

Appendix A

Event Timeline

1. 11 August 2020 - 23:30 – The Roads Maintenance Partnership (RMP) standby officer received a text telemetry alarm to clear the trash screens on Craigie Burn on South Inch and Queens Avenue. The officer attended the site at approximately 23:45, cleared the screens and left the site at approximately 00:15, returning home around 00:30am.
2. Further telemetry alarms started going off at the railway arch at the side of Craigie burn around 1am. Consequently the site was attended by the standby officer when it was established that the Scottish Water manhole had blown (not uncommon) however water remained in the channel. As a result of the deteriorating weather, increasing phone calls and a potentially escalating situation the PKC standby officer called four Tayside Contracts road workers from Perth and Blairgowrie at 1am to attend Perth depot as soon as possible.
3. At around 1am the A9 culvert on south side of Broxden roundabout blocks and overflows on to A93 Glasgow Road in Perth adding more water to the already overloaded surface water drainage system and continues to flow down towards the Cherrybank area. The Council became aware of this around 2am when it was observed BEAR Scotland attending to their culvert around 2am.
4. Broxden Flood Ponds attenuate water and wet pond performed satisfactorily and successfully attenuates the volume of water being discharged into the dry pond below. However due to the huge volume of water the dry pond subsequently overtopped into the woods and Craigie Burn resulting in increased flows in the Craigie Burn. The maximum telemetry readings for water levels in these wet ponds was 65.7m AOD which is 2.2m (7 feet 2 inches) higher than normal and in excess of design levels.
5. The Scottish Water sewer systems in Glasgow Road and Crieff Road which run down to the city centre also quickly became overloaded leading to surcharging water / sewage and manhole covers being blown off into the road around 2am, which led to an extensive uncontrolled overland flow of water
6. The Craigie burn culvert in the Persimmon Homes site at Cherrybank blocked due to the volume of water and water overtopped the attenuation area to flow over the B9112 Necessity Brae and cascade down into the Cherrybank Inn car park. It is important to note that Persimmon Homes had been alerted by the flooding team to maintain this culvert on several occasions and that the RMP identified work required to adopt by PKC, however, this work had not been undertaken.
7. The flow of surface water down the B9112 Necessity Brae joined the Craigie burn via Low Road adding to the volume of water along with the flow from Persimmon Homes site (see above).

8. From telemetry data at around 2:15am the trash screen at Queens Avenue blocks due to build-up of debris (subsequently known to be wheelie bins, garden waste etc.) and consequently water began to spill over into Queen Street and Windsor Terrace. This trash screen was cleared prior to midnight by the standby officer and was coping at that time.
9. Telemetry measurement identify the water levels at Queens Avenue to be 4.581m @ 00:45, 5.01m @ 01:00, 5.13m @ 01:30 and 5.17m @ 02:15. This is a significant increase in water level of 0.589m over 90 minutes, including a large surge of +0.429m over a fifteen minute period. This increase in height coincides with losing all attenuation at Broxden ponds, Broxden roundabout culvert failing and Bellway Homes / Persimmon Homes sites Sustainable Urban Drainage Scheme (SUDS) and culvert blocking.
10. Sections of private walls along the Craigie burn in Windsor Terrace area began to collapse into the watercourse and block the culvert at Glenearn Road causing water to flow over Glenearn Road and inundate Glenearn Community Campus and then flow back into watercourse above the railway bridge
11. The Telemetry alarms received at 2:30am indicated that the South Inch flood gates should be closed as the Craigie burn was overtopping banks and flowing into South Inch reservoir area. An officer arrived at the site at 3.00am and established that the 2 gates at the side of Craigie Burn were inundated and could not be safely reached. This is fast flowing water obscuring blown manhole covers and so is not safe to approach. It is not unusual for these gates to become inundated in under an hour and are generally pro-actively closed based on warnings received. Around the same time the standby officer became aware from Tayside Contract colleagues that Feus Rd and Marshall Place were also being flooded, therefore he elected to call for assistance from 2 other RMP officers who were in depot by 3:30am. Unfortunately, given the volume of rain, most affected properties were likely to already be flooded.
12. 04.30 A RMP officer attends the South Inch flood gates. It was observed at this time that gullies and manholes on the "dry side" were surcharging due to the sheer volume of water. The officer on site passed the message to a colleague who subsequently contacted SW to ensure the pumps were operational.
13. 04.35 Multi-agency first responder teleconference. This covered an update on the forecast, flooding issues and the resources available. The Council's Emergency Duty Officer advised he would contact Scottish Water to get information on how the SW pumping stations in Perth were performing
14. Water levels continue to build up in Marshall Place, Princes Street and Canal Street in Perth as Scottish Water sewers have reached capacity in the area with houses and businesses being at risk of inundation. Scottish Fire and Rescue attend with Police closing the road. The water level drops, and emergency services leave around 4:45am.

