21 Roundhill Road, Torquay, TQ2 6TQ Tel: 01803 524347 draincure@mac.com

DRAINCURE
Devons Local Drainage Services

Drainage Report

Site: St Catherines
New North Road
Exeter
EX4 4AG

Date: Friday, December 6, 2019

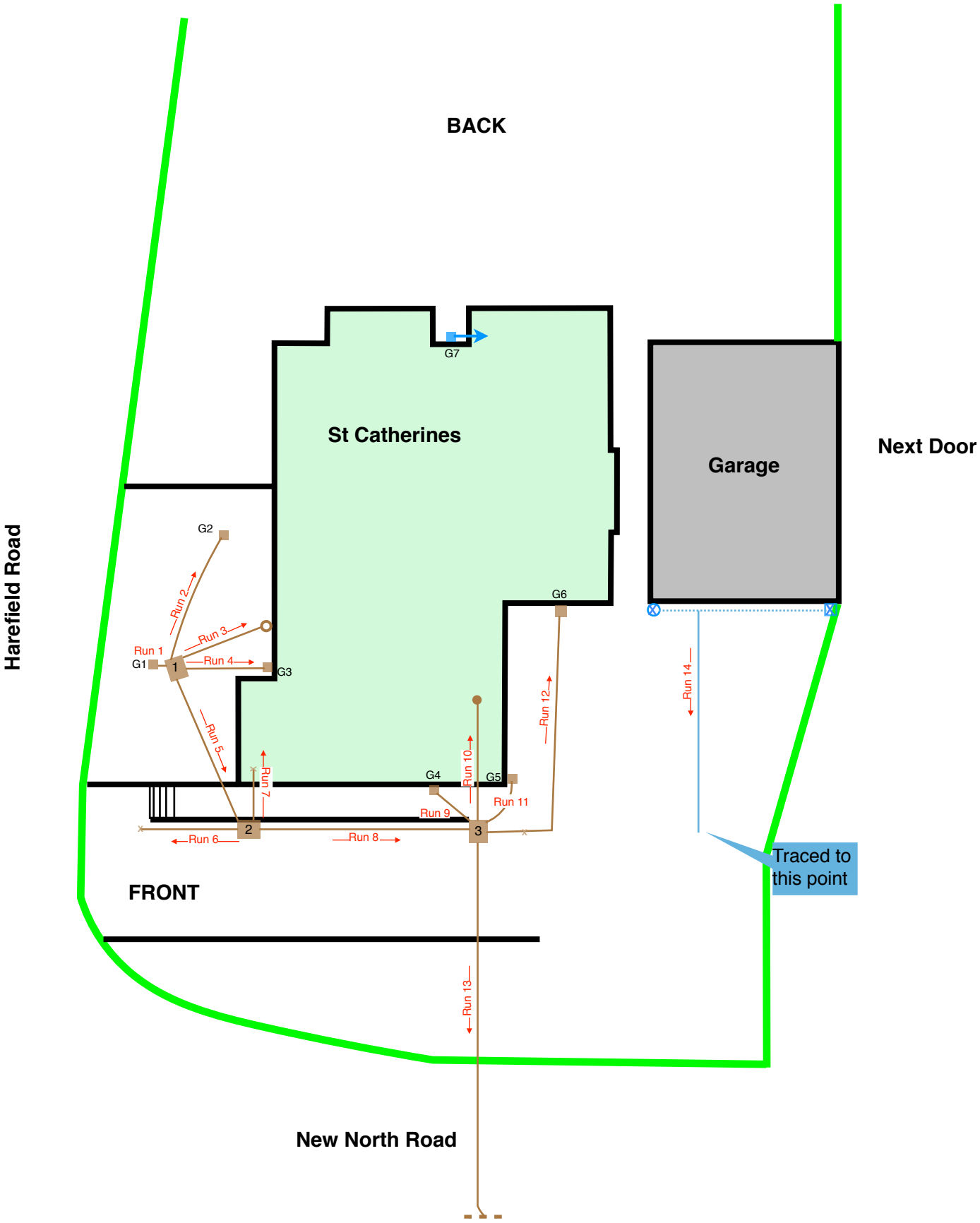
We have carried out an inspection of some of the drains at the above property.

The results and my conclusions are listed on the following sheets. I have attached an appendix that explains some of the procedures and terms used.

