Memorandum – W4L-H Water Recycling Plant Wastewater Discharges

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Subject:	W4L-H Water Recycling Plant Wastewater Discharges		

1 Background and Purpose

This memo seeks to summarise the existing [redacted] wastewater catchment and wastewater treatment works (WTW) overflows and discharges, how the proposed water recycling plant (WRP) wastewater discharges integrate into the existing system, and where recycled water waste will ultimately be discharged into the environment considering the current concept design developed to RAPID Gate 2.

[redacted] has raised concerns that wastewater from the proposed water recycling plant will be discharged into Langstone Harbour during operation. This memo seeks to demonstrate that the current concept design does not allow this discharge into Langstone Harbour to occur and it will not be permitted as the design develops, should WRP options be progressed.

2 Existing System of Overflows and Discharges

The sewerage system which drains to [redacted] is formed of two catchments – the Havant catchment draining directly to [redacted] and the [redacted] catchment which drains to the former [redacted]

Figure 1: Existing [redacted] Catchment Discharges and Overflows provides and overview of the catchments, overflows and discharges.

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Untreated effluent which drains to [redacted] are pumped from [redacted] to [redacted] via a rising main which is mounted within a tunnel that crosses Langstone Harbour underground and delivers screened effluent (SE) to the primary treatment process at [redacted]. The tunnel also transfers final effluent (FE) [wastewater passed through the full treatment process at [redacted]] in the opposite direction to [redacted], at which point it is lifted out of the tunnel by pumps and discharged to the long sea outfall (LSO), discharge location [redacted].

The Portsmouth and Havant areas are serviced by a combined sewerage system which collects both wastewater and surface water run off (rainwater) via an extensive network of underground pipes. This type of combined collection system is typical across England and during periods of heavy rainfall, the capacity of the collection pipes can be exceeded. In these instances a system of storm storage and overflows is used to initially store (for post storm treatment) followed by permitted emergency overflows of SE to the environment. This overflow system safeguards public health and property damage from uncontrolled overflows within the catchment.

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As the [redacted] catchment is formed from of two historic catchments, the system of storage and overflows is more complex. The following tables summarise the storage and overflows for screened, and final effluent, indicating where this is screened and settled prior to discharge to environment. The Figure 1: Existing [redacted] Catchment Discharges and Overflows references within the table link back to Figure 1 whereby the reference is denoted by a green triangle.

Table 1: Screened Effluent – Eastney Catchment

Event order	Scenario	Mitigation	Figure 1 Reference
1 (normal operation)	Flows to [redacted] are transferred to [redacted] for treatment	None	1
2	[redacted] effluent transfer reaches capacity (capacity may be limited to avoid overload of effluent at [redacted]) 1,379 L/s	Screened effluent overflow is diverted to the LSO via screened effluent pumping station at [redacted]	2
3	LSO at maximum discharge capacity (3,600 L/s)	Additional flows diverted to [redacted]	3
4	[redacted] at capacity (40,000 m3)	Overflow to [redacted] Short Sea Outfall (SSO) – discharges into the seaward side of Langstone Harbour entrance	4

Table 2: Screened Effluent – Havant Catchment

Event order	Scenario	Mitigation	Figure 1 Reference
1 (normal operation)	Flows direct to [redacted] for treatment	None	5
2	[redacted] reaches Havant Catchment treatment capacity (983 L/s)	Flow diverted to [redacted] storm tanks	6
3	[redacted] at capacity (7,250 m3)	Settled and screened effluent overflow to [redacted] SSO	7
4	[redacted] storm tank and [redacted] SSO at capacity (1,800 L/s)	Screened effluent overflow at [redacted] Combined Sewer Overflow (CSO)	8

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Tables 1 and 2 demonstrate that the system prioritises diversion of screened effluent to the LSO and storm tanks before overflowing to the seaward side of the Langstone Harbour entrance via the [redacted] SSO or directly into Langstone Harbour via the [redacted] SSO from [redacted]. The respective discharges from these SSO's will be determined based on the inflows received in each catchment and how these combine within the system. This can vary as the intensity, duration, coverage and movement of storms will affect each catchment differently e.g. one catchment may experience a storm event with the other being relatively unaffected, or both catchments could experience storm conditions with similar timing to peak inflows.

