


S. S. W. W.

DESCRIPTION OF PUMPING STATIONS
1921.

VOL. I

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ENGINEER.

SOUTH STAFFORDSHIRE WATERWORKS COMPANY.

PUMPING STATIONS.

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and supplementary
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situate near

DUDLEY in the County of STAFFORD.

S U M M A R Y

Total Engine Power at this
Station is equal to 3,000,000
Gallons per 24 hours.

No. 1. Engine.	Power per day	=	1,500,000	Gallons.
No. 2. Engine	do	=	1,500,000	"

TOTAL SPECIFIED HEAD = 590 Feet

C O S T S

	<u>£.</u>	<u>s.</u>	<u>d.</u>
Land and Law Charges ...	372.	12..	6.
Making Well ...	2,178.	3.	5.
Engine and Boiler Houses ..	6,407.	14.	7.
Cottage ...	455.	0.	0.
Nos 1 and 2 Engines and Boilers)	15,592.	5.	4.
Sundries, Wharf Connections, etc.)	1,661.	5.	11.
<u>VENTURI RECORDER</u>	<u>495</u>	<u>0.</u>	<u>0.</u>
<u>TOTAL COST</u>	<u>£ 27,152.</u>	<u>1.</u>	<u>9.</u>

Station Commenced - 1899.

Station Completed - 1901.

LAND (1 acre, 0 roods, 5 poles)

Purchased from J.Dutton and
A.Hopkins, in September and
November, 1899.

Level of E.H.F. above O.D. ... 210.24 Feet.
Rent of Wharf per annum ... £3. 3. 0.

CONTRACTORS

WELL.

Sunk by South Staffordshire
Waterworks Company ... 1899 - 1900

BUILDINGS.

Engine & Boiler Houses.
H. Lovatt. ... 1900 - 1901
Cottage
H. Lovatt ... 1900 - 1901

ENGINES.

Nos. 1 and 2.
Fawcett and Preston . 1901

BOILERS

Nos. 1, 2 and 3.
Fawcett and Preston. ... 1901.

C O S T S

	<u>£.</u>	<u>s.</u>	<u>d.</u>
Land and Law Charges ...	372.	12.	6.
Making Well ...	2,178.	3.	5.
Engine and Boiler Houses ..	6,407.	14.	7.
Cottage ...	455.	0.	0.
1 and 2 Engines, and 3) Boilers)	15,592.	5.	4.
Sundries :- Levelling, Ground & Connections ...	1,280.	5.	11.
Wharf ...	381.	0.	0.
	<u>495.</u>	<u>0.</u>	<u>0.</u>
<u>VENTURI RECORDER</u>			
	<u>£ 27,162</u>	<u>1.</u>	<u>9.</u>

ENGINE HOUSE

Internal Dimensions.	Length.	56 Ft - 0 Ins.
	Width.	32 Ft - 3 Ins.
Height to top of Wall Plate.		32 Ft - 4 Ins.
Depth of Foundations.		15 Ft - 6 Ins.

BOILER HOUSE

Internal Dimensions.	Length.	66 Ft - 7 $\frac{1}{2}$ Ins.
	Width.	36 Ft - 6 Ins.
Height to top of Wall Plate.		21 Feet.

WELL.

Diameter at top	...	10 Ft. - 0 Ins.
"	bottom ...	12 Ft - 0 Ins.
Total depth from E.H.F.		72 Ft - 0 Ins.
Top of Well	ditto	8 Ft - 6 Ins.

NOS 1 AND 2 ENGINES

Compound Vertical Surface
Condensing Marine types.
Engine Builders' Order No.
288.

CAPACITY OF ENGINE

Net Quantity equals 1,500,000
Gallons per 24 hours at 140
feet per minute.
Both Engines are of the same
size and capacity.