Only the drain runs logged on the following pages have been surveyed

Yours Faithfully,

K.J. Twydell



	Storm Drain	3 or 1 or 1	Manhole		Gully to unknown	or	Gully
	Foul Drain		Boundary		Direction of survey		Soil-vent-pipe
	Not surveyed		Pipe discharges over ground		pipe direct to ground		Unvented WC

General Observations:

a) Manholes

Manhole 1	Depth	360mm	Channel cracked, Benching defective. Photos 1&2
Manhole 2	Depth	900mm	Ok.
Manhole 3	Depth	730mm	Root ingress, Manhole cover warped. Photos 3&4

b) Gullies

Gully 1	Surface water, Clay, Ok.
Gully 2	Surface water, Clay, Surround defective. Photo 5
Gully 3	Rainwater & Sink waste, Clay, Surround defective. Photo 6
Gully 4	Sink waste & Surface water, Clay, Ok. Clay broken to allow for surface water. Photo 7
Gully 5	Rainwater, Clay, Ok.
Gully 6	Rainwater & Sink waste, Clay, Surround defective, Photo 8
Gully 7	Rainwater, Clay, Surround defective. Photo 9

c) Other Observations

There is a rainwater downpipe that discharges over the ground

There is a rainwater downpipe that goes direct to ground

There is an open vent at ground level. Photo 10

Photos

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8

Photo 9

Photo 10

Run 1 From Manhole 1 Upstream To Gully 1

Site:	St Catherines New North Road Exeter EX4 4AG	Depth:	260mm	Assumed Status:	Private
		Material:	Clay		
Date:	Friday, December 6, 2019	Diameter:	4”	Duty:	Surface water

Metres	Observations	Rating	Photo
1 0.00	Start at manhole		
0.19	Finish at the back of the gully		

Direction of survey

Direction of flow

Recommendations: No further action.

Run 2 From Manhole 1 Upstream To Gully 2

Site:	St Catherines New North Road Exeter EX4 4AG	Depth:	250mm	Assumed Status:	Private
		Material:	Clay		
Date:	Friday, December 6, 2019	Diameter:	4”	Duty:	Surface water

Direction of survey

Direction of flow

	Metres	Observations	Rating	Photo
1	0.00	Start at manhole		
	0.08	Crack	3	11
	0.17	Slight displacement. Holding water.	2	12
	0.75	Damaged and cracked joint	3	13
	2.57	Root ingress	4	14
	3.05	Finish at the back of the gully. Crack & Root ingress	4	15

Recommendations: Remedy defects.


Photo 11

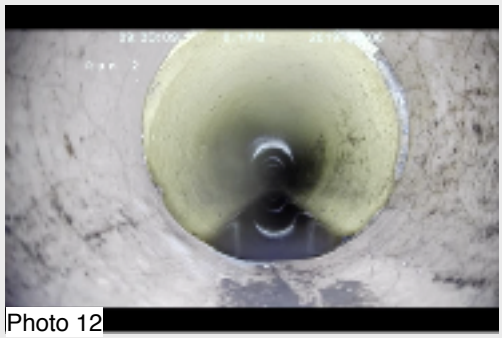


Photo 12

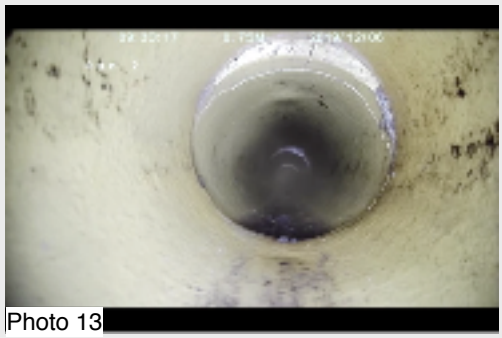


Photo 13


Photo 14


Photo 15

Run 3 From Manhole 1 Upstream To Soil-Vent-Pipe

Site:	St Catherines New North Road Exeter EX4 4AG	Depth:	360mm	Assumed Status:	Private
		Material:	Clay		
Date:	Friday, December 6, 2019	Diameter:	4”	Duty:	Foul & Vent

Direction of survey

Direction of flow

Metres		Observations	Ratin	Photo
1	0.00	Start at manhole		
	0.37	Displaced joint	3	16
	2.29	Circumferential crack	3	17
	2.38	Open joint	2	18
	3.34	End of run at bend to vertical		

