

CULVERT PROTECTION CALCULATION REPORT AT HOLLINGWORTH ROAD, LITTLEBOROUGH.

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REV.	Revision description	Date
01	First issue	17/04/2024
02	Second issue to capture loads acting on the crown of the pipe & reference guidance from the Standard Conditions for Works Adjacent to Pipelines 90048	21/05/2024
03	Compressible material added to underside of steel plate protection.	10/10/2024
04	Calculations and design philosophy updated. Site construction phase culvert protection verification supported by before & after condition surveys.	10/02/2026
05	Permanent loading calculations revised to suit UU comments	19/06/2026

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   	Project LITTLEBOROUGH CULVERT PROTECTION REPORT			Job No. YZ074
	Drawing Reference	Calculations by HB	Checked by SB	Calc Sheet No. 2
	Unit			Date 17/06/26

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1. BACKGROUND & DESIGN PHILOSOPHY

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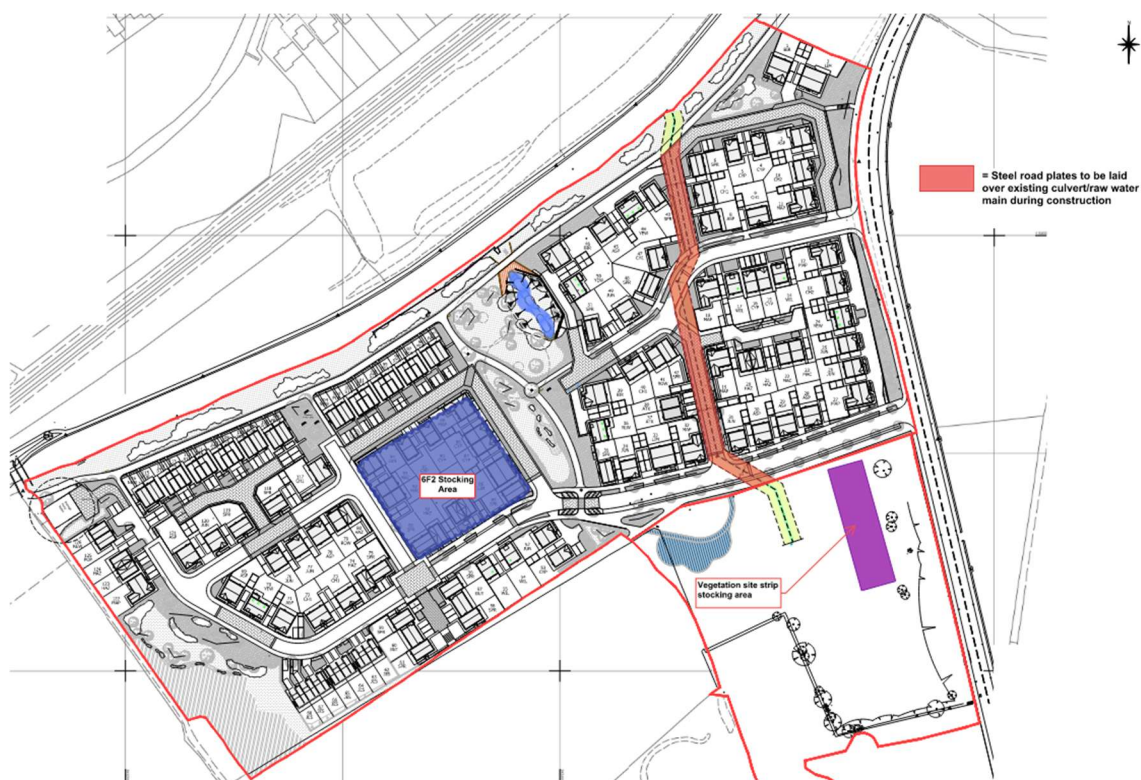
An existing water main culvert lies within the site boundary (highlighted below in yellow / orange semi-transparent outline). Planning condition 6 for the development highlights the need for the water main to be protected from damage. Mitigation / protective measure are designed within this report by utilizing a steel protective plate with a compressible material underneath over the culvert in areas of vehicle traffic / foreseen surcharge loads in the temporary case. The protective plate is later removed once the construction phase is finished, and suitable cover is placed above the culvert to dissipate any loads at the surface for the permanent load case.