SPECIFIED HEAD

Specified depth of Well	...	150 Feet
Head on Delivery Main (Including Friction)		440 "
<u>TOTAL SPECIFIED HEAD</u>		<u>590 Feet</u>

SPECIFIED HEAD (Continued)

Speed per Minute	...	...	17½ Revs.
Pump Horse Power at 17½ Revs.	...	...	186.2.

RISING MAINS OR LIFTS.

Number Lifts to each Engine	...	...	2
Distance apart, Lifts.	...	...	5 Feet
Diameter, Lifts	...	...	17 Inches.
Length each Pipe	...	...	9 Feet
Thickness do	...	...	1 Inch
Diameter, Flanges on Pipes	...	...	25½ Ins.
Thickness Flanges	...	...	1½ Ins.

Each Lift consists of 10 Pipes,
including Working Barrel, Clack
Box & Inspection Box, Suction
Pipe, Sliding Pipe and top length.
The Lift, in each case, is fitted
with Sliding Pieces, so that length
of Lifts can be adjusted.

CAST IRON WORKING BARRELS.

Diameter, each Barrel	...	...	16 Ins.
Length do	...	...	4 Ft - 9½ Ins.
Thickness, Metal	...	...	1½ In.
Diameter, Flanges	...	...	26 Ins.

CLACK BOXES.

Diameter, each Box(at smallest part)	...	...	17 Ins.
Length do	...	...	5 Ft - 2 Ins.
Diameter Flanges (top)	...	....	26 Ins.
(bottom)	...	....	23½ Ins.
<u>Gunmetal Seat in each Box for Clack</u>			

Valve to rest upon.

CAST IRON SNORE PIECES.

Diameter, each Snore Piece(at Neck)	15	Ins.
Length ditto	2	Ft - 6 Ins.

INSPECTION BOXES FOR WELL PUMP BUCKET.

Diameter	...	...	17	Ins.
Length	...	...	5	Ft - 2 Ins.
Diameter, Flanges on Boxes	...		26	Ins.
Size, Openings in side of Boxes,			17	Ins. X
			36	Ins.

STEAM CYLINDERS

Diameter, H.P.	...	22	Ins.
" L.P.	...	53	Ins.
Stroke of Engine	...	4	Feet

Cylinders are steam jacketted.

PISTON RINGS

H.P. Piston. Ramsbottom Rings.
 L.P. Piston. Mather & Platt's Patent
 Springs and Rings.

Diameter, Piston Rods	...	5	Ins.
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PACKINGS ON PISTON RODS.

H.P. Piston Rods have "Metallic" Packings
Made by - United States Metallic Packing
Company Ltd, Bradford.

L.P. Piston Rods are packed with
ordinary Packing.

ENGINE VALVE GEAR

Ordinary Slide Valve worked from
Crank Shaft by Eccentrics and Rods.

ENGINE VALVE GEAR. (Continued-)

Diameter, H.P. Slide Valve Spindle ...	2 $\frac{3}{8}$	Ins.
" H.P. Expansion ditto ...	1 $\frac{7}{8}$	Ins.
" L.P. Slide Valve Spindle ...	2 $\frac{1}{2}$	Ins.
" L.P. Expansion ditto ...	2	Ins.

AIR PUMP.

One Single-Acting Pump to each
Engine Working off Crank Shaft.

Diameter ...	24	Ins.
Stroke ...	18	Ins.
Diameter, Delta Metal Pump Rod ..	3	Ins.

Valves - India - Rubber.

Number Valves on Head Valve ...	5	
do Bucket " ...	4	
do Foot " ...	4	
Diameter, India-Rubber Valves ...	7	Ins.
Thickness ditto ...	9/16	Ins.
Diameter, Bucket Rod ...	3	Ins.
" Inlet ...	8	Ins.
" Outlet ...	5	Ins.

WELL PUMPS

Pumps actuated by side levers
off the Engine Crossheads.

WELL PUMP BUCKET & SUCTION VALVE.

India-Rubber, Hat-Band type.