Photo 16

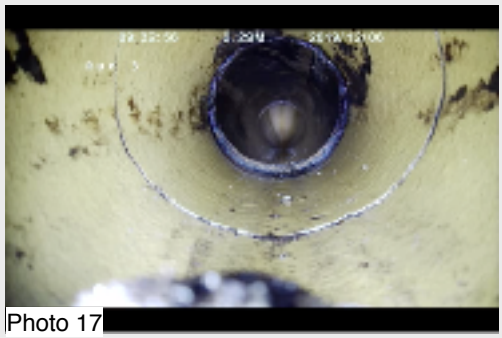


Photo 17

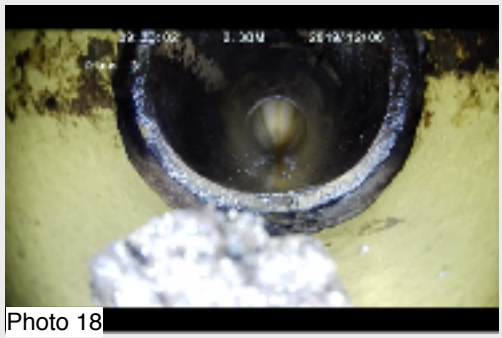


Photo 18

Recommendations: Remedy defects.

Run 4 From Manhole 1 Upstream To Gully 3

Site:	St Catherines New North Road Exeter EX4 4AG	Depth:	300mm	Assumed Status:	Private
		Material:	Clay		
Date:	Friday, December 6, 2019	Diameter:	4”	Duty:	Rainwater & Sink waste

Direction of survey

Direction of flow

	Metres	Observations	Rating	Photo
1	0.00	Start at manhole		
	0.28	Circumferential crack	2	19
	2.40	Finish at the back of the gully		

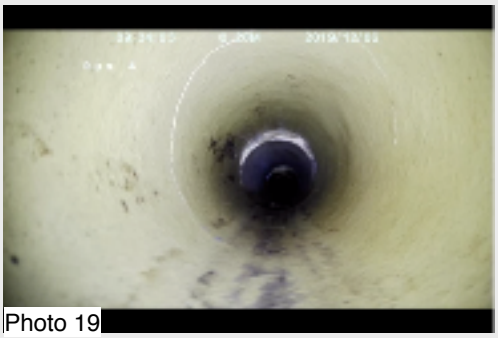


Photo 19

Recommendations: Remedy defect.

Run 5 From Manhole 1 Downstream To Manhole 2

Site:	St Catherines New North Road Exeter EX4 4AG	Depth:	360mm	Assumed Status:	Private
		Material:	Clay		
Date:	Friday, December 6, 2019	Diameter:	4”	Duty:	Combined

Direction of survey

Direction of flow

	Metres	Observations	Rating	Photo
1	0.00	Start at manhole		
	1.92	Circumferential crack	2	20
	3.26	Circumferential crack & Root ingress	3	21
	3.93	Crack	3	22
2	4.51	Manhole 2		

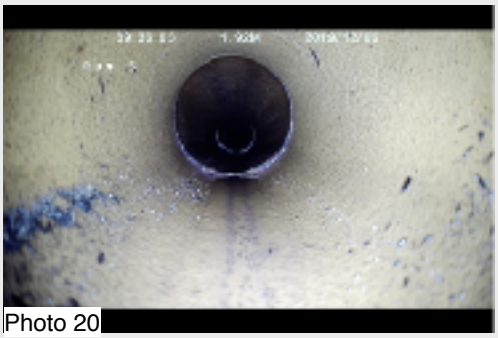


Photo 20

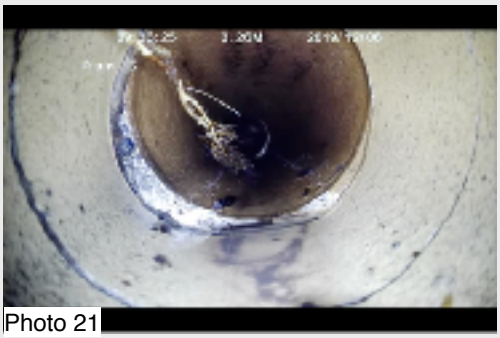


Photo 21

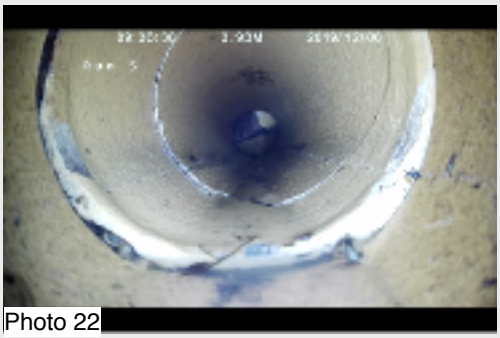


Photo 22

Recommendations: Remedy defects.

