

Technical Note Reservoir Outfall

Project	Sefter Farm South
Project Number	23995
Planning Reference	P/40/25/PL
Date	28 April 2026

1 Introduction

- 1.1 Following a meeting on Thursday 23 April 2026 with Arun District Council and their Drainage Team it was agreed that an assessment of the change in discharge to the Pagham Rife through the existing reservoir outfall would be undertaken to confirm flood risk is not increased in the event the site ceases to trade.
- 1.2 The criteria agreed in the meeting was to assess the existing reservoir outfall using a water level 200mm above the existing outfall invert level, allowing for a 300mm of freeboard to the existing reservoir and then to add 46mm to that water level (increase in level from the roof area proposed to drain to the reservoir) and to confirm the resultant increase in outflow and agree the need for any restriction to the existing outflow pipe.
- 1.3 It is noted that the 46mm increase in water level was calculated as the total volume of a 1:100 year plus 45% climate change event. See Section 6.3 and Appendix 6 of the Flood Risk Assessment v2.0 for the proposal and calculations.

2 Existing Reservoir Outflow

- 2.1 The existing reservoir has a 150mm diameter outflow pipe at its northwest corner that is set 500mm below the top bank of the reservoir.
- 2.2 This outflow pipe discharges to the existing ditch located adjacent to the reservoir bank. That ditch follows the alignment of the access road / track to the south and discharges into the Pagham Rife to the southwest of the temporary staff accommodation field.
- 2.3 Relevant levels were confirmed by a site check on Friday 24 April 2026 as:
 - The difference in height between the top bank of the reservoir and the invert level in the 150mm outfall pipe in the ditch is 2.636m.
 - The difference in level between the reservoir outfall invert level and the invert level of the outfall pipe in the ditch is 2.136m.
- 2.4 The details are noted on drawing 203, copy attached to the rear of this note.

3 Outfall Flow

- 3.1 If the existing reservoir fills to 200mm above the existing overflow invert level a freeboard of 300mm to the top of the reservoir bank would be maintained.

- 3.2 With a water level 200mm above the outfall invert level the hydraulic gradient (s) of outfall pipe is as follows:

$$s = ((2.136 - 0.150) + 0.2) / 19.5 = 0.112 = 1:8.92$$

- 3.3 The Flood Risk Assessment v2.0 established that the additional roof area will add 46mm of water from the 1:100 year plus 45% climate change event to the reservoir. The difference in hydraulic gradient from an additional 46mm water depth is as follows:

$$s = ((2.136 - 0.150) + 0.246) / 19.5 = 0.114 = 1:8.74$$

- 3.4 Calculations have been undertaken using the Colebrook White formula for pipes under full bore flow conditions as follows:

- Existing reservoir at 200mm above outflow invert level

Colebrook White Equation

for Circular Pipes under Full Bore Conditions

Existing reservoir outflow at 200mm above outlet invert

$$V = -2\sqrt{(2gDS)} \log \left[\frac{k_s}{3.7D} + \frac{2.51\nu}{D\sqrt{2gDS}} \right]$$

Where:

g= gravitational acceleration	9.81 m/s ²	
ν = kinematic viscosity of fluid	1.139E-06 m ² /s	(1.139E-6 for water at 15 Celsius)
k _s = roughness value	0.6 mm	(Storm Sewer 0.6mm Foul Sewer 1.5mm)
D= pipe diameter	150 mm	
S= hydraulic gradient	1: 8.92	
V=	3.39 m/s	
Q=	0.06 m ³ /s	59.9 l/s

Discharge Q = 59.9l/s.

- Existing reservoir level at 246mm above the outfall invert level.