Diameter, Well Pump Bucket ...	16	Ins.
Stroke ditto ...	4	Feet.
Number Tiers of I.R. Bands ...	4	
Depth Gutta Percha Gearings ...	3	Ins.
Diameter, Largest part Suction Valve,	15 $\frac{1}{2}$	Ins.

WELL PUMP BUCKET & SUCTION VALVE. (Continued)

Number Tiers I.R. Bands	...	4
Diameter Well Pump Rods	...	2 $\frac{3}{4}$ Ins.
" Top ditto	...	2 $\frac{3}{4}$ Ins.
Number W.P. Guides in one Lift.		1
Diameter ditto	...	16 $\frac{3}{8}$ Ins.

Well Pump Rod CouplingsClasp Joint secured with2 Collars.FORCE PUMPSPiston and Plunger Type.

Diameter, Piston	...	16 Ins.
" Plunger	...	11 $\frac{3}{8}$ Ins.
Stroke Force Pump	...	4 Feet
Capacity of One Pump	...	34.9 Gallons
Gallons discharged per revolution,		69.8
Multiplier given to Foreman ..		69
Excess of discharge of Well Pumps) over Force Pumps.)		None.

FORCE PUMP VALVES.Cast Iron Double-Beat Valves with
Gutta-Percha Beats.

Number Suction & Delivery Valves.		2 Each.
Outside Diameter, Flange on Seat.		18 $\frac{5}{8}$ Ins.
Free lift of Valves	...	$\frac{3}{4}$ In.

CONDENSER.

Open type with Tubes expanded into
Cast Iron Water ends. Condenser
placed in Force Pump Suction Tank.

Cooling Surface	...	362 Sq. Ft.
Number Ordinary Tubes	...	211

CONDENSER (Continued)

Length, Ordinary Tubes	...	5 Ft - 10 Ins.
Diameter, ditto	...	1½ In. Bore.
Thickness ditto	...	15 B.W.G.
Number Stay Rods,	...	0
Pitch of Tubes	...	3½ Ins.
Distance over Cast Iron Ends ..		5 Ft - 9 Ins.
Thickness, End Plate	...	1½ Ins.
Diameter, Inlet	...	12 Ins.
" Outlet	...	8 Ins.

NOTE:- No Tube Plates with these
Condenser Tubes are expanded into
Cast Iron Ends.

DELIVERY AIR VESSELS.

Top portions - Mild Steel.

Bottom portions - Cast Iron.

Total height inside	...	9 Ft - 2½ Ins.
Diameter "	...	3 Ft - 0 Ins
Height above Branches	...	6 Ft - 7½ Ins.
Thickness of Mild Steel	...	½ In.
Working pressure per sq. inch .		190 Lbs.
Capacity above Branches	...	47 C. Ft.
Total Capacity	...	65 C. Ft.

FLYWHEEL.

Diameter	...	22 Ft - 6 Ins.
Width of Rim	...	14½ Ins.
Internal diameter, Boss	...	14½ Ins.
Number Segments in Wheel	...	8

FEED PUMP ON MAIN ENGINE.

Diameter, Plunger	...	3½ Ins.
Stroke do	...	18 Ins.

AIR CHARGER ON MAIN ENGINE

Diameter, Plunger	...	4 $\frac{1}{2}$ Ins.
Stroke	do ...	18 Ins.
Diameter, Crank Shaft	...	10 $\frac{1}{2}$ Ins.
"	Crank Pins ...	10 $\frac{1}{2}$ Ins.
"	Crosshead Pin ...	5 $\frac{1}{2}$ Ins.

OVERHEAD TRAVELLING CRANE. (HAND WORKED)

Made by The Leeds Hydraulic
Engineering Company.

Load	... ..	12 Tons
Span	... ..	31 Ft - 6 Ins.
Top Crane Rail to E.H.F. ..		27 Ft - 3 Ins.

AIR COMPRESSOR.

Single-Stage "Westinghouse" Type
made by Westinghouse Brake Co.