Temporary Case:

- The temporary case (site construction phase) is to be verified by calculation AND / OR before and after drainage survey reports.

The following calculations show that the steel plate is designed to bridge over both the culvert and the granular surround and redistribute loads to suitable strata either side of the pipe. A layer of compressible material between the steel plate and the granular pipe surround is to be installed. The compressible material allows the steel plate to deflect along the 900mm length spanning over the culvert & granular pipe surround. The loads will path to suitable supporting bearing strata either side. The interface between the granular pipe surround and the natural strata is considered a line of fault. Loads will dissipate down through the natural firm clay soil strata. Ultimately, loads acting on the crown of the pipe will be negligible (from the self-weight of granular backfill) and will fall well within the 8.5kN/m^2 limit set out by clause 4.1.3. of the Standard Conditions for Works Adjacent to Pipelines.

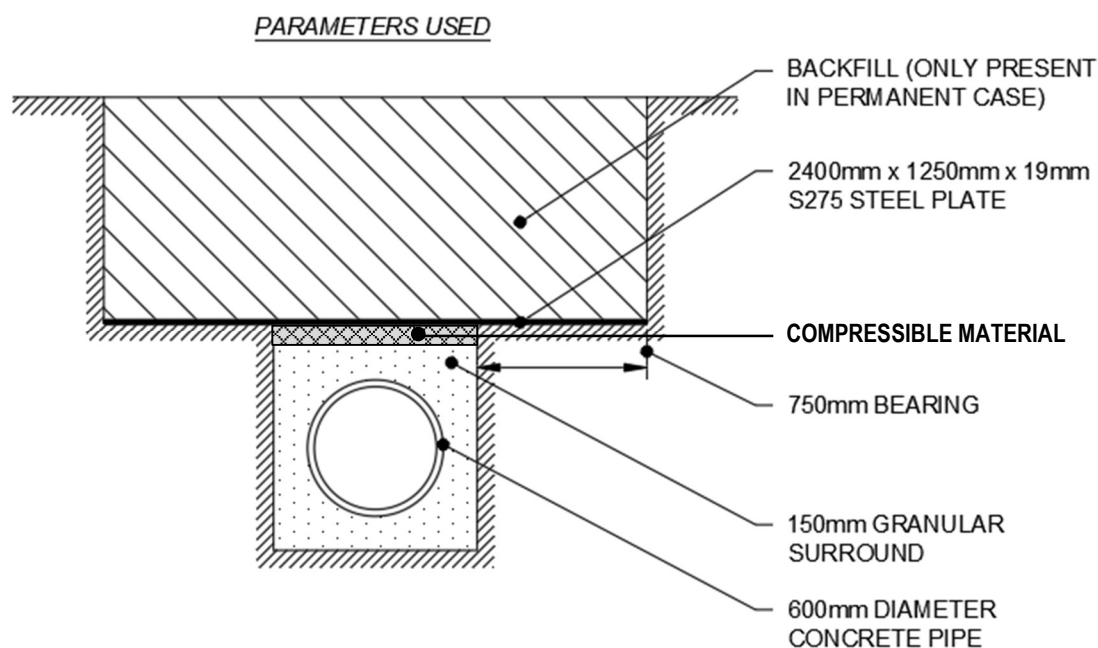
The steel plate is designed to withstand the above loading arrangement, as shown by the following calculations where the steel plate capacity is reviewed in FEA.



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	<u>Permanent case:</u> Design calculations are to be carried out to verify the loading on the crown of the culvert are within allowable limits, considering load spread with cover & overburden pressures. A before & after culvert drainage camera survey will be undertaken to monitor culvert defects and ensure site construction works have not structurally impacted the existing culvert The results of these surveys will be appended to this report. The permanent (end-use) case is to be verified by the project design engineer – Eastwoods CE. A design statement for the permanent case is appended to this report.			