Table 3: Final Effluent – [redacted]Table 3 summarises the FE discharges from [redacted] to the environment.

Table 3: Final Effluent – [redacted]

Event order	Scenario	Mitigation	Figure 1 Reference
1 (normal operation)	FE flows discharged into [redacted]. FE transferred to LSO via [redacted] (max 2,362 L/s)	None	9
2	LSO capacity to discharge FE restricted as screened effluent discharge at [redacted] to LSO is prioritised. (max screened effluent flow 2,221 L/s) (max FE flow 1,379 L/s) (Total 3,600 L/s)	[redacted] transfer tunnel available storage volume used	10
3	[redacted] transfer tunnel available at maximum storage capacity (approx. 38,000 m3).	Flow diverted to [redacted] SSO	11

Table 3 demonstrates that FE is discharged to the LSO before it is discharged to the [redacted] SSO. However, by limiting the [redacted] FE transfer to [redacted] via the tunnel in storm conditions and discharging more FE via the SSO, it allows screened effluent discharge via the LSO to be prioritised. This means that less screened effluent is discharged into the Langstone Harbour.

FE is diverted from the WTW outlet channel to the [redacted] SSO before entering the transfer tunnel to [redacted]. The tunnel is approximately 20m below this diversion point and therefore FE within the transfer tunnel cannot flow back into the SSO overflow system.

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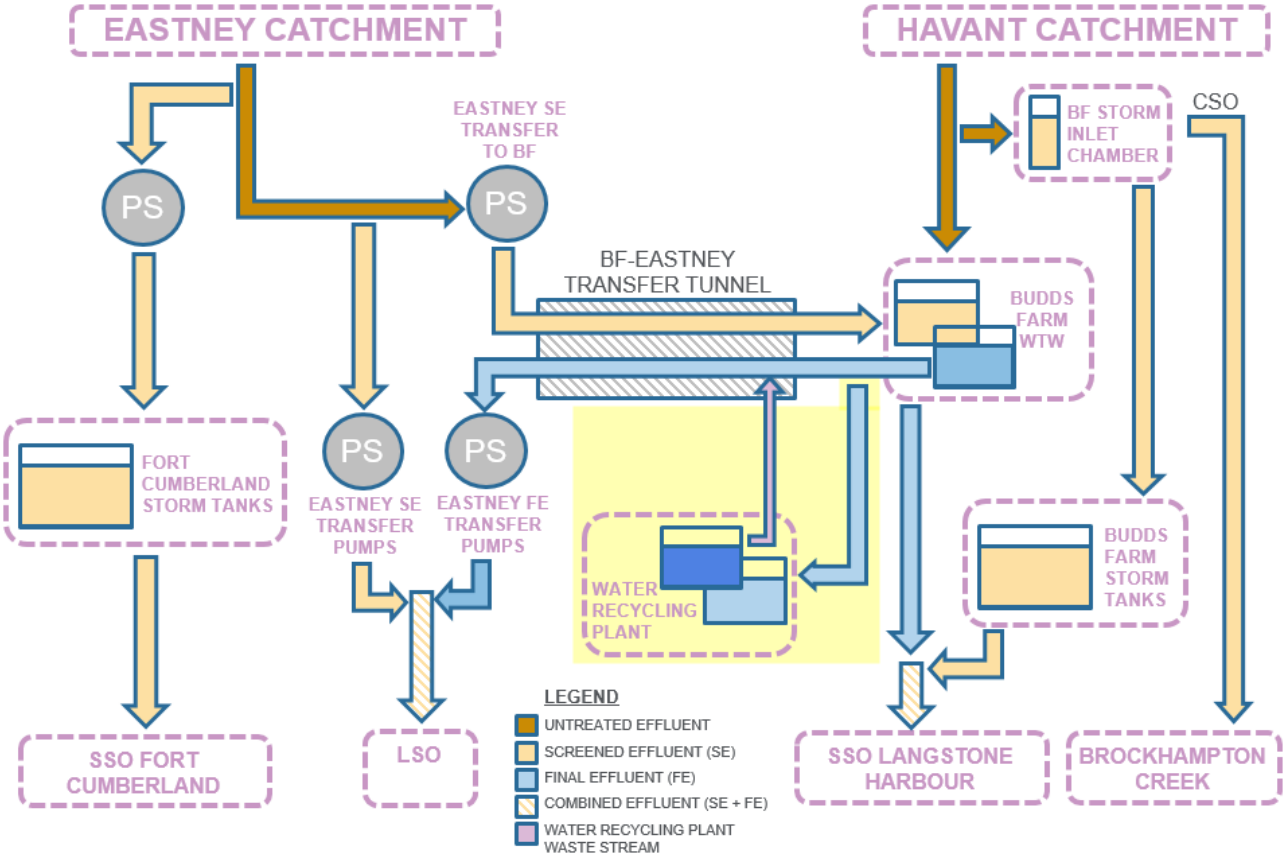
3 Proposed Water Recycling Plant Discharges

