

# Drainage Asset Inventory & Condition Report Survey

*Ingenuity in Minimising  
Highways Disruption*



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<b>1</b>	<b>26 August 2008</b>	<b>Danny Pitcher</b>	<b>Mike Rollason</b>	<b>Issue 1</b>
<b>Issue</b>	<b>Date</b>	<b>Prepared by</b>	<b>Authorised by</b>	<b>Issue/amendment details</b>

## 1 Summary

Lime Lane between Lime Lane canal bridge and the junction with the B4145 were commissioned to be surveyed by Carnell Contractors Ltd. (CCL) on behalf of Staffordshire Highways. The survey and drainage investigation were required to locate the source of oil contamination in the canal water.

The specification of the survey was a full Asset and Condition Survey on the specified location. The survey area is shown in Fig1.

The survey identified that the general condition of the network was in a poor state, consisting of gullies running to ditches on both sides of the carriageway which eventually outfall out into the canal via 'wetlands' on both sides of the carriageway. A full CCTV report and footage is included in this report. Particular areas of concern are prioritised in this report and a full list of 'Survey Abandoned' sections is also included.

A total of 80 point items and 32 linear items were captured under the GIS specification. Many more linear items were captured under the CCTV survey but due to the condition of the pipe work we are unable to map these as we cannot apply any grading of confidence.

Traffic Management was carried out by Staffordshire Highways.

We consider the survey to be complete against the tendered scope of work and the conclusions are in section 7.

## **2 Introduction**

In July 2008 Carnell Contractors Ltd (CCL) was commissioned to undertake a highway surface water drainage infrastructure asset inventory and CCTV condition survey on behalf of Staffordshire Highways on Lime Lane between Lime Lane Canal Bridge and the junction with the B4115.

The requirements were for internal inspections and full GIS asset mapping. The survey was undertaken as night works.

The scope of the survey was to identify and survey all drainage assets that were applicable to highway drainage on both sides of the carriageway.

All data has been recorded in accordance with HD43/04 and all data has been delivered to Staffordshire Highways in both electronic and hard copy. This report is inclusive of AutoCAD drawings of the survey area.

### **3 Methodology**

The following methodology was employed:

#### **3.1 Internal Point Item Inspection Surveys**

Chamber assessment and condition surveys in accordance with HD43/04 survey requirements.

Confined space entry required, using a full safe system of work (SSW) for underground surveys.

Measurements taken for manhole cover information, chamber size, construction and pipe information

#### **3.2 Point Item Global Positioning System Levelling Surveys**

Carnell Contractors Ltd field survey team completed the survey using the Trimble Rover R8 RTK GPS survey equipment using the bespoke data capture software exclusively developed for Carnell Contractors Limited. This equipment will give 1cm accuracy on x, y and z coordinates where adequate satellite coverage is available as was the case with this survey.

The GPS survey was undertaken using the OSTN02 and OSGM02 transformation And all coordinate positions refer to the OSGB National Grid.

#### **3.3 Asset Inventory and CCTV Condition Survey**

Both surveys were carried out in full accordance with the latest specifications, namely the Design Manual for Roads & Bridges; Vol 4; Section 2; Part 4 (HD43/04) and the 'Manual of Contract Documents for Highways Works; Vol 5; Section 9; Parts 1-5 (SD15/03).

## **4 Results**

### **4.1 Point And Linear Assets**

The following sheets represent a true HD43/04 breakdown of the point and continuous items surveyed under this commission.

## Point and Continuous Items Key

<b>Code</b>	<b>Description</b>
SW	Surface Water
PC	Pre Formed Concrete
IC	In-Situ Concrete
L	Light Duty
M	Medium Duty
H	Heavy Duty