Colebrook White Equation

for Circular Pipes under Full Bore Conditions

Existing reservoir outflow at 246mm above outlet invert

$$V = -2\sqrt{(2gDS)} \log \left[\frac{k_s}{3.7D} + \frac{2.51\nu}{D\sqrt{2gDS}} \right]$$

Where:

g= gravitational acceleration	9.81 m/s ²	
ν = kinematic viscosity of fluid	1.139E-06 m ² /s	(1.139E-6 for water at 15 Celsius)
k _s = roughness value	0.6 mm	(Storm Sewer 0.6mm Foul Sewer 1.5mm)
D= pipe diameter	150 mm	
S= hydraulic gradient	1: 8.74	
V=	3.43 m/s	
Q=	0.06 m ³ /s	60.6 l/s

Discharge Q = 60.6l/s

- Restriction required with the existing reservoir level at 246mm above the outfall invert level to maintain 59.9l/s

Colebrook White Equation

for Circular Pipes under Full Bore Conditions

Existing reservoir outflow at 246mm above outlet invert pipe restricted to achieve 59.9l/s flow

$$V = -2\sqrt{(2gDS)} \log \left[\frac{k_s}{3.7D} + \frac{2.51\nu}{D\sqrt{2gDS}} \right]$$

Where:

g= gravitational acceleration	9.81 m/s ²	
ν = kinematic viscosity of fluid	1.139E-06 m ² /s	(1.139E-6 for water at 15 Celsius)
k _s = roughness value	0.6 mm	(Storm Sewer 0.6mm Foul Sewer 1.5mm)
D= pipe diameter	149.4 mm	
S= hydraulic gradient	1: 8.74	
V=	3.42 m/s	
Q=	0.06 m ³ /s	59.9 l/s