All water recycling Strategic Resource Options (SROs) will take final effluent from the WTW outlet channel (prior to discharge into the [redacted] transfer tunnel or in an emergency the SSO) and transfers it offsite for further treatment at the WRP. Waste discharges from the WRP will be transferred back to the [redacted] system and will be discharged downstream of the [redacted] FE outlet channel and directly into the [redacted] transfer tunnel. From this location, WRP waste water is unable to backflow to the [redacted] SSO as the tunnel is approximately 20m below the [redacted] SSO Langstone Harbour diversion point. Figure 2 shows how WRP feed and waste returns integrate into the system (highlighted in yellow).

Figure 2: Proposed [redacted] Catchment Discharges and Overflows including Water Recycling



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Waste discharges from the water recycling plant will enter the transfer tunnel and will be discharged to the LSO. Final effluent and WRP waste streams discharged into the transfer tunnels will be controlled and when tunnel capacity is reached, FE will be diverted to the SSO only and WRP discharges will continue into the tunnel (and on to the LSO). The capacity of the tunnel is not reduced by the WRP waste discharges, as this is a smaller percentage of the WRP feed water taken from the system. Once sufficient capacity becomes available in the tunnel (as heavy rainfall subsides and catchment inflows decrease), FE will then be redirected back to the tunnel from the SSO.

Therefore no WRP waste discharges will enter Langstone Harbour via the [redacted] SSO. Permitted emergency overflow of screened effluent discharges within the system will remain unchanged.

4 Other AMP7 Capital Works

Southern Water has the following programmes of work which are being undertaken in AMP7. These works are part of Southern Waters wider programme of improvements aimed at reducing impacts to Langstone Harbours.

- Drainage and Wastewater Management Plan (DWMP) – Southern Water is currently developing a DWMP which is at an early stage of option development. These options will consider any water recycling proposals and how they integrate into the wider system.
- £5m environmental improvement fund – a proportion of this fund will be spent in the Langstone Harbour catchment to reduce nutrient leaching whilst considering the application of Natural Capital principles.
- Investment in instrumentation and data capture allowing us to improve the management of excess flows.
- An online storm release notification system, Beachbuoy that helps our customers and partners by providing near real time information about CSO activity at designated bathing waters and recreational watercourses. Beachbuoy will cover all 83 designated bathing waters and Chichester Harbour and Langstone Harbour.
- A roll out of Event Duration Monitoring (EDM) technology across 98 per cent of the network since 2017 to build a clearer and more detailed picture of the use of CSOs, that helps to target future investment and operational activity. Further investment to ensure 100 per cent coverage by 2025 is in place.
- [redacted]

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- [redacted]
- An AMP7 growth scheme has been initiated to consider the catchment wide development proposals which will allow holistic network modifications to be developed to service new connections.

The current WRP proposals do not conflict with these work programmes.