2. ASSUMPTIONS

The pipe should be bedded and surrounded in appropriate material in the normal way, as shown below:



In all cases, backfilling should be carried out in accordance with BS EN 1610:2015, clause 11.

Assumptions:

- Concrete pipe of diameter: 600mm.
- Width of granular surround to pipe: 150mm.
- Plate spans a gap of: 900mm.
- Steel grade of plate: S275.
- Plate dimensions: 2400mm x 1250mm x 19mm.
- Compressible material installed between granular surround and underside of steel plate

NOTE: The steel plate and compressible material are to be removed once the temporary case (construction phase) is complete & cover to the pipe is to be placed.

Design Codes:

- BS EN 1991-2:2023 - Actions on Structures
- NA to BS EN 1991-2:2003 - Actions on Structures
- BS 9295:2020 - Guide to the structural design of buried pipes
- Standard Conditions for Works Adjacent to Pipelines 90048

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3. LOAD CATEGORIES

3.1. LOAD TYPES:

Dead loads:

Self-weight of plate (accounted for by FEA software): (D1)

Live Loads:

Vehicle loading (to be determined): (L1)

3.2. LOAD COMBINATIONS:

Serviceability Limit State - SLS:

1.00 D1 + 1.00 L1

Ultimate Limit State - ULS:

1.35 D1 + 1.50 L1

4. PERMANENT LOADINGS & DESIGN CHECKS

Rev 4

'Appendix A – Eastwoods CE Design Statement' Verifies the permanent / end-use case. As Vistry's design engineer, Eastwoods take responsibility for the civil engineering proposals, but this excludes the temporary works design for culvert protection. However, a cursory loading check has been carried out below to determine the utilization / safety factor within the design.



STANDARD PIPES

Nominal Size	DN	300	375	450	525	600	675	750	825	900	1050	1200	*1350	*1500	*1800
Internal Diameter	A	300	375	450	525	600	675	750	*805	900	1050	1200	1350	1500	1800
Barrel Diameter	B	416	505	590	685	790	901	996	975	1080	1266	1460	1620	1800	2130

Assumptions for unknown pipe specification, installed within the last 10 years:

Precast concrete pipes were manufactured in accordance with BS EN 1916.

