

Pennington Wastewater System - Outline Options Appraisal												
Generic Option	Location of Risk	Planning Objective and Description of Risk	Option Reference	Description	Further Description	Unconstrained Option?	Constrained Option?	Feasible Option?	Net Benefits	Estimated Cost	Preferred Option	Best value / Least cost or Reasons for Rejection
Control/ Reduce surface water entering the sewers	Catchment Wide/ L4	PO5, PO7 - Hydraulic Drivers	PENN.SC01.1	Natural Flood Management	Storing water by planting hedgerows and trees, slowing water through bunds/ditches/ponds, increasing soil infiltration vis improved soil structure, intercepting rainfall via increased vegetation - areas identified using Hydraulic model.	No						Cost Effective
Control/ Reduce surface water entering the sewers	Catchment Wide/ L4	PO5, PO7 - Hydraulic Drivers	PENN.SC01.2	Rural Land Management	Large scale eco-system restoration, farming principles to increase biodiversity and enrich soils, rewilding - areas identified using Hydraulic model.	No						Cost Effective
Control/ Reduce surface water entering the sewers	Catchment Wide/ L4	PO5, PO7 - Hydraulic Drivers	PENN.SC01.3	Changes in Rural Land Drainage	Swales, sediment traps, bunds, ponds, wetland/constructed farm - areas identified using Hydraulic model.	No						Cost Effective
Control/ Reduce surface water entering the sewers	Catchment Wide/ L4	PO5, PO7 - Hydraulic Drivers	PENN.SC01.4	Surace Water Seperation	Removal of connected surface water into the sewer network at source.	No						Cost Effective
Control/ Reduce surface water entering the sewers	Catchment Wide/ L4	PO5, PO7 - Hydraulic Drivers	PENN.SC01.5	SuDS	Installation of SuDS - areas identified using Hydraulic model.	No						Cost Effective
Control/ Reduce surface water entering the sewers	Catchment Wide/ L4	PO5, PO7 - Hydraulic Drivers	PENN.SC01.6	Rain Water harvesting	Collect rainwater from roofs and other paved surfaces for use on site.	No						Cost Effective and Risk and uncertainty - future resilience
Control / Reduce groundwater infiltration												
Improve quality of wastewater entering sewers (inc reducing FOG, RAG, pre-treatment, trade waste)												
Control / Reduce the quantity / flow of wastewater entering sewer system	Catchment Wide	PO8 (2050) - Dry Weather Flow	PENN.SC04.1	Customer Incentive Programmee	Customers incentivised to reduce their consumption rate through bill reductions or voucher schemes.	No						Cost Effective, Environmental risk mitigatable and Risk and uncertainty - future resilience
Control / Reduce the quantity / flow of wastewater entering sewer system	Catchment Wide	PO8 (2050) - Dry Weather Flow	PENN.SC04.3	Water Efficient Measures	Use/promote/providing water efficiency measures to domestic and business customers.	Yes	No					Environmental - Strategic Environmental Assessment
Control / Reduce the quantity / flow of wastewater entering sewer system	Catchment Wide	PO8 (2050) - Dry Weather Flow	PENN.SC04.4	Blackwater Reuse	Reuse of wastewater from toilets.	Yes	No					Engineering and Cost
Control / Reduce the quantity / flow of wastewater entering sewer system	Catchment Wide	PO8 (2050) - Dry Weather Flow	PENN.SC04.5	Greywater Reuse	Reuse of wastewater from sinks, baths, washing machines and other kitchen appliances.	Yes	No					Performance and Sustainability
Network Improvements (eg increase capacity, storage, conveyance)	Catchment Wide	PO5, PO7 - Hydraulic Drivers & PO8 - Dry Weather Flow	PENN.PW01.1	Separate Flows (WfL-H)	Study / Investigation: Identify suitable location/s for surface water separation in the Pennington catchment (update hydraulic model) Collaborate to identify suitable location/s to separate foul and surface water systems.	Yes	Yes	Yes	Minor Positive +	£TBC - With Partners	No	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Lymington Area	PO5, PO7 - Hydraulic Drivers & PO8 - Dry Weather Flow	PENN.PW01.2	Separate Flows/Relining sewers	Study / Investigation: Identify suitable location/s in Lymington for sewer relining to prevent saline intrusion (update hydraulic model) Collaborate to identify suitable location/s to for sewer relining to prevent saline intrusion.	Yes	Yes	Yes	Minor Positive +	£TBC - With Partners	No	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Catchment Wide	PO5, PO7 - Hydraulic Drivers	PENN.PW01.3	Additional Storage Capacity	Construction of online/offline storage as stipulated point across the catchment, as outlines in the hydraulic model - using DAP results.	No						Risk and uncertainty - future resilience
Network Improvements (eg increase capacity, storage, conveyance)	Catchment Wide	PO5, PO7 - Hydraulic Drivers	PENN.PW01.4	Additional Conveyance Capacity	Based on results of hydraulic model (option PENN.	No						Risk and uncertainty - future resilience