Pipe restriction required = 149.4mm

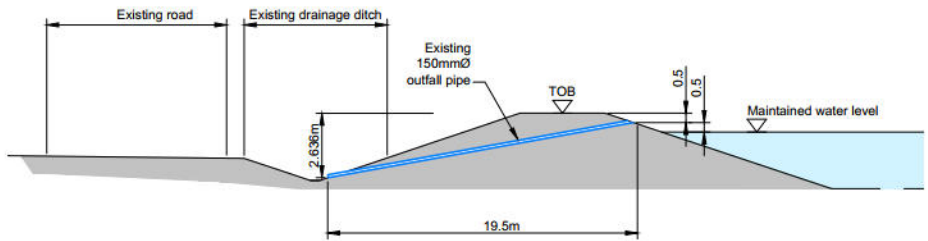
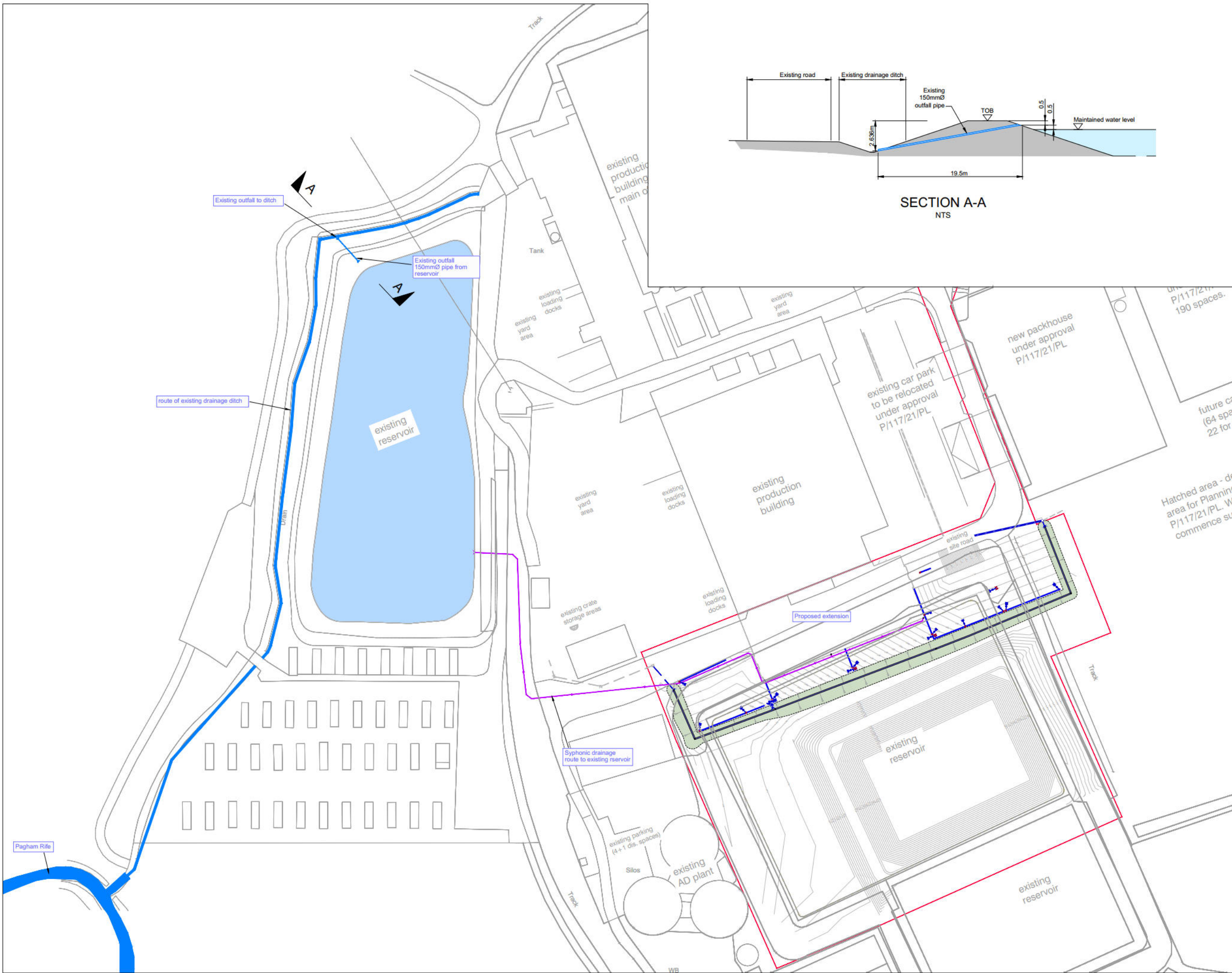
- ~~3.5~~ An orifice plate of 149.4mm could in theory be attached to the outfall pipe but such a small wall thickness sleeve is impractical.
- 3.6 As previously noted the increase in discharge from the reservoir from the increased depth without such a sleeve is 0.7l/s.

4 Greenfield Runoff

- 4.1 The Flood Risk Assessment established the Q_{bar} Greenfield runoff rate at 1.72l/s/ha and discharge is required to be restricted to the Q_{bar} rate or 3l/s/ha (whichever is the greater) to comply with National Technical Standards for Sustainable Drainage.
- 4.2 No runoff from the extension roof area was allowed within the discharge calculations for the site nor was the area included in the runoff rate calculation for the site since this was to be captured and reused on site.
- 4.3 The areas of the positively drained elements of the development are as follows:
- Extension Roof Area 2,195m²
 - External Hard Standing (Including Dock Leveller) 3,490m²
- 4.4 The noted 3l/s/ha discharge for the total development area of 5,685m² equates to a total site discharge of 1.71l/s.
- 4.5 Calculations for the external hardstanding areas were based on a discharge rate no greater than 1l/s during the 1:100 year plus climate change event.
- 4.6 The increase in discharge of 0.7l/s from the existing reservoir during a 1:100 year plus climate change event would raise the total site discharge to the Pagham Rife from the development site to 1.7l/s which is less than the 1.71l/s discharge allowed by National Technical Standard for Sustainable Drainage (SuDS) and Arun District Council Drainage Guidance.