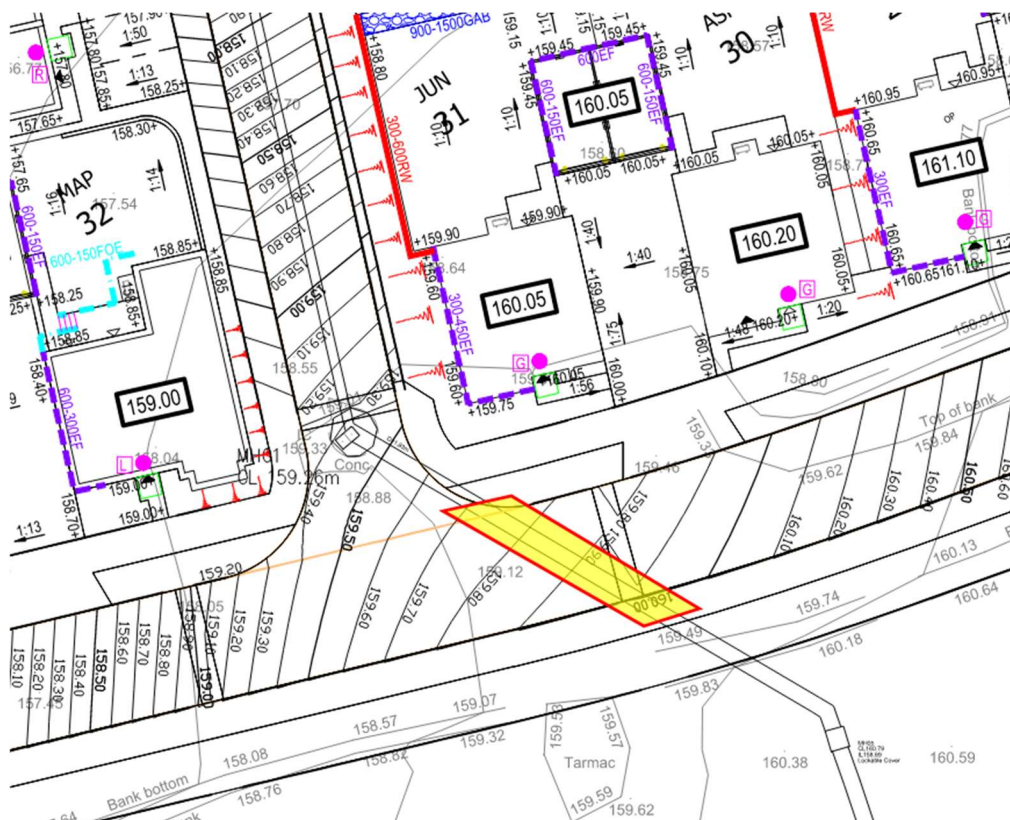
ID = 600mm

OD = 790mm

(Standard pipe spec assumed)

Loading assessment variation 1:

(Minimum cover to culvert)



Most onerous cover to culvert is located in yellow above.

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		Drawing Reference	Calculations by HB	Checked by SB	Calc Sheet No. 8																													
		Unit			Date 17/06/26																													
	Approximate cover: IL of 2No. chambers = 158.69 & 157.43 Midspan IL = (158.69 + 157.43) / 2 = 158.06 600mm diameter pipe, crown level = 158.06 + 0.6 = 158.66 Road level @ midspan = 159.90. Cover = 159.90 – 158.66 = 1.24m Say, 1.20m cover to culvert from road surface. Pavement Build-Up: Asphalt: 40 mm (surface) + 60 mm (binder) + 75 mm (base) = 175 mm bound Type 1 sub-base: 150 mm unbound Capping: 325 mm unbound Total pavement thickness = 650 mm Subgrade clay starts at 650 mm below surface. Target depth = 1,200 mm → 1.2 m – 0.65 m = 0.55 m into clay. STRUCTURAL ADEQUACY CHECK OF CONCRETE PIPE UNDER ROAD 1. Design Standard Assessment undertaken generally in accordance with the methodology presented in Figure 15 of BS 9295:2020+A1:2025 for rigid pipelines. 2. Pipe Data <table><tr><th>Parameter</th><th>Value</th></tr><tr><td>Pipe Material</td><td>Concrete</td></tr><tr><td>Manufacturing Standard</td><td>BS EN 1916</td></tr><tr><td>Nominal Diameter (DN)</td><td>600 mm</td></tr><tr><td>Internal Diameter</td><td>600 mm</td></tr><tr><td>External Diameter (Bc)</td><td>790 mm</td></tr><tr><td>Pipe Crushing Strength (Wt)</td><td>72 kN/m</td></tr></table> 3. Installation Data <table><tr><th>Parameter</th><th>Value</th></tr><tr><td>Installation Type</td><td>Narrow Trench</td></tr><tr><td>Trench Width (Bd)</td><td>1.10 m</td></tr><tr><td>Cover to Pipe Crown (H)</td><td>1.20 m</td></tr><tr><td>Groundwater</td><td>Not Present</td></tr><tr><td>Internal Water Pressure</td><td>None</td></tr><tr><td>Road Classification</td><td>Main Road</td></tr><tr><td>Backfill Material</td><td>Compacted Clay</td></tr></table>				Parameter	Value	Pipe Material	Concrete	Manufacturing Standard	BS EN 1916	Nominal Diameter (DN)	600 mm	Internal Diameter	600 mm	External Diameter (Bc)	790 mm	Pipe Crushing Strength (Wt)	72 kN/m	Parameter	Value	Installation Type	Narrow Trench	Trench Width (Bd)	1.10 m	Cover to Pipe Crown (H)	1.20 m	Groundwater	Not Present	Internal Water Pressure	None	Road Classification	Main Road	Backfill Material	Compacted Clay
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Compaction Standard Series 600 Earthworks Specification