# Linear Items

Item Type	Pipe Reference	Item Type Code	Upstream Reference	Downstream Reference	System Type	Height	Width	Material	Shape	length
PIPE	SK0206_0115d.1	PW	SK0206_0115d	SK0206_0015a	SW	225	225	CO	CI	7.94
PIPE	SK0206_0115a.1	PW	SK0206_0115a	SK0206_0115b	SW	225	225	PV	CI	3.39
PIPE	SK0206_0116a.1	PW	SK0206_0116a	SK0206_0115a	SW	225	225	PV	CI	12.19
PIPE	SK0206_0116b.1	PW	SK0206_0116b	SK0206_0115a	SW	225	225	PV	CI	12.33
PIPE	SK0206_0415a.1	PW	SK0206_0415a	SK0206_0115c	SW	225	225	PV	CI	31.31
PIPE	SK0206_0003b.1	PW	SK0206_0003b	SK0206_0003a	SW	225	225	CO	CI	2.52
PIPE	SK0206_0404a.1	PW	SK0206_0404a	SK0206_0403c	SW	100	100	PV	CI	5.65
PIPE	SK0206_0403a.1	PW	SK0206_0403a	SK0206_0403b	SW	100	100	PV	CI	5
PIPE	SK0206_0403a.2	PW	SK0206_0403a	SK0206_0403b	SW	100	100	PV	CI	5
PIPE	SK0206_0504d.1	PW	SK0206_0504d	SK0206_0504b	SW	150	150	VC	CI	2.84
PIPE	SK0206_0504c.1	PW	SK0206_0504c	SK0206_0504e	SW	150	150	CO	CI	2.75
PIPE	SK0206_0402a.1	PW	SK0206_0402a	SK0206_0003b	SW	225	225	CO	CI	47
PIPE	SK0206_0602a.1	PW	SK0206_0602a	SK0206_0602b	SW	225	225	PV	CI	6.27
PIPE	SK0206_0602b.1	PW	SK0206_0602b	SK0206_0402a	SW	225	225	CO	CI	17.65
PIPE	SK0206_0600a.1	PW	SK0206_0600a	SK0206_0500a	SW	150	150	PV	CI	3.83
PIPE	SK0205_1373b.1	PW	SK0205_1373b	SK0205_1273a	SW	150	150	VC	CI	8.62
PIPE	SK0205_1468c.1	PW	SK0205_1468c	SK0205_1468a	SW	150	150	VC	CI	7.68
PIPE	SK0205_2042a.1	PW	SK0205_2042a	SK0205_1941a	SW	150	150	CO	CI	0
PIPE	SK0205_1945a.1	PW	SK0205_1945a	SK0205_1845a	SW	150	150	CO	CI	0
PIPE	SK0205_2046a.1	PW	SK0205_2046a	SK0205_1846a	SW	150	150	CO	CI	0
PIPE	SK0205_1946b.1	PW	SK0205_1946b	SK0205_2046a	SW	150	150	CO	CI	0
PIPE	SK0205_1951a.1	PW	SK0205_1951a	SK0205_1851b	SW	150	150	CO	CI	0
PIPE	SK0205_1855a.1	PW	SK0205_1855a	SK0205_1755b	SW	150	150	CO	CI	0
PIPE	SK0205_1760a.1	PW	SK0205_1760a	SK0205_1659b	SW	150	150	CO	CI	0
PIPE	SK0205_1664a.1	PW	SK0205_1664a	SK0205_1564b	SW	150	150	CO	CI	0
PIPE	SK0205_1664b.1	PW	SK0205_1664b	SK0205_1564a	SW	150	150	CO	CI	0
PIPE	SK0205_1565a.1	PW	SK0205_1565a	SK0205_1465a	SW	150	150	CO	CI	0
PIPE	SK0205_0991a.1	PW	SK0205_0991a	SK0205_0990c	SW	150	150	CO	CI	0
PIPE	SK0205_0990b.1	PW	SK0205_0990b	SK0205_0990d	SW	150	150	CO	CI	0
PIPE	SK0205_0990a.1	PW	SK0205_0990a	SK0205_0990e	SW	150	150	CO	CI	0
PIPE	SK0206_0600b.1	PW	SK0206_0600b	SK0206_0500a	SW	150	150	CO	CI	0
PIPE	SK0206_0214a.1	PW	SK0206_0214a	SK0206_0115a	SW	150	150	CO	CI	0