London. Class "F". Size 8" / 5 $\frac{1}{2}$ "

Steam Inlet	... Diameter...	1 Inch.
Exhaust Outlet	do ...	1 $\frac{1}{4}$ Inch.
Air Delivery	do ...	1 Inch.
Steam Cylinder	do ...	8 Ins.
Maker's Number on Name Plate .		33145
ditto	(London Works)	11264.

RELIEF VALVE ON WATER MAIN.

Lever, Dead-Weight.

Diameter, Gun Metal Valve	...	3 Ins.
Valve loaded to blow off at ..		242 Lbs.
Each Weight represents pressure of		46 $\frac{1}{2}$ "
Number, Dead Weights	...	5

MAIN BRAKE

Lever & Dead Weight with Double-
Beat Valves.

Diameter, Gun Metal Valves	...	4 $\frac{1}{2}$ Ins & 5 Ins
Pressure at which Valves close	...	140 Lbs.
Diameter, Weight	...	8 $\frac{1}{2}$ Ins.
Depth do	...	6 Ins.
Total amount of Weight	...	82 Lbs.

STEAM BOILERS ... 3

Lancashire type made by
Fawcett and Preston-Liverpool.

Diameter	...	8 Ft - 0 Ins.
Length	...	30 Ft - 0 Ins.
Thickness, Shell	...	23/32 In.
" End	...	$\frac{3}{4}$ In.
Diameter, Internal Flues, Front End		3 Ft - 2 Ins.
Back End		2 Ft - 9 Ins.
Thickness Flue Plates, Front End Section	...	9/16 In.
Intermediate "	...	$\frac{1}{8}$ In.
Back End "	...	$\frac{1}{8}$ In.
Diameter, Circular Manhole	...	16 $\frac{3}{4}$ Ins.
Working Pressure	...	130 Lbs.
Test "	...	220 Lbs.
Heating Surface	...	1068 Sq. Ft.

STEAM MOUNTINGS ON EACH BOILER.

One C.I. Junction Stop Valve	...	4 $\frac{1}{2}$ Ins dia.
One G.M. Blow-Down Cock	...	2 $\frac{1}{2}$ Ins "
One Hopkinson's Accessible Check Feed Valve, Fig. No. 1372	...	2 In. Bore.
One Safety Valve	...	3 Ins. dia.
Two sets Hopkinsons Water Gauges to each Boiler	...	$\frac{3}{4}$ In. "

ECONOMISER & ENGINEMade by E. Green & Sons, Wakefield.Maker's Number - 6941.

Number, Tubes	...	...	80
<u>Engine for driving Scrapers.</u>			
Cylinder	...	...	3 $\frac{1}{2}$ Ins. dia.
Stroke	...	...	6 Ins.
Steam Inlet	...	...	$\frac{1}{2}$ In.
Exhaust	...	...	$\frac{3}{8}$ In.

MECHANICAL STOKERS.Made by T & T Vicars, Earlstown.

Maker's Number on Stokers	...	
No. 1. Boiler	...	4523 - 4524
No. 2. do	...	4525 - 4526
No. 3. do	...	4527 - 4528

Stoker Engine.Particulars on Name Plate.T & T Vicars, No. 33627.Earlstown. Lancashire.

Diameter, Crank Shaft	...	2 $\frac{1}{2}$ Ins.
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FITTINGS

2 Lancaster & Tonges Bucket Type Steam Traps on Main Steam Range in Engine House	...	1 In. dia.
1 Lancaster & Tonges Bucket Type Steam Trap on Jackets of each Engine	...	1 In. dia.

FEED WATER FILTER.

Made by The Harris Patent Feed Water
Filter Company, Newcastle-upon-Tyne.

Number on Filter - 1424.

HINKSFORD P.S.FITTINGS (Continued).

One Kennedy Water Meter.

STOP VALVE ON ENGINES

No. 2. Engine is fitted with
a Dewrance Stop Valve, Figure
3090. Diameter - 4 Inches.

Height of Main Delivery Pressure from

B.H.F. = 5.5 Feet