Basic design instructions for the SW program

- 1) Assume the drawing has the manhole positions and pipe runs
- 2) Decide on the Index run this is usually the longest run from the head to the outfall if you get it wrong, the program will sort it out.
- 3) Start at the head of the index run and number the pipe sections (in this run only) as 1.01. 1.02 *et seq.*
- 4) Again, starting at the head of the index run, move down this run until you see a branch coming in. Go to the head of this branch and number the sections starting at 2.01, 2.02 *et seq.* Only label the pipes that are directly in this run. If you meet a branch coming into this run, go to the head and number this 3.01, continuing as above.
- 5) Move down the index run numbering the branches, sub-branches, sub-sub-branches and sub-subbranches as above.



## Example layout for a job

- 6) List the pipe runs in the order that you labelled them
- 7) Calculate the areas drained by each pipe do not summate these areas to get a cumulative area the program does this. Add these measurements to the list.
- 8) Take off the lengths of each pipe section and add these to the list

- 9) Number the manholes e.g. SW1, SW2 etc.
- 10) If you have cover levels and invert levels, add these also.
- 11) Now enter this data into the program, using (in this case) Direct Sizing.



12) The following screen is displayed

Masterdrain	$\times$
Do you want load a data file for editing? Click Yes to load file, No to open Load Config file.	
Yes No	

- 13) Click on No to load the configuration file for the location of the job. (You may have to make this if it is not already present see notes at the end of this document)
- 14) The Sizing constants screen is displayed
  - a. This shows the hydrology for the chosen location
  - b. Urban creep can be left at zero
  - c. Runoff defaults to Manual. The Wallingford method calculates this using both the impervious and pervious areas since runoff from pervious areas such as gardens cannot be put into a surface water sewer, it is better to use a manual figure of 95% for impervious areas.
  - d. Set the return period as required. A design is now expected to take a 30yr storm with surcharging, so use 30 year return period to make sure that this condition is accommodated. A climate change factor of 30% is also used (40% in Scotland).
  - e. Select the pipe material and the slope of the site.
  - f. If there are no invert levels available, select Recalculate
  - g. The Aerial Reduction Factor only applies to the bigger sites exceeding 1ha in area.
  - h. The question mark in the caption bar will provide context sensitive help click on the question mark and then on a box in this screen for further information.
  - i. Click on OK when you have finished with this screen and it is all set up for the next section.

MasterDrain - Sizing constants	? ×
Map data	
Location CROYDON	Nat Grid TQ3365
Area England and Wales	Soilindex 0.15 WBAP 1
r value	
м5.60 19.9	Load Config
M3-00	
FEH Map data	
c 0.000 d1 0.000 d2 0.000	d3 0.000 e 0.000 f 0.000
Urban creep	Rainfall calculations
Annual urban growth rate %	Use FSR constants
Growth period (yrs)	
- Runoff calcs	C Slope of site
O Use Wallingford	Select type of slope from the list below:
Use Manual	Mild <2% (1:50) C
	Medium 2% - 3.5% 🔎
	Steep >3.5% (1:28)
Return period and CCF	Prone to flooding (3min)
The current storm CCF %	Manual (from Constants) 🔿 🛛 0
	Gradients
5 yrs. 0 %	<ul> <li>Recalculate (autogradients)</li> </ul>
Pipe material	Keep existing
Concrete G	Areal reduction factor
Vitrified clay C	🔽 Use ARF
Plastic (uPVC)	
Spun Cast Iron O	OK Cancel

- 15) You are now asked for a file name for saving the data. This will default to the location name and the .SW extension.
- 16) The data input screen is displayed and we can input data.
  - a. Turn on Autogradients by clicking in the Use autogradients box
  - b. Enter the section number for the first section this is already in place at 1.01.
  - c. Enter the length in metres
  - d. Enter the impervious area
  - e. Enter the upstream manhole reference e.g. SW1 tip use Caps Lock for this
  - f. Enter the ground level if known (metres)
  - g. There are no invert levels, but if there were, they would be entered here.
  - h. Enter the downstream manhole reference e.g. SW2
  - i. Enter the ground level if known (metres)
  - j. There are no invert levels, but if there were, they would be entered here.
  - k. Click on Register data with program this puts the data in the main screen and sizes it.