Assumed Unit Weight of Fill (γ) 19.6 kN/m³

4. Soil Load, W_c

The lower of:

$$W'_c = C_c \gamma B_c^2$$

Where C_c is the lower of:

$$C_c = (e^{2KuH/B_c} - 1) / 2Ku \quad C_c = (\text{EXP}(2 \times 0.19 \times 1.2 / 0.79) - 1) / (2 \times 0.19) \quad C_c = 2.055$$

$$C_c = 1.50 (H/B_c) - 0.07 \quad C_c = 1.50(1.2/0.79) - 0.07 \quad C_c = 2.208$$

Adopt:

$C_c = 2.055$ – complete projection exists

For the above:

$$Ku = 0.19$$

$$H = 1.20\text{m}$$

$$B_c = 0.79\text{m}$$

$$r_{sd}\rho = 0.5 \text{ (firm clay \& bedding class S – granular surround)}$$

$$W'_c = 2.055 \times 19.6 \times 0.79^2 = 25.137$$

&

$$W_c = C_d \gamma B_d^2$$

Where:

$$C_d = (e^{2Ku'H/B_d} - 1) / 2Ku' \quad C_d = 1.261$$

For the above:

$$Ku' = 0.13$$

$$B_d = 1.10\text{m}$$

$$W_c = 1.261 \times 19.6 \times 1.10^2 = 29.905$$

Adopt:

$$\mathbf{W_c = 25.137 \text{ kN/m}^2}$$

4. Vehicle Surcharge Load

For a main road with 1.2 m cover, surcharge pressure is taken as:

$$P_s = 62 \text{ kN/m}^2$$

Vehicle surcharge load:

$$W_{csu} = P_s \times B_c$$

$$W_{csu} = 62 \times 0.79$$

$$\mathbf{W_{csu} = 48.98 \text{ kN/m}}$$

5. Internal Water Load

No internal pressure loading is present.

For a conservative assessment, the pipe is assumed to be flowing full.

Water load:

$$W_w = C_w \times \gamma_w \times \pi D_i^2 / 4$$

Where:

$$C_w = 0.75$$

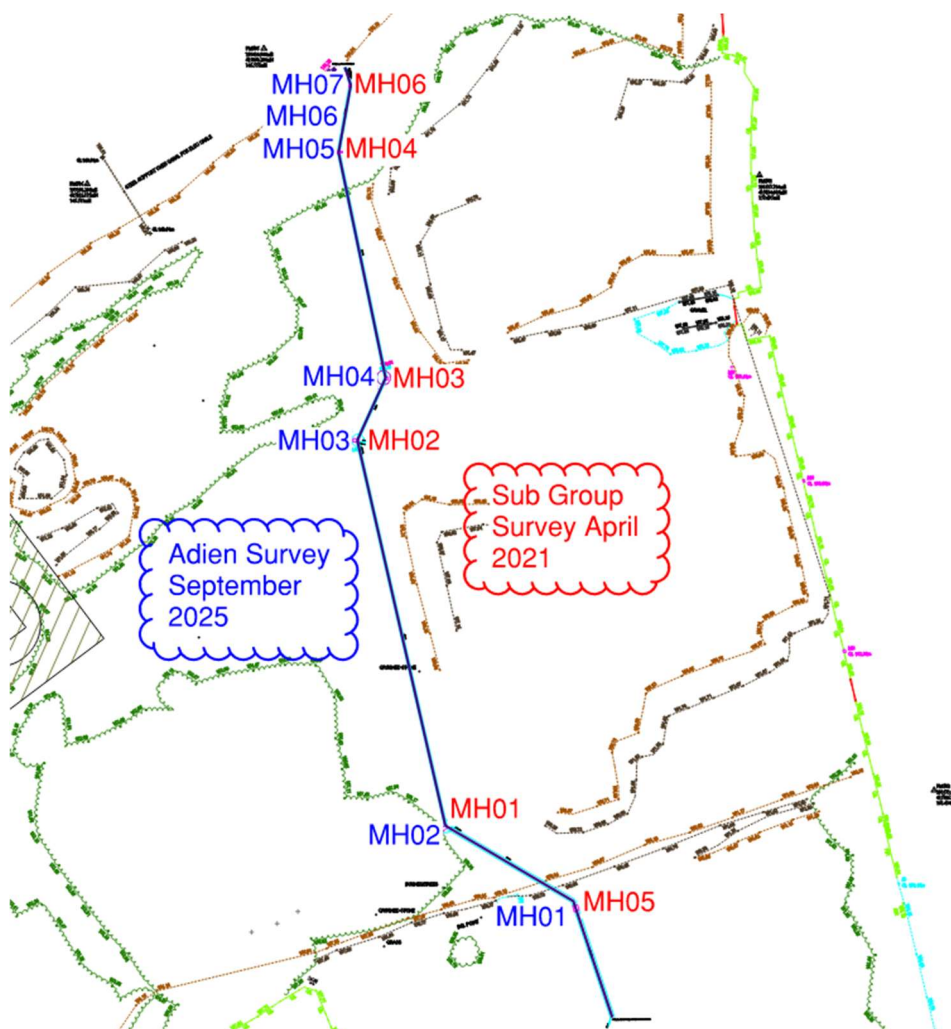
$$\gamma_w = 9.81 \text{ kN/m}^3$$

$$D_i = 0.60 \text{ m}$$

$$W_w = 0.75 \times 9.81 \times \pi(0.60^2) / 4$$

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	Ww = 2.08 kN/m Adopt: Ww = 2.08 kN/m 7. Total Design External Load Total external load: We = Wc + Wcsu + Ww We = 25.137 + 48.98 + 2.08 We = 76.197 kN/m 8. Required Bedding Factor Minimum recommended bedding factor, $F_m' \geq W_e F_{se} / W_t$ (or W'_t) Where: We = 76.197 kN/m Fse = 1.25 Wt = 72 kN/m $76.197 \times 1.25 / 72 = 1.32$ Minimum bedding factor, F_m' should be at least 1.32 A required bedding factor of 1.32 is low and would normally be achieved by standard rigid pipe bedding arrangements. We are assuming a gravel surround to the pipe under wide trench conditions. This can achieve a bedding factor of 2.5. – See Annex B of this report for surround & bedding evidence 1.32 < 2.5, Therefore PASS			PASS	

Loading assessment variation 2:
(Maximum cover to culvert)



The maximum cover is at MH05 (Adien) / MH04 (Sub Group).

IL: 146.450m (interpolated)

Crown of pipe level = $146.450 + 0.600 = 147.050\text{m}$

CL: 151.900m

Cover to the crown of pipe = 4.85m

Pavement Build-Up:

Asphalt: 40 mm (surface) + 60 mm (binder) + 75 mm (base) = 175 mm bound

Type 1 sub-base: 150 mm unbound

Capping: 325 mm unbound

Total pavement thickness = 650 mm

Subgrade clay starts at 650 mm below surface.

Target depth = $4.85\text{ m} - 0.65\text{ m} = 4.2\text{ m}$ into clay.

STRUCTURAL ADEQUACY CHECK OF CONCRETE PIPE UNDER ROAD

1. Design Standard

Assessment undertaken generally in accordance with the methodology presented in Figure 15 of BS 9295:2020+A1:2025 for rigid pipelines.