Network Improvements (eg increase capacity, storage, conveyance)	Northern Lymington	PO4 and PO7 - Growth	PENN.PW01.5	Diversion sewer	DAP Option.	Yes	No					Feasibility and Risk
Network Improvements (eg increase capacity, storage, conveyance)	Waterloo Road, Lymington	PO4 and PO7 - Growth	PENN.PW01.6	Online tank and sewer regrade	DAP Option.	Yes	No					Feasibility and Risk
Network Improvements (eg increase capacity, storage, conveyance)	Saltgrass Lane	PO4 and PO7 - Growth	PENN.PW01.7	Increase manhole size	DAP Option.	Yes	No					Feasibility and Risk
Network Improvements (eg increase capacity, storage, conveyance)	School Lane and Lymore Valley	PO4 and PO7 - Growth	PENN.PW01.8	Regrading and upsizing	DAP Option.	Yes	Yes	Yes	Major Positive +++	£80K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Ashely Common Road	PO4 and PO7 - Growth	PENN.PW01.9	Upsizing	DAP Option.	Yes	Yes	Yes	Major Positive +++	£380K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Beechwood Avenue and Marley Avenue	PO4 and PO7 - Growth	PENN.PW01.10	Upsizing	DAP Option.	Yes	Yes	Yes	Major Positive +++	£605K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Milford Road Pennington WTW	PO4 and PO7 - Growth	PENN.PW01.11	Storage	DAP Option.	Yes	Yes	Yes	Major Positive +++	£660K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Peters Lane New Milton WPS	PO2- Pollution Risk	PENN.PW01.12	Maintenance Programme WPS	Improve resilience: Review operation and maintenance of Peters Lane New Milton pumping station to improve resilience.	Yes	Yes	Yes	Minor Positive +	£235K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Holly Lane Ashely WPS	PO2 Pollution Risk	PENN.PW01.13	Maintenance Programme WPS	Improve resilience: Review operation and maintenance of Holly Lane Ashely pumping station to improve resilience.	Yes	Yes	Yes	Minor Positive +	£235K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	BECTON LANE BARTON ON SEA CEO	Flooding and spill assessments - PO5	PENN.PW01.14	Storage	The model has a Medium risk DAP confidence score of 3 and was last verified in 2013.	No						Risk and uncertainty - future resilience
Network Improvements (eg increase capacity, storage, conveyance)	HIGH STREET LYMINGTON CSO	Flooding and spill assessments - PO5	PENN.PW01.15	Storage	Use Hydraulic Model to identify storage volume needed to prevent the high spilling CSO from discharging.	Yes	Yes	Yes	Major Positive +++	£1,000K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	LYMORE CSO	Flooding and spill assessments - PO5	PENN.PW01.16	Storage	Use Hydraulic Model to identify storage volume needed to prevent the high spilling CSO from discharging.	Yes	Yes	Yes	Major Positive +++	£1,000K	Yes	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	MILFORD ROAD PENNINGTON WTW	Flooding and spill assessments - PO5	PENN.PW01.17	Storage	Use Hydraulic Model to identify storage volume needed to prevent the high spilling CSO from discharging.	Yes	Yes	Yes	Major Positive +++	£1,000K	No	Best Value
Network Improvements (eg increase capacity, storage, conveyance)	Catchment Wide	PO8 (2050)- Dry Weather Flow	PENN.PW01.18	Pipe Rehabilitation Programme	Relining/improving structural grades of sewers across the catchment.	Yes	No					Environmental - Strategic Environmental Assessment

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Improve treatment (capacity and quality at existing works or develop new WTWs)	Pennington WTW	PO8 (2050) - Dry Weather Flow	PENN.PW02.1	Increase Treatment Capacity	Increasing the treatment capacity at the treatment works, to ensure permit is below 80% and reduced risk of exceeding.	Yes	No					Operational
Improve treatment (capacity and quality at existing works or develop new WTWs)	Effected Designated Sites/Pennington WTW	PO11 - Nutrient Neutrality	PENN.PW02.2	Install P removal tertiary plant	Currently no Phospahte permit.	No						Risk and uncertainty - future resilience
Improve treatment (capacity and quality at existing works or develop new WTWs)	Effected Designated Sites/Pennington WTW	PO11 - Nutrient Neutrality	PENN.PW02.3	Install N removal tertiary plant	Remove more N from final effluent, past the currently allowed 9.	No						Risk and uncertainty - future resilience
Improve treatment (capacity and quality at existing works or develop new WTWs)	Pennington WTW	PO5 - Storm Overflow Performance PO11 - Nutrient Neutrality	PENN.PW02.4	Optimisation of Treatment Process	Optimising treatment process by increasing full flow to treatment of works.	Yes	No					Operational
Improve treatment (capacity and quality at existing works or develop new WTWs)	Pennington WTW	PO2, PO8 - Operational PO5, PO7 - Hydraulic	PENN.PW02.5	De-centralisation of Treatment	Breaking up of sewer system into smaller catchments that only cover the small towns, rather than Pennington which covers seevral of these developments.	No						Risk and uncertainty - future resilience