Run 6 From Manhole 2 Upstream

Site: St Catherines New North Road Exeter EX4 4AG	Depth: 850mm Material: Clay	Assumed Status: Private
Date: Friday, December 6, 2019	Diameter: 4”	Duty: -

Direction of survey

Direction of flow

Metres		Observations	Ratin	Photo
2	0.00	Start at manhole		
	0.96	Circumferential crack & Root ingress	3	23
	2.20	Circumferential crack & Root ingress	3	24
	2.78	Circumferential crack	3	25
	3.07	Drain filled with concrete. End of run	-	26

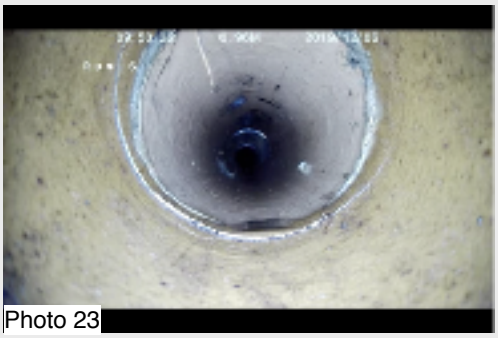


Photo 23

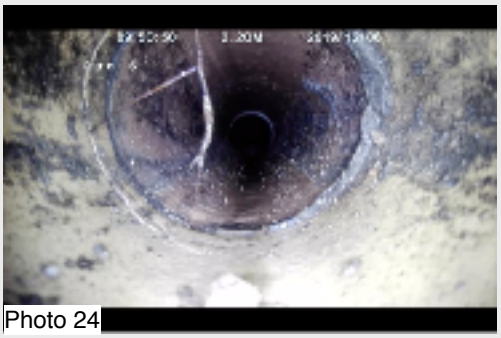


Photo 24


Photo 25


Photo 26

Recommendations: Drain presumed disused. Seal off drain at manhole.

Run 7 From Manhole 2 Upstream

Site:	St Catherines New North Road Exeter EX4 4AG	Depth:	850mm	Assumed Status:	Private
		Material:	Clay		
Date:	Friday, December 6, 2019	Diameter:	4”	Duty:	-

Direction of survey

Direction of flow

Metres		Observations	Rating	Photo
2	0.00	Start at manhole		
	0.09	Circumferential crack	2	27
	0.38	Longitudinal cracks at 3&6 o'clock	1	28
	1.34	Debris in pipe. End of run	-	29

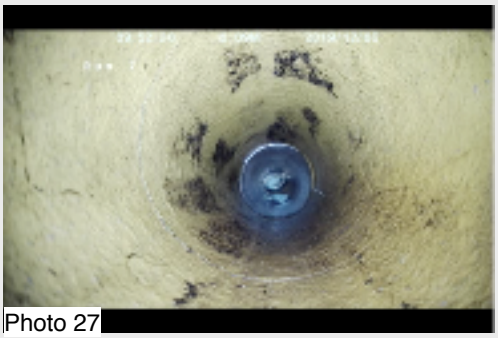


Photo 27

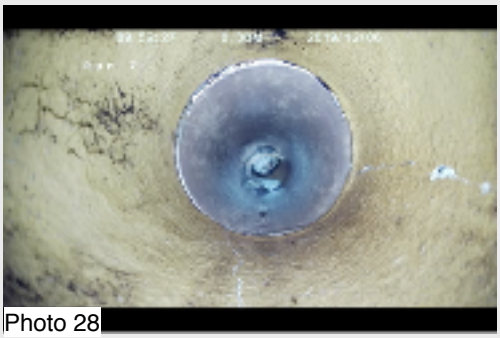


Photo 28

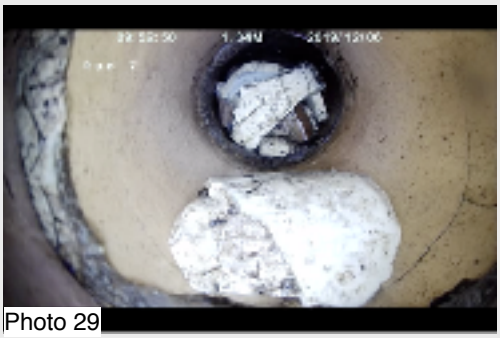


Photo 29

Recommendations: Drain presumed disused. Seal off drain at manhole.