## Point Items

Item Type	Asset Reference	Item Type Code	Eastings	Northings	Manhole Construction	Cover Shape	Cover Duty	Cover Width	Cover Length	Manufacturer	Grating
GULLY	SK0206_0214a	GU	402024.62	306145.171	PC	Rectangle	L	0.37	0.42	Clarke	Y
GULLY	SK0206_0404a	GU	402049.144	306040.447	PC	Rectangle	L	0.47	0.5	Clarke	Y
GULLY	SK0206_0403a	GU	402049.38	306039.709	PC	Rectangle	L	0.47	0.5	Clarke	Y
GULLY	SK0206_0600a	GU	402061.149	306003.048	PC	Rectangle	L	0.47	0.5	Clarke	Y
GULLY	SK0205_1373a	GU	402131.961	305731.46	PC	Rectangle	L	0.35	0.5	Needham	Y
GULLY	SK0205_1468b	GU	402142.808	305687.807	PC	Rectangle	L	0.35	0.5	Unknown	Y
GULLY	SK0205_1565a	GU	402151.028	305656.859	PC	Rectangle	L	0.41	0.45	Unknown	Y
GULLY	SK0205_1564c	GU	402154.797	305642.467	PC	Rectangle	L	0.35	0.54	Unknown	Y
GULLY	SK0205_1659a	GU	402165.807	305599.809	PC	Rectangle	L	0.35	0.54	Unknown	Y
GULLY	SK0205_1755a	GU	402177.318	305551.828	PC	Rectangle	L	0.35	0.54	Unknown	Y
GULLY	SK0205_1851a	GU	402185.594	305510.618	PC	Rectangle	L	0.35	0.54	Unknown	Y
GULLY	SK0205_1946a	GU	402192.681	305465.01	PC	Rectangle	L	0.35	0.54	Unknown	Y
GULLY	SK0205_1945a	GU	402193.706	305458.862	PC	Rectangle	L	0.44	0.44	Unknown	Y
GULLY	SK0205_1942a	GU	402197.154	305421.039	PC	Rectangle	L	0.35	0.5	Unknown	Y
GULLY	SK0206_0315a	GU	402030.455	306155.623	PC	Rectangle	L	0.37	0.42	Clarke	Y
GULLY	SK0206_0504c	GU	402055.001	306042.461	PC	Rectangle	L	0.46	0.5	Clarke	Y
GULLY	SK0206_0504d	GU	402055.383	306041.682	PC	Rectangle	L	0.46	0.5	Clarke	Y
GULLY	SK0206_0600b	GU	402067.113	306005.152	PC	Rectangle	L	0.45	0.52	Clarke	Y
GULLY	SK0205_1373b	GU	402137.333	305732.68	PC	Rectangle	L	0.38	0.5	Clarke	Y
GULLY	SK0205_1468c	GU	402148.586	305689.222	PC	Rectangle	L	0.39	0.52	Unknown	Y
GULLY	SK0205_1664b	GU	402160.21	305644.191	PC	Rectangle	L	0.39	0.52	Unknown	Y
GULLY	SK0205_1760a	GU	402171.546	305600.859	PC	Rectangle	L	0.39	0.52	Clarke	Y
GULLY	SK0205_1855a	GU	402182.898	305552.776	PC	Rectangle	L	0.39	0.52	Clarke	Y
GULLY	SK0205_1951a	GU	402191.147	305511.702	PC	Rectangle	L	0.39	0.52	Clarke	Y
GULLY	SK0205_1946b	GU	402198.341	305465.788	PC	Rectangle	L	0.39	0.52	Clarke	Y
GULLY	SK0205_2042a	GU	402202.858	305421.19	PC	Rectangle	L	0.39	0.52	Clarke	Y
CATCHPIT	SK0206_0003b	CP	402003.79	306035.504	IC	Circular	H	0.72	0.9	Clarke	N
CATCHPIT	SK0206_0402a	CP	402048.183	306020.171	PC	Round	M	0.57	0.57	Unknown	N
CATCHPIT	SK0206_0602b	CP	402065.813	306020.984	PC	Square	L	0.6	0.6	Clarke	N
CATCHPIT	SK0205_1664a	CP	402161.557	305645.526	PC	Square	L	0.64	0.64	Unknown	N
CATCHPIT	SK0205_2046a	CP	402200.467	305465.011	PC	Square	L	0.64	0.64	Clarke	N
GHOST	SK0206_0216a	GN	402023.054	306162.467							
GHOST	SK0205_1179a	GN	402111.125	305794.789							
GHOST	SK0205_2034a	GN	402201.188	305345.248							