Direct Sizing - usi	ng manual	runoff coefficient											?	×
No. Sect.No.	Length	Imp. area Gr	ad Up. ref	Up. GL. Up. IL	Dwn. ref	Dwn. GL Dwn. IL	Pref diam	±Flow	Restrictor	Diam.	Flow I/s	Vel I/s	Prop Vel	Prop A. %
- Data entry and Ec	litina								Controls and S	ettinas				
Section Ref	1.01	 Length (m)		Imp. area		Entry No.	1	F	Enable error	checking	🔽 Show e	rror messag	jes	
Grad 1:XX		Pref. diam		+/- Flow		Add row afte	r selected		Turn off erro	or checking	if editing file.	Re	eset	
Upstream Ref		 Upstream G	-	Upstream IL		Delete sele	cted row		Level inve	et e		) Level cri		
Upstream X ref		 Upstream Y	ref	_		Edit select	ted row		Lovonino			Lovoron	01110	
Dwnstream Ref		 Dwnstream	GL	Dwnstream IL		Register data v	with program		Use autog	radients				
Downstr. X ref		Downstr. Y	ref			Move	line							
Flow re	strictor at he	ead of this section 1/	3						Finish	Quit	Save	s	ize	
- Hudrologu														
Location C	ROYDON		M	5-60 19.9	'r' value	0.40	SAAR 70	00	WRAP	1				

## 17) First set of data entered (Liverpool used for this job)

Data entry and E	diting						Controls and Settings
Section Ref	1.01	Length (m)	27.79	Imp. area	240.00	Entry No. 1	Enable error checking 🔽 Show error messages
Grad 1:XX		Pref. diam		+/- Flow		Add row after selected	Turn off error checking if editing file.
Upstream Ref	SW1	Upstream GL	18.650	Upstream IL	17.450	Delete selected row	Level inverts     C Level crowns
Upstream X ref		Upstream Y ref				Edit selected row	To the entropy fronts
Dwnstream Ref	SW2	Dwnstream GL	18.500	Dwnstream IL		Register data with program	V Use autogradients ∞uradient jou
Downstr. X ref		Downstr. Y ref				Move line	
Flow r	estrictor at head o	f this section 1/s	0				Finish Quit Save Size

18) Click on Register data button Direct Sizing - using manual runoff coefficients

No. Sect.No. Length Imp.area Grad Up.ref Up.GL Up.IL Dwn.ref Dwn.GL Dwn.IL Pref diam ±Flow Restrictor Diam. Flow Vs Vel Vs Prop Vel Prop A %

- 19) Calculated data is displayed
- 20) Data entry errors can be corrected by highlighting the entry number (first column) and then clicking on Edit selected row. Make the correction and then click on the register button again check that the data is in the correct position.
- 21) Continue entering the data as above. Finally, make sure that the system ends on the index run.
- 22) If you have already entered a manhole and its data, the program will fill in the missing bits if you subsequently just put in the manhole reference (case sensitive see note about Caps Lock).
- 23) The Save button will save the data to the file and can be used throughout the data entry process (just in case!).

The final file will contain all the data entered plus the calculated data. Use the Edit file function for adding data that is not catered for in the Direct sizing function. Use the main Sizing/Size system function for final sizing and obtaining the printout.

## <u>Notes</u>

Config files

The program database contains over 6000 UK/Eire locations. To search for a location click on the Search icon (the N with the binoculars)



The following screen is displayed – enter the place name or the first few letters, then click on OK

Place Name Sea	rch	
Enter the place few letters to fir letters. A general searc performed if the asterisk e.g. *le 'ley', such as Ci	e name in full if known, nd all places beginning ch for a part name will t e part name is preceder y will find all places co rawley etc.	or the first with these d by an ntaining
Sea	-	
● GB	C N.Ireland	⊂ Eire
	OK Cancel	

Place Name Search results	
The following towns were found that match description:	i the
SEAFIELD	-
SEAFIELD	
SEAFORD	
SEAHAM	
SEAHOUSES	
SEALE	
SEARBY	
SEASIDE	<b>v</b>
Quit Save Print Back	



Select the required location by clicking on it and the data is displayed. Check the National Grid reference (NJ9104 in this case) to make sure it is the correct location.

Click on Save to write the config file for that location.

