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DESIGN OF WASTEWATER PUMP STATIONS

Proposed Wastewater Pump Station At _____

Designed By _____ DATE _____

INFLOWS

See Fig 5.1 in Vol 2 Design Guide Part 5.

1. Average dry weather flow ..... l/s
2. Peak daily dry weather flow ..... l/s
3. Peak wet weather flow ..... l/s

HEAD LOSSES

Static Head

Level at rising main discharge (or highest point)	=	m	
Level at pump bowl	=	m	
Static Head			= m

Friction Head

Required Discharge (@ P.W.W.F.)		=	l/s	
Select Diameter		=	mm	
Rising Main	Type	=		
	Length	=	m	
Head Loss (from flow resistance chart)		=	m	
Fitting Loss		=	m	
				= m
TOTAL HEAD (@ P.W.W.F)				= m

PUMP SELECTION

Proposed Pump Type _____ Impeller _____

PLOT SYSTEM CURVE AND CHECK SELECTION

Discharge (l/s)	( )	( )	( )	( )	( )	( )	( )
Head Loss							
Static Head							
Fitting Losses							
Total							

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Operating Discharge (from system curve) = l/s

Operating Head (from system curve) = m

Wastewater Flow Velocity (1.0 m/s <VEL> 3.0 m/s) = m/s
(From System Head Curve and Rising Main dia.)

Check Efficiency of Various Impellers (see notes)

Revised Pump (if applicable) Type _____ Impeller _____
(Attach system curve to final calculation sheet)

Revised Initial Impeller (see note)

PUMP CHAMBER SIZE

Chamber diameter = mm

Chamber Invert = m

Overflow Invert = m

Storage Volume Chamber = l

Storage Volume in Pipes and Manholes = l

Total Storage = l

Chamber Volume required for Desirable Storage at A.D.W.F = l

Final Storage Time at A.D.W.F (see note) =
hrs

Inlet Invert = m

Distance between Start and Stop Points = mm

Volume Between Stop and Start Points $V_{min} = \frac{T_{min} \times Q}{4}$ = l

OVERFLOW (If Required)

Invert of Overflow at Chamber = m

Invert of Overflow at Discharge = m

Diameter = mm

Capacity = l/s

Check low points in catchment ❑

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NOTES

Check capacity of rising main receiving sewer.

Check class of rising main is compatible with operating pressure head.

Check capacity of overflow receiving line. (Check to consider possible surcharge under storm conditions - is it likely to flood pump station).

Check that stop and start levels are adjusted so as to prevent surcharge in inlet pipe.

Check alignment of inflow pipe into station as to prevent airlock of pump. (May require baffle).

A smaller impeller may be desirable if only part of the overall catchment is initially contributing.

Sump volume $V_{min} = \frac{T_{min} \times Q}{4}$

Where Vmin is in litres
Tmin (cycle time) is in seconds
Q (pump capacity) is in l/s

The recommended maximum number of starts/hour is 15.

The recommended minimum is 1 start/hr.

Therefore $T_{min} = \frac{60min}{15} = 4min = 240$ secs.

Power Consumption in kWhr/Day $= \frac{A.D.W.F.}{\text{Pump Capacity}} \times \text{Pump Power Input} \times 24$

"Time to Overflow" - In most cases this should not be less than 6 hours at A.D.W.F

- For small stations with no standby pump this should be not less than 12 hours at A.D.W.F.