## Point Items

Item Type	Asset Reference	Item Type Code	Eastings	Northings	Manhole Construction	Cover Shape	Cover Duty	Cover Width	Cover Length	Manufacturer	Grating
GHOST	SK0205_1934a	GN	402197.787	305343.927							
GHOST	SK0206_0316a	GN	402030.636	306168.233							
GHOST	SK0206_0415a	GN	402046.847	306159.974							
GHOST	SK0206_0416a	GN	402049.305	306163.247							
GHOST	SK0206_0409a	GN	402044.539	306093.879							
GHOST	SK0206_0409b	GN	402044.493	306091.611							
GHOST	SK0206_0408a	GN	402045.957	306087.206							
GHOST	SK0206_0408b	GN	402046.843	306085.575							
GHOST	SK0205_1093a	GN	402101.855	305938.646							
GHOST	SK0205_1181a	GN	402119.007	305811.438							
GHOST	SK0205_1566a	GN	402156.66	305663.078							
GHOST	SK0205_1946c	GN	402199.904	305466.948							
GHOST	SK0205_2040a	GN	402204.459	305403.736							
INLET_OUTLET	SK0206_0115d	IT	402011.675	306154.531							
INLET_OUTLET	SK0206_0602a	IT	402063.009	306026.588							
MANHOLE	SK0206_0115a	MH	402019.954	306156.258	PC	Square	M	0.8	0.8	Clarke	N
OUTFALL	SK0206_0115b	OU	402016.649	306155.509							
OUTFALL	SK0206_0115c	OU	402016.046	306154.341							
OUTFALL	SK0206_0015a	OU	402003.801	306155.551							
OUTFALL	SK0206_0403b	OU	402044.647	306038.112							
OUTFALL	SK0206_0403c	OU	402043.936	306038.264							
OUTFALL	SK0205_0990c	OU	402093.7	305904.66							
OUTFALL	SK0205_0990d	OU	402097.353	305900.91							
OUTFALL	SK0205_0990e	OU	402093.593	305904.53							
OUTFALL	SK0205_1176a	OU	402119.497	305769.365							
OUTFALL	SK0205_1273a	OU	402128.986	305730.538							
OUTFALL	SK0205_1468a	OU	402142.588	305684.423							
OUTFALL	SK0205_1465a	OU	402147.488	305655.077							
OUTFALL	SK0205_1564a	OU	402151.051	305642.055							
OUTFALL	SK0205_1564b	OU	402150.367	305642.608							
OUTFALL	SK0205_1659b	OU	402161.617	305598.386							
OUTFALL	SK0205_1846a	OU	402185.865	305463.58							
OUTFALL	SK0205_1845a	OU	402187.613	305457.537							
OUTFALL	SK0205_1941a	OU	402193.228	305419.901							

## Point Items

Item Type	Asset Reference	Item Type Code	Eastings	Northings	Manhole Construction	Cover Shape	Cover Duty	Cover Width	Cover Length	Manufacturer	Grating
OUTFALL	SK0206_0003a	OU	402001.556	306036.659							
PHANTOM	SK0206_0500a	PN	402057.944	306000.958							
PHANTOM	SK0205_1755b	PN	402174.477	305550.414							
PHANTOM	SK0205_1851b	PN	402183.086	305510.07							
PHANTOM	SK0206_0116a	PN	402019.586	306168.442							
PHANTOM	SK0206_0116b	PN	402018.325	306168.482							
PHANTOM	SK0206_0504b	PN	402058.218	306041.745							
PHANTOM	SK0206_0504e	PN	402057.662	306043.139							
PIPED_GRIP	SK0205_0991a	MH	402097.879	305910.854	PC		L	0	0	Clarke	N
PIPED_GRIP	SK0205_0990a	MH	402099.304	305904.406	PC		L	0	0	Clarke	Y
PIPED_GRIP	SK0205_0990b	MH	402099.979	305903.785	PC		L	0	0	Unknown	Y
PIPED_GRIP	SK0205_1565b	MH	402157.608	305655.245	PC	Circular	L	100	100	Clarke	Y

## **5 Defect Grades & Event Coding Reports**

The following table is a breakdown of the point and continuous items requiring attention.