Run 8 From Manhole 2 Downstream To Manhole 3

Site:	St Catherines New North Road Exeter EX4 4AG	Depth:	900mm	Assumed Status:	Private drain
		Material:	Lined clay		
Date:	Friday, December 6, 2019	Diameter:	4”	Duty:	Combined

Direction of survey

Direction of flow

	Metres	Observations	Rating	Photo
2	0.0	Start at manhole		
	4.8	Holding water	1	30
	5.9	End of liner. Crack	2	31
3	6.3	Manhole 3		

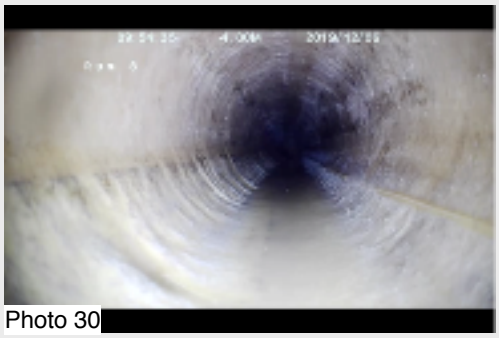


Photo 30

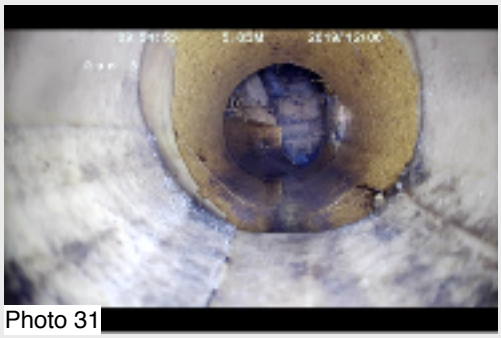


Photo 31

Recommendations: Remedy defects.

Run 9 From Manhole 3 Upstream To Gully 4

Site:	St Catherines New North Road Exeter EX4 4AG	Depth:	680mm	Assumed Status:	Private
		Material:	Clay		
Date:	Friday, December 6, 2019	Diameter:	4”	Duty:	Surface water & Sink waste

Direction of survey

Direction of flow

Metres		Observations	Rating	Photo
3	0.00	Start at manhole		
	0.19	Cracks	3	32
	1.24	Root ingress	2	33
	1.34	Root ingress & finish at the back of the	3	34
		Roots removed - damaged and cracked joint	3	34a

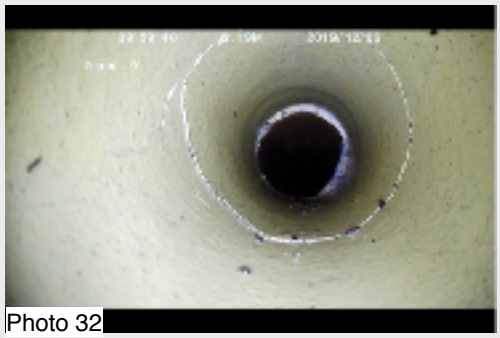


Photo 32

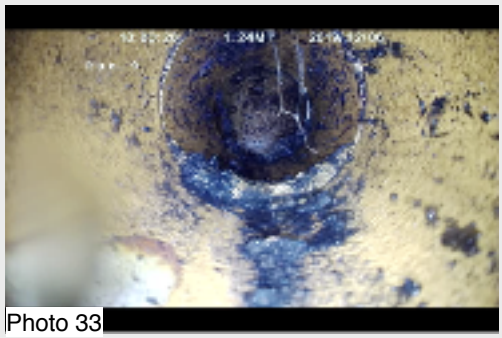


Photo 33


Photo 34

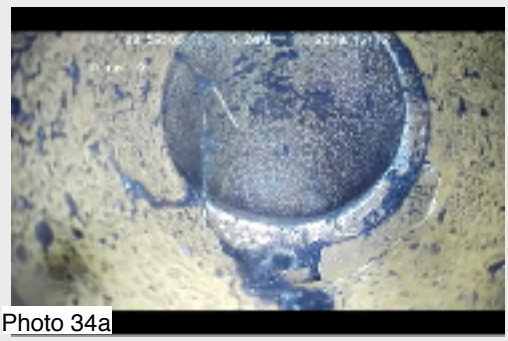


Photo 34a

Recommendations: Remedy defects.