Problems with data entry etc can be resolved by emailing the .SW file to <u>support@mstdrain.co.uk</u>. This allows us to run it and reproduce the error. Corrected files will be sent back with a change to the file name to prevent the modified one over-writing the original. This is the full data file printout for the previous drawn schematic.

	3 Å	npany R mon s tr	ation V	ersion									Project					
		ta file p	rintout	of NBV-⊅	WS.EB.								Job Ref			Sheet no. 1		
MasterDrai Stor 16 04	<u>ē</u> .= -	o. by	0		Date 16/11,	17		Che	ked by		Dete		Approved	à		0ate Date		
	] 🧕											23 22			0	3		
Entry Sec No.	stion Le No.	ength B	Fall 6	radient 1 in	Twp.	Perv.	up GI	Up Inv	Up Ref. m	X ref	Y ref	Dun GL	Dum Inv	Dun Ref.	Sump	Pref	+/-	Restrict 1/8
н ц	1.01 2	27.8	496	56	240	0	18.65	17.45	RUICBI	335213.242	387932.859	18.50	16.95	I AHA I	0	225	0.0	0.0
2 B	2.01 1	10.2	352	29	700	0	18.50	17.30	ACO	335196.105	387911.000	18.50	16.95	MHA.I	0	300	0.0	0.0
3 B 3 B	3, 01 1	13.7	507	27	125	0	18.65	17.45	RUI CAL	335183.788	387906.140	18.50	16.95	<b>MHAI</b>	0	150	0.0	0.0
4 B 4	1.01 1	12.0	501	24	125	0	18.65	17.45	RUI CA2	335181.807	387909.284	18.50	16.95	<b>MHAI</b>	0	150	0.0	0.0
5 I I	l. 02	9.1	78	116	150	0	18.50	16.95	MHAI	335189.344	387918.666	18.50	16.87	MHA2	0	300	0.0	0.0
6 8 5	2, 01 1	11.0	580	19	240	0	18.65	17.45	RUT CA3	335175.180	387920.751	18.50	16.87	MHA2	0	150	0.0	0.0
7 I 1	1.03	5.3	211	25	150	0	18.50	16.87	MHAZ	335184.603	387926.465	18.50	16.66	MHA3	0	300	0.0	0.0
8 B 6	2' 0T 1	12.2	812	15	125	0	18.65	17.45	RUI CAS	335170.154	387927.576	18.50	16.66	MHA3	0	150	0.0	0.0
с 11 12	1.01	14.2	167	18	125	0	18.65	17.45	RUI CA6	335167.763	387932.994	18.50	16.66	MHA3	0	150	0.0	0.0
TO I OT	1.04 3	34.9	179	194	0	•	18.50	16.66	MHAG	335181.861	387930.995	18.50	16.48	TABIK	•	300	0.0	0.0
11 B 8	3.01 2	25.7	989	26	125	0	18.65	17.45	RUPL	335189.825	387935.683	18.50	16.48	TADIK	0	150	0.0	0.0
12 B 9	10 'é	7.9	989	00	125	0	18.65	17.45	RUPZ	335206.154	387945.382	18.50	16.48	TAMK	0	150	0.0	0.0
13 B 10	J. 01 J	19.0	L902	10	0	0	19.50	18.30	AC05	335228.125	387952.182	18.50	16.48	TANK	0	150	5.8	0.0
14 B 11	1. 99	6.7	1681	ా	200	0	19.50	18.30	AC06	335184.513	387946.124	18.50	16.48	TANK	0	150	0.0	0.0
I5 I I	L. 05 C	34.9	19	436	0	0	18.50	15.70	TANK	335209.111	387952.724	18.50	15.62	OUTFALL	-	150	0.0	0.0
I6 I I	1.06 1	18.7	165	113	0	0	18.50	15.62	OUTFALL	335177.180	387938.705	18.50	15.45	SUL	0	150	0.0	16.0
17 I 1	1.07 1	14.7	124	118	0	0	18.50	15.45	INS	335159.970	387946.123	18.50	15.32	SU2	0	150	0.0	0.0
I8 B I2	3, 99	54.1	2575	21	0	0	20.00	I7.85	NBVE	335147.278	387992.797	18.50	15.32	SU2	0	150	2.0	0.0
19 I I	1.08	50.8	523	97	0	0	18.50	15.32	SNZ	335147.239	387938.714	18.50	14.80	COMI	0	150	0.0	0.0