- 15 The RMP Manager was called at home at 4am and advised of the flooding situation and generally deteriorating conditions across entire Council area. He attended depot at 5am via Feus Road. Feus Road was approximately knee height at its mid-point and was suffering from bow waves of large vehicles. Tayside Contracts set up a more rigid closure at each end to prevent this from continuing at around 6am once the blown Scottish Water manhole covers on Crieff Road had all been protected.
- 16 The South Inch reservoir continues to fill up and then flows into the culvert that takes it to the South Inch pumping station with four large pumps operating at around 2000 litres / minute.
- 17 05.15 – 06.15 The Council ERDO tried to contact Scottish Water call centre regarding the pumping stations update but lines permanently engaged. Improved lines of communication are now in place between the Council and Scottish Water. However, he was advised when he called the local contact that the scheme had earlier ceased operating, and that they had dispatched a maintenance crew to South Inch Terrace and Mill Lade pumping stations immediately to reset. This coincides with the surcharging that was observed when closing the South Inch gate and it is assumed they were inoperable for a period of around an hour but they worked satisfactorily after that.
- 18 05.50 The Council's ERDO contacted the Council's Corporate Emergency Planning and Business Continuity Manager to update him on the current situation. He agrees to attend the next multi-agency teleconference.
- 19 Officers attended numerous flooded areas between 3am and 8am but were limited in what they could do to assist as all were already flooded. This involved 11 officers and road workers, including 3 who were not on standby but who voluntarily came to assist when called in the middle of the night.
- 20 At around 7am it was observed that Marshall Place water level had gone up and was increasing to around the same level as before. SW confirmed that the pumps remained operational. It was assumed that the reason for the continuing increase in water being discharged on to Marshall Place was the sheer volume that had fallen and entered the SW system creating a head of water within the sewer system toward Marshall Place – this being the low point in the system.
21. Therefore, it was decided at 8am to deploy a 6-inch pump to attend Marshall Place and when it arrived it started to reduce the level of water however not as quickly as anticipated. PKC supervisor attend again around 9am and established that one flood gate at the children's playpark had been missed in error, and had not been closed. He and a colleague immediately waded into chest high slow moving water to close this gate and reduce the flow of water out onto Marshall Place.
22. Unfortunately, whilst by no means the sole factor, it is fair to say that less water would have entered Marshall Place should this gate have been closed earlier. This omission was clearly an error on the Council's behalf, however

additional awareness of gates and pro active closure in the event of yellow warnings are now in place to avoid any reoccurrence in the future.

23. SW attended Feus Road at around 11am but could not remove the water due to the sheer volume. Capacity started to return to the sewerage system just after mid-day and all flood water (except basements) was clear by 4pm on 12 August 2021.
24. Tayside Contracts remained at Marshall Place with six-inch pump to bring down level of flood water until approximately 1pm. Tayside Contracts then attended Queich Place Kinross until 7pm due to concerns with water levels in the Queich Burn. During this time we deployed the 6 inch pump to reduce water levels affecting properties
25. Both the RMP and the Council's flooding & structures team officers visited, assessed and assisted numerous locations through the day and ensuing weeks / months. This involved more than 100 officers.