Run 10 From Manhole 3 Upstream To Soil Pipe

Site: St Catherines New North Road Exeter EX4 4AG	Depth: 730mm Material: Lined clay	Assumed Status: Private
Date: Friday, December 6, 2019	Diameter: 4”	Duty: Foul

Direction of survey

Direction of flow

Metres	Observations	Rating	Photo
3 0.0	Start at manhole		
3.6	Unable to go past bend due to liner. End	-	35

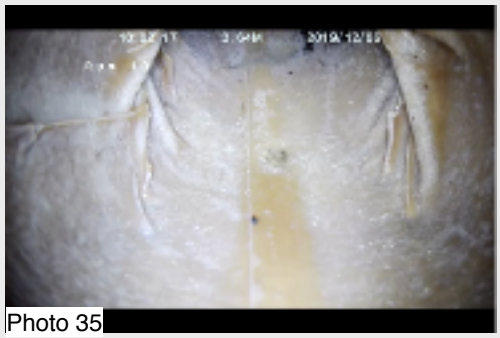


Photo 35

Recommendations: Note wrinkled liner.

Run 11 From Manhole 3 Upstream To Gully 11

Site: St Catherines New North Road Exeter EX4 4AG	Depth: 680mm Material: Clay	Assumed Status: Private
Date: Friday, December 6, 2019	Diameter: 4”	Duty: Rainwater

Direction of survey

Direction of flow

Metres		Observations	Rating	Photo
3	0.00	Start at manhole		
	0.28	Circumferential crack	2	36
	0.57	Hard deposit & crack	2	37
	1.15	Displaced. End of run at back of gully	2	38

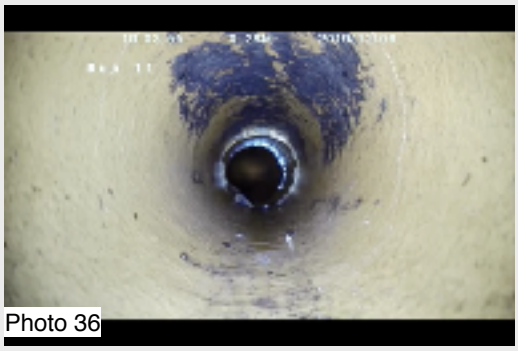


Photo 36

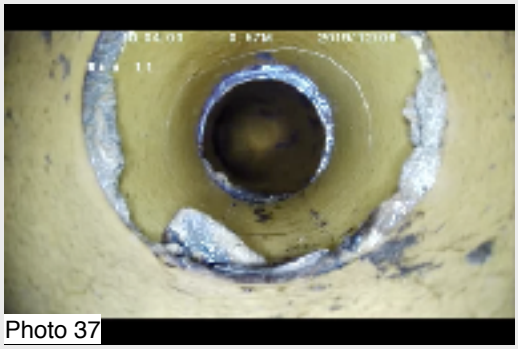


Photo 37

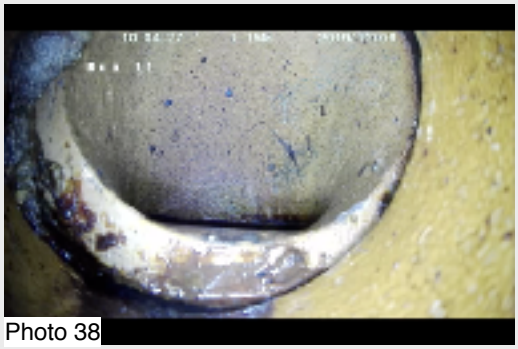


Photo 38

Recommendations: Remedy defects.

Run 12 From Manhole 3 Upstream To Gully 6 Before & After Root Cut

Site: St Catherines New North Road Exeter EX4 4AG	Depth: 680mm Material: Clay	Assumed Status: Private drain
Date: Friday, December 6, 2019	Diameter: 4”	Duty: -

Direction of survey

Direction of flow

Metres	Observations	Rating	Photo
3 0.00	Start at manhole		
0.09	Circumferential crack	2	39
0.76	Circumferential crack	3	40
1.05	Root ingress. As far as we could go	5	41
1.63	Roots removed- damaged pipe	5	41a
2.59	Circumferential crack just before joint	3	41b
5.95	Circumferential crack just before joint	3	41c
7.68	Finish at the back of the gully		