2. Pipe Data

Parameter	Value
Pipe Material	Concrete
Manufacturing Standard	BS EN 1916
Nominal Diameter (DN)	600 mm
Internal Diameter	600 mm
External Diameter (Bc)	790 mm
Pipe Crushing Strength (Wt)	72 kN/m

3. Installation Data

Parameter	Value
Installation Type	Narrow Trench
Trench Width (Bd)	1.10 m
Cover to Pipe Crown (H)	4.85 m
Groundwater	Not Present
Internal Water Pressure	None
Road Classification	Main Road
Backfill Material	Compacted Clay
Compaction Standard	Series 600 Earthworks Specification
Assumed Unit Weight of Fill (γ)	19.6 kN/m ³

4. Soil Load, W_c

The lower of:

$$W'_c = Cc \gamma B_c^2$$

Where Cc is the lower of:

$$Cc = (e^{2KuH/Bc} - 1) / 2Ku \quad Cc = (EXP(2 \times 0.19 \times 4.85/0.79) - 1) / (2 \times 0.19) \quad Cc = 24.494$$

$$Cc = 1.50 (H/Bc) - 0.07 \quad Cc = 1.50(4.85/0.79) - 0.077 \quad Cc = 9.138$$

Adopt:

$Cc = 9.138$ – incomplete projection exists

For the above:

$$Ku = 0.19$$

$$H = 1.20m$$

$$Bc = 0.79m$$

$$r_{sd}\rho = 0.5 \text{ (firm clay \& bedding class S – granular surround)}$$

$$W'_c = 9.138 \times 19.6 \times 0.79^2 = 111.779$$

&

$$W_c = Cd \gamma B_d^2$$

Where:

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	$Cd = (e^{2Ku'H/Bd} - 1) / 2Ku'$ $Cd = 8.256$ For the above: $Ku' = 0.13$ $Bd = 1.10m$ $Wc = 8.256 \times 19.6 \times 1.10^2 = 195.799$ Adopt: $Wc = 111.779 \text{ kN/m}^2$ 4. Vehicle Surcharge Load For a main road with 4.85 m cover, surcharge pressure is taken as: $Ps = 17 \text{ kN/m}^2$ Vehicle surcharge load: $Wcsu = Ps \times Bc$ $Wcsu = 17 \times 0.79$ $Wcsu = 13.43 \text{ kN/m}$ 5. Internal Water Load No internal pressure loading is present. For a conservative assessment, the pipe is assumed to be flowing full. Water load: $Ww = Cw \times \gamma_w \times \pi Di^2 / 4$ Where: $Cw = 0.75$ $\gamma_w = 9.81 \text{ kN/m}^3$ $Di = 0.60 \text{ m}$ $Ww = 0.75 \times 9.81 \times \pi(0.60^2) / 4$ $Ww = 2.08 \text{ kN/m}$ Adopt: $Ww = 2.08 \text{ kN/m}$ 7. Total Design External Load Total external load: $We = Wc + Wcsu + Ww$ $We = 111.779 + 13.43 + 2.08$ $We = 127.289 \text{ kN/m}$ 8. Required Bedding Factor Minimum recommended bedding factor, $F_m' \geq We F_{se} / W_t$ (or W'_t) Where: $We = 127.289 \text{ kN/m}$ $F_{se} = 1.25$ $W_t = 72 \text{ kN/m}$ $127.289 \times 1.25 / 72 = 2.21$ Minimum bedding factor, F_m' should be at least 2.21 We are assuming a gravel surround to the pipe under wide trench conditions. This can achieve a bedding factor of 2.5. – See Annex B of this report for surround & bedding evidence 2.21 < 2.5, Therefore PASS	
		PASS

5. TEMPORARY LOADINGS & DESIGN CHECKS

Most onerously loaded plant operating on site (temporary case).

Circa 40-ton haulage truck (Moxy) such as a Volvo A35G.

OPERATING WEIGHT UNLOADED

			A35G		A40G	
Tires			26.5R25*		29.5R25**	
Front	kg	lb	15,700	34,613	16,100	35,494
Rear	kg	lb	13,600	29,983	14,600	32,187
Total	kg	lb	29,300	64,595	30,700	67,682
Payload	kg	lb	34,500	76,059	39,000	85,980

Operating weight includes all fluids and operator

*) A35G with tires 775/65R25, add 200 kg (440 lb)/axle

**) A40G with tires 875/65R25, add 300 kg (660 lb)/axle

TOTAL WEIGHT

