing pumping station as long as required necessary to assure that we maintain our ability to discharge to sea. In order to do this, the Environment Agency are onboard with keeping the existing permit discharges available for operation until such time as we are confident with the new station facility.

The new pumping station will not prevent the flooding that occurred during the 22nd and 23rd of November 2017, this should be clear from the above findings associated with the capacity of the sewer system to deal with all types of drainage.

However, the new station should provide a more reliable long term operation of the station which has been purpose built for the intermittent nature of operation of the station, and to improve the Bathing Waters of Blackpool.

Dated: 31st August 2018