Recommendations: Line or renew


Photo 39

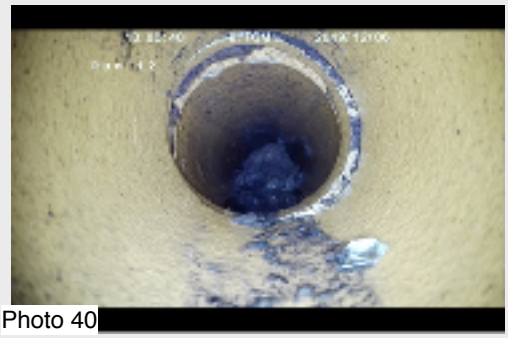


Photo 40


Photo 41


Photo 41a

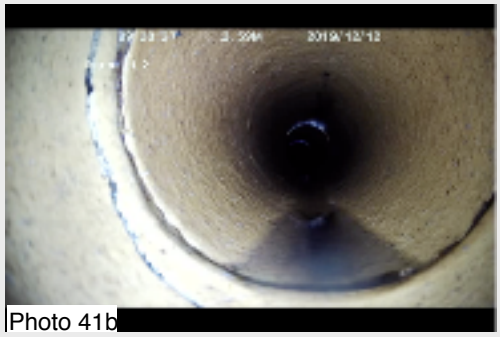


Photo 41b

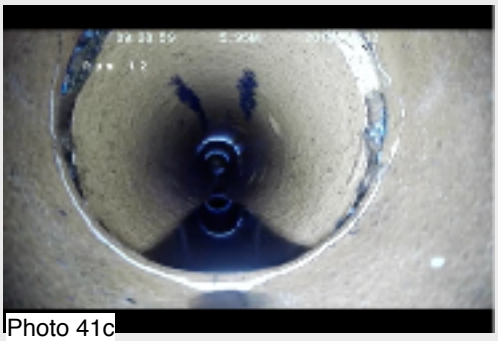


Photo 41c

Run 13 From Manhole 3 Downstream To Sewer

Site:	St Catherines New North Road Exeter EX4 4AG	Depth:	730mm	Assumed Status:	Private up to property boundary. Adopted beyond property boundary.
		Material:	Clay		
Date:	Friday, December 6, 2019	Diameter:	4”	Duty:	Combined

Direction of survey

Direction of flow

Metres	Observations	Rating	Photo
3 0.00	Start at manhole. Cracks & Root ingress	3	42 & 42a
0.57	Start of liner		
	Holding water & debris throughout	2	43
6.62	End of liner		
11.30	Joins sewer in road		

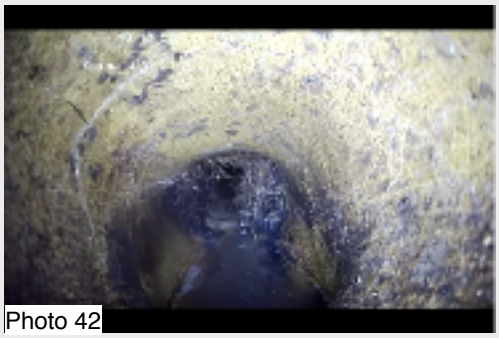


Photo 42

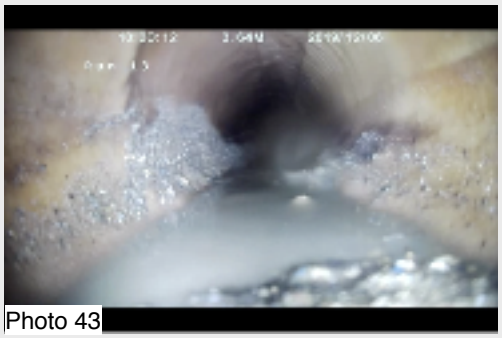


Photo 43

Photo 42a

Recommendations: Note defects.

Run 14 From Surface water drain Downstream

Site: St Catherines New North Road Exeter EX4 4AG	Depth: N/a Material: -	Assumed Status: Private
Date: Friday, December 6, 2019	Diameter: 110mm	Duty: Rainwater

Metres	Observations	Rating	Photo
0.00	Start at Surface water drain		
	In debris and water throughout.	3	44
8.45	As far as we could go		

Direction of survey

Direction of flow

Photo 44

Recommendations: Further jetting and investigation.

Conclusions & Recommendations

1. I recommend that the following works are carried out:

1.1	General	Remedy the defects noted in the General Observations on page 3
1.2	Run 2	Renew or line
1.3	Run 3	Renew
1.4	Run 4	Patch line the circumferential crack at .28m or renew
1.5	Run 5	Renew or line
1.6	Run 6	Confirm disused & if so seal off at the manhole
1.7	Run 7	Confirm disused & if so seal off at the manhole
1.8	Run 8	Patch line the crack & end of the liner
1.9	Run 9	Renew
1.10	Run 11	Renew
1.11	Run 12	Renew
1.12	Run 13	Knock out the interceptor fitting and replace with a straight through piece of pipe

2. Please note that the following drains have not been surveyed:

2.1 The drain downstream from gully 7

Appendix

1. Severity of defects

I have attempted to quantify the severity of defects using a scale of 1 to 5 as follows:

1 - A very mild defect or an observation that I want to report.