Improve treatment (capacity and quality at existing works or develop new WTWs)	MILFORD ROAD PENNINGTON WTW	PO8 (2050)- Dry Weather Flow	PENN.PW02.6	Permit Review	Increase capacity of the Wastewater Treatment Works (WTW).	Yes	Yes	Yes	Minor Positive +	£2,385K	Yes	Best Value
Wastewater Transfer												
Mitigate impacts on Air Quality (e.g. Carbon neutrality, noise, odour)												Not included in the first round of DWMPs
Improve Land and Soils												Not included in the first round of DWMPs
Mitigate impacts on Water Quality	Effected Designated Sites/Pennington WTW	PO11 - Nutrient Neutrality	PENN.RC03.1	Catchment permits	Reduce consented permit levels for nutrients and solids in the final effluent from treatment works.	No						Do customer support it and Risk and uncertainty - future resilience
Mitigate impacts on Water Quality	Effected Designated Sites	PO11 - Nutrient Neutrality	PENN.RC03.2	River enhancement and mitigation	Enhance river upstream of catchment to provide attenuation of flows, limiting unconsented spills from CSOs, and providing opportunity for natural nutrient removal.	No						Cost Effective
Mitigate impacts on Water Quality	Effected Designated Sites/Pennington WTW	PO11 - Nutrient Neutrality	PENN.RC03.3	Efflent re-use	Re-use of effluent from site - pumping of this effluent to potable process treatment works.	No						Cost Effective and Deliver the required outcome
Reduce consequences Properties (e.g. Property Flood Resilience)	Catchment Wide	PO7 - Hydraulic Drivers	PENN.RC04.1	Flood Mitigation for Flooding	Flooding mitigation to consider options (but not limited to); Non-return Values, Smart Airbricks, Flood Doors.	Yes	No					Operational
Study/ investigation to gather more data	Catchment Wide	PO5, PO7 - Hydraulic Drivers & PO8 - Dry Weather Flow	PENN.OT01.1	Further Study/Investigation	Futher Study/Investigation - Identifying ideal locations to separate foul and surface water systems.	Yes	No					Environmental - Strategic Environmental Assessment
Study/ investigation to gather more data	Catchment Wide	PO8 (2050)- Dry Weather Flow	PENN.OT01.2	Further Study/Investigation CCTV Survey - Condition Assessment	Investigation work to determine the structural condition of the sewer network within the catchment.	Yes	No					Operational
Study/ investigation to gather more data	CSOs - Becton Lane Barton on Sea; High Street Lymington; Lydmore; Milford Road Pennington.	PO5 - High Spilling CSOs	PENN.OT01.3	Further Study/Investigation	Failing CSOs - EDM data shows spills are greater than threshold - however, predicted model spills on Hydraulic Model has a spill frequency less than the threshold.	Yes	No					Operational
Study/ investigation to gather more data	Solent and Dorset Coast Solent & Southampton Water	PO11 - Nutrient Neutrality	PENN.OT01.4	Further Study/Investigation	In order to take forward any unconstrained option - PENN.	Yes	No					Operational
Study/ investigation to gather more data	PENN FC08 - BECTON LANE BARTON ON SEA CEO	Flooding and spill assessments - PO5, PO13	PENN.OT01.5	Storage (FC08 - BECTON LANE BARTON ON SEA CEO)	Use Hydraulic Model to identify storage volume needed to prevent the high spilling CSO from discharging.	Yes	Yes	Yes	Major Positive +++	£1,000K	Yes	Best Value
Study/ investigation to gather more data	PENN FC09- LYMINGTON SLIPWAY PENNINGTON CSO	Flooding and spill assessments - PO5, PO13	PENN.OT01.6	Storage (FC09- LYMINGTON SLIPWAY PENNINGTON CSO)	Use Hydraulic Model to identify storage volume needed to prevent the high spilling CSO from discharging.	Yes	Yes	Yes	Major Positive +++	£1,000K	Yes	Best Value
Study/ investigation to gather more data	PENN FC010 - HIGH STREET LYMINGTON CSO	Flooding and spill assessments - PO5, PO13	PENN.OT01.7	Storage (FC010 - HIGH STREET LYMINGTON CSO)	The model has a Medium risk DAP confidence score of 3 and was last verified in 2013.	Yes	No					Feasibility and Risk
Study/ investigation to gather more data	PENN FC11 - LYMORE CSO	Flooding and spill assessments - PO5, PO13	PENN.OT01.8	Storage (FC11 - LYMORE CSO)	The model has a Medium risk DAP confidence score of 3 and was last verified in 2013.	Yes	No					Feasibility and Risk
Study/ investigation to gather more data	Catchment Wide	PO5- Storm Overflow PO7- Hydraulic Overload	PENN.OT01.9	Improve Hydraulic Model	Study / Investigation: Update and re-verify the Pennington Hydraulic Model to improve model confidence.	Yes	Yes	Yes	Minor Positive +	£225K	Yes	Best Value
Study/ investigation to gather more data	Solent and Dorset Coast Solent & Southampton Water	PO11 - Nutrient Neutrality	PENN.OT01.10	Nutrient Budget	Study / Investigation: Develop a nutrient budget and investigate the risks and sources impacting these named Habitat sites.	Yes	Yes	Yes	Minor Positive +	£75K	Yes	Best Value