5 Conclusion

- 5.1 It is not proposed to alter the existing outfall from the reservoir to the Pagham Rife.
- 5.2 The existing reservoir will continue to be managed with the operational water level 500mm below the reservoir outflow pipe.
- 5.3 If the site ceases to trade or if the water irrigation demand is reduced or ceases the discharge from this development is limited to 1.7l/s during a 1:100 year plus climate change event under the criteria agree with Arun District Council and in accordance with National Technical Standards for Sustainable Drainage and Arun District Council Drainage Guidance and therefore Flood Risk from the development is not increased.



SECTION A-A
NTS

GENERAL NOTES:

1. All dimensions to be checked on site. All details and dimensions relating to sub-Contractors work must be checked and agreed between the sub-Contractor or supplier and the general Contractor.
2. This drawing is to be read in conjunction with all relevant Architect's and Engineer's drawings and specification.
3. The main Contractor is responsible for ensuring the stability of the structure whilst the works are in progress.
4. Any information given regarding existing underground services is given in good faith after consultation with the relevant authority. No liability is accepted by the Consultant and the main Contractor is responsible for obtaining and checking all information and taking due care and attention whilst undertaking the works.

DRAINAGE NOTES:

1. All adoptable pipes, bends and junctions shall be vitrified clay in accordance with the current version of BS EN 295-1, with flexible joints and kilnmark certified.
2. All Adoptable sewers shall be in strict accordance with the SSG Appendix C - Design and Construction Guidance. Unless otherwise stated adoptable sewers shall be 150mm diameter and shall be laid in a class S bedding. Where the depth to soffit is less than 1.2m under a public highway or 0.9m elsewhere the pipe shall be laid with a class 2 bedding.
3. All private building drainage shall be constructed in strict accordance with the current version of BS EN 752:2017. Unless otherwise specified building drainage shall be 100mm diameter and shall be laid at a minimum gradient of 1 in 40 for foul drains and 1 in 80 for surface water drains. All building drains shall be laid in class B bedding unless otherwise specified.
4. Where a pipe is within 1m of a foundation the trench shall be filled with class GEN 3 concrete up to the lowest level of the foundation. Where the trench is further than 1m from the foundation, the trench shall be filled with class GEN 3 concrete to a level below the lowest level for the foundation equal to the distance from the foundation less 150mm. In both cases the pipe shall be bedded and surrounded in 150mm thick class GEN 3 concrete.
5. Where pipes, external to the structures, have a depth to soffit from ground level of less than 450mm they shall have a class GEN 3 concrete encasement (150mm thick). In all other cases the pipes shall be bedded and surrounded with 100mm thick granular material.
6. In any circumstances where pipes are bedded and surrounded in concrete flexible joints should be provided. Compressible boards (fibreglass or polystyrene) shall be provided at a maximum of 8m centres (coinciding with pipe joints). The boards shall be pre-cut to pipe diameter and to a height and width equal to the concrete cross section. A board thickness of 18mm for pipes up to 450mm nominal diameter and 36mm for pipes over 450mm nominal diameter.
7. All svs shall have rodding access plates fitted at their bases (ground floor level).
8. Impermeable membranes to be sealed around any incoming pipes.
9. Where existing pipes are to be abandoned they shall be dug out together with any abandoned manholes.
10. Any discrepancy between the drawing and site should be reported immediately to the Engineer.
11. All manhole and chamber sizes are given as a minimum to meet the SSG Appendix C-Design and Construction Guidance



REV	DATE	INT	DESCRIPTION	CHK
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Issue Status PRELIMINARY

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CLIENT	Barfoots Of Botley		
PROJECT	Seffer Farm Extension		
TITLE	Site Layout - Existing Reservoir Outfall		
DRAWN	A Davies	DATE	Apr 2026
ENGINEER	S Doughty	CHECKED	SRD
SCALE	NTS		
PROJECT NO.		23995	
DWG. No.		REV.	
203		-	