2 - A significant defect - However you may decide that to remedy this would not be cost effective, for the time being. Obviously, I cannot be held responsible for the consequences of any inaction

3 - A defect to which I recommend a remedy, but not so severe as to prevent the drains functioning in the short term.

4 - A severe defect that warrants urgent attention.

5 - A very severe defect, such as a major collapse that renders the drain unusable.

2. Sewers, Drains and Responsibility

Since October 2011 the laws regarding drains and sewers that eventually discharge to a Public Sewer or Public sewage treatment plant have changed, *as I understand it*, to the following:

2.1 Drains serving more than one property (sewers) have become the responsibility of the Water Authority from the point at which they join together - even though they may be situated under private land.

2.2 Drains serving just a single property are still the responsibility of the property owner whilst within the boundary of the property. Once they pass beyond the boundary of that property or join with the drains from another property (as in 2.1 above) they become the responsibility of the Water Authority.

2.3 Drains and sewers connected to private sewage treatment plants/septic tanks are not necessarily included in this for the time being.

2.4 Where I have indicated the status of a drain, please note that this is just my opinion and it is only the water authority who can decide on the status.

2.5 Where I have indicated the duty of a drain, please note that this is just my observation as to what goes into it. It does not infer correct usage or permission as in Foul/Storm/Combined

3. Notes:

3.1 The above is a true record of the tests and observations that I have carried out However, due to the essentially hidden nature of drains, no guarantee of the drains future condition or performance is implied or given, and no responsibility can be accepted for any omissions.

3.2 I have tested only the underground drainage system. I have not tested any above ground soil, waste or rainwater pipes, the water supply system or the condition or fixing of any W.C's , Baths , Sinks etc

Appendix Continued……

4. Types of lining methods and materials:

4.1 Polyester resin with felt liner -

This is the most common form of lining. It can be installed with simple equipment and can cure at ambient temperatures. Although some grades can be inverted into the drain, the majority is either dragged or pushed in and inflated by an inverted PVC hose which is removed after curing. The cured resin shrinks slightly, so the liner is only an interference fit. Therefore it will not seal against groundwater ingress and it is possible for roots to grow in the small gap between the existing pipe and the liner. **The WRC recommend that, if the liner does not go manhole to manhole, the 'blind' end is sealed by a patch liner or other suitable means. However, I have yet to see an example where this has been carried out**.

The simplicity of the system lends itself to firms trying to instal far too many liners in one day - 4 is not an uncommon target. To manage this, installers cut corners by such means as inaccurate measuring of the liner, not cleaning the drain first, accelerating the resin far too much, not using a vacuum pump during impregnation, not rolling out the liner to a set thickness, using insufficient pressure etc. This results in a weak and wrinkled liner - I have seen examples that could be deformed by hand.

The resin contains styrene which has an unpleasant smell and has an environmental impact. It is not suitable for interior installations in sensitive situations such as schools.

We no longer offer a polyester resin based lining system

4.2 Epoxy Resin -

The resin contains **no styrene** and has **no smell**. The liner is inverted into the drain so the resin is in contact with the drain and, as there is **no shrinkage,** the liner **bonds** strongly to the pipe. We use this with a seamless synthetic woven material called **Brawoliner,** although it can be used with other lining materials. **Brawoliner can line multiple bends with no wrinkles and changes in the pipe diameters can be accommodated.** Material costs are up to 3 times those of Polyester resin based liners and the installation equipment is costly. We usually hot cure the resin at 60ºC and aim to only install one length in a day. However the results are excellent

Draincure is a Brawoliner approved Installer

4.3 Silicate Resin -

This has no volatile solvents and no shrinkage. Sometimes used with Brawoliner.

4.4 'Patch lining' -

A glass fibre mat is impregnated with silicate resin and wrapped around an expandable packer which is then pushed into the drain to a predetermined point and inflated. The resin cures rapidly (hard in 2hrs) and forms a very strong repair with naturally chamfered ends. It can be used in 'live' sewers and where there is ground water infiltrating into the pipe. This method is particularly useful where there is localised damage to a pipe. Each patch can be 600mm to 1200mm long. If the damage is widespread it is usually more economical to line the entire section. It requires a fair degree of skill on the part of the installer but results can be excellent.

4.5 Junctions -

If there is a junction along a length of drain we line the length as normal and mill out the junction using a robotic cutter. This takes time and skill and requires very expensive equipment. As a short cut, some firms just line up to the junction or pre-cut slots in the liner before dragging it in. Neither of of these are satisfactory as the resulting job is weak and not properly sealed. Sometimes the slots do not line up with the junction....