Within the tables, there are a few end points ('from' and/or 'to' points) that do not appear as a 'Unique Asset Reference'. This may be due to obstructions in the pipe work flowing to outfall / outlet which prevents the actual outfall / outlet point from being identified, the end point being buried, the end point being inaccessible to the operative, site TM preventing access, etc, all of which mean there has been no GPS measurement recorded at the time this report was compiled, hence no means of calculating this Unique Asset Reference. Where there is no comment in the 'comments' column, the pipe work is clean and serviceable.

Section	From	To	Comments	Grade
4	SK0205_1564c	SK0205_1564a	Settled deposits fine 10 % cross-sectional area loss	1
28	SK0205_1760a	SK0205_1659b	Joint displaced medium	1

Section	From	To	Comments	Grade
22	SK0206_0504d	SK0206_0504b	Crack Circumferential from 01 to 05 o'clock	2
24	SK0205_1373b	SK0205_1273a	Crack Circumferential from 12 to 05 o'clock	2

Section	From	To	Comments	Grade
9	SK0205_1945a	SK0205_1845a	Deformed drain/sewer 10 %	5

Section No	Start MH Ref	End MH Ref	Distance	Observation
2	SK0205_1468b	SK0205_1468g	1.3	Survey abandoned, Remark: unable to continue over debits
5	SK0205_1659a	SK0205_1659g	1.9	Survey abandoned, Remark: unable to continue forward
15	SK0206_0115d	SK0206_0015a	4.1	Survey abandoned, Remark: OUTFALL IN VIEW
16	SK0206_0214a	SK0206_0115a	1	Survey abandoned, Remark: CAMERA UNABLE TO CONTINUE
19	SK0206_0600a	SK0206_0500a	2.7	Survey abandoned, Remark: DUE TO DITCH BLOCKED
20	SK0206_0402a	SK0206_0003a	3.1	Survey abandoned, Remark: UNABLE TO CONTINUE
22	SK0206_0504d	SK0206_0504b	1.5	Survey abandoned, Remark: DUE TO HIGH WATER LEVEL
24	SK0205_1373b	SK0205_1273a	1.7	Survey abandoned, Remark: DUE TO WATER LEVEL
25	SK0205_1468c	SK0205_1468a	1.6	Survey abandoned, Remark: DUE TO SILT LEVELS
26	SK0205_1565a	SK0205_1465a	5.5	Survey abandoned, Remark: DUE TO HIGH WATER LEVEL
28	SK0205_1760a	SK0205_1659b	1.3	Survey abandoned, Remark: UNABLE TO GET OVER LIP OF PIPE
29	SK0206_1855a	SK0206_1755a	3.9	Survey abandoned, Remark: DUE TO HIGH WATER LEVEL
30	SK0205_1951a	SK0205_1851a	3	Survey abandoned, Remark: DUE TO SLIT LEVELS
31	SK0205_2046ab	SK0205_1846a	7.8	Survey abandoned, Remark: DUE TO WATER LEVEL



## **6 Survey Results**

- 1.1.1 The CCTV survey results should be viewed directly from the WinCan software stored on the DVD located inside the rear cover of this report, by ticking the relevant boxes in the report screen as shown in the sheets included in this section of the report and titled 'How to print CCTV reports in Standard Form'.
- 1.1.2 Results can also be viewed in the more traditional '*straight line drawing*' layout, complete with associated photographs of the survey results, by ticking the relevant boxes in the aforementioned report screen, as shown in the enclosed sheets included in this section of the report and titled 'How to print Line CCTV reports with Photo's'.

Within this section are paper copies of each point item and the associated continuous items.

OS Tiles are located in section 10 of this report.

## **7 Conclusions**

The survey identified that the general condition of the network was in a poor state. 'Wetlands' discovered throughout the scheme required maintenance as water levels had become higher than the gully outlets causing them to hold water and not drain. A pipe was discovered to have been broken to allow drainage from the wetland straight to the canal, bypassing any catchpits. If contamination of the 'wetland' occurred this would then directly run into the canal. Carnell recommend that this is repaired as soon as possible. A high majority of runs from the gullies had high silt levels and contained hard debris, as a result of which could not be fully surveyed, it is recommended that these runs and all gullies in the area undergo regular maintenance. During the survey no direct single source of oil contamination was discovered. A full CCTV report and footage is included in this report. Particular areas of concern are prioritised in this report and a full list of 'Survey Abandoned' sections is also included.

A total of 80 point items and 32 linear items were located, surveyed and mapped under this commission. CCL would recommend that some further remedial work be carried out on the Continuous Items listed in the defect grading report, with particular attention being paid to gradings 4 and 5.

There are several methods of repair to underground drainage systems. Included are some details of 'No Dig Solutions'. These solutions eliminate the need to break ground and removes the need for "opening/closing" notices and surface maintenance issues in the future.

## 8 References

- HD 43/04: Drainage Data Management System for Highways
- Highways Agency/Scottish Executive/Welsh Assembly Government/The Department for Regional Development
- November 2004
  
- Guidelines for the use of GPS in Surveying and Mapping
  
- Model Contract Document for Sewer Condition Inspection. 2<sup>nd</sup> Edition
- WRc, March 2005
  
- MSCC4 Manual of Sewer Condition Classification. 4<sup>th</sup> Edition
- WRc

## **9 OS Tiles & DVD Footage:**

The OS tiles and video footage can be found within this section.

### **Phantom Nodes**

HD43/04 requires that each drainage run has an end point, even if that end point is a defect in the pipe that prevents the camera from continuing with its survey. *'Phantom Nodes'* are generated as 'Point Items' under this specification, to cater for such events, as well as a start / end point for each section of a survey if it does not start / end at a catchpit / manhole etc.

To avoid confusion and over-population of the drawing, the enclosed drawings only include the Phantom Node symbol '•' and not the Unique Asset Reference for each item.

**SYMBOLOLOGY:**

LINE TYPES:	
	DRAINAGE SURVEYED
	DRAINAGE RUN UNABLE TO SURVEY DUE TO OBSTRUCTION
	SURFACE DRAINAGE RUN
	XXX) DENOTES CCTV SECTION NUMBERS
SYMBOLS:	
	MANHOLE
	OUTFALL
	OUTLET
	INLET
	PUMPING STATION
	BIFURCATION OR OVERFLOW
	GULLY
	PIPED GRIP
	SOAKAWAY
	INTERCEPTOR
	CATCH PIT
	GHOST NODE
	ALL PONDS AND WETLANDS
	PHANTOM NODE
	RODDING EYE

**NOTE:**

GPS CHAMBERS / GULLYS etc ARE SHOWN AS CO-ORDINATES AND MAY APPEAR TO BE IN CONFLICT WITH THEIR ACTUAL POSITION IN RELATION TO THE CARRIAGE WAY MARKINGS GIVEN

Doc No	Date	Ch/App	Description
01	14/06/08		COMPLETED IN LINE WITH COMMENTS ISSUED 27/04/08
00	14/06/08		FIRST ISSUE POINTS ITEMS INSERTED



Client:

Managing Agent Contractor:



Project Title:  
HIGHWAYS AGENCY  
STAFFORDSHIRE HIGHWAYS  
B4154 LIME LANE

Drawing Title:  
CONDITION FORMAT DRAWING

Scheme No. (SUPP\_SCH): 145  
Drawn By: DDC Date: 15/07/08  
Checked By: Date:  
Approved By: Date:

Drawing Number: 100077\_SK\_CON 01  
Revision

Day Scale: 1:500 Sheet No: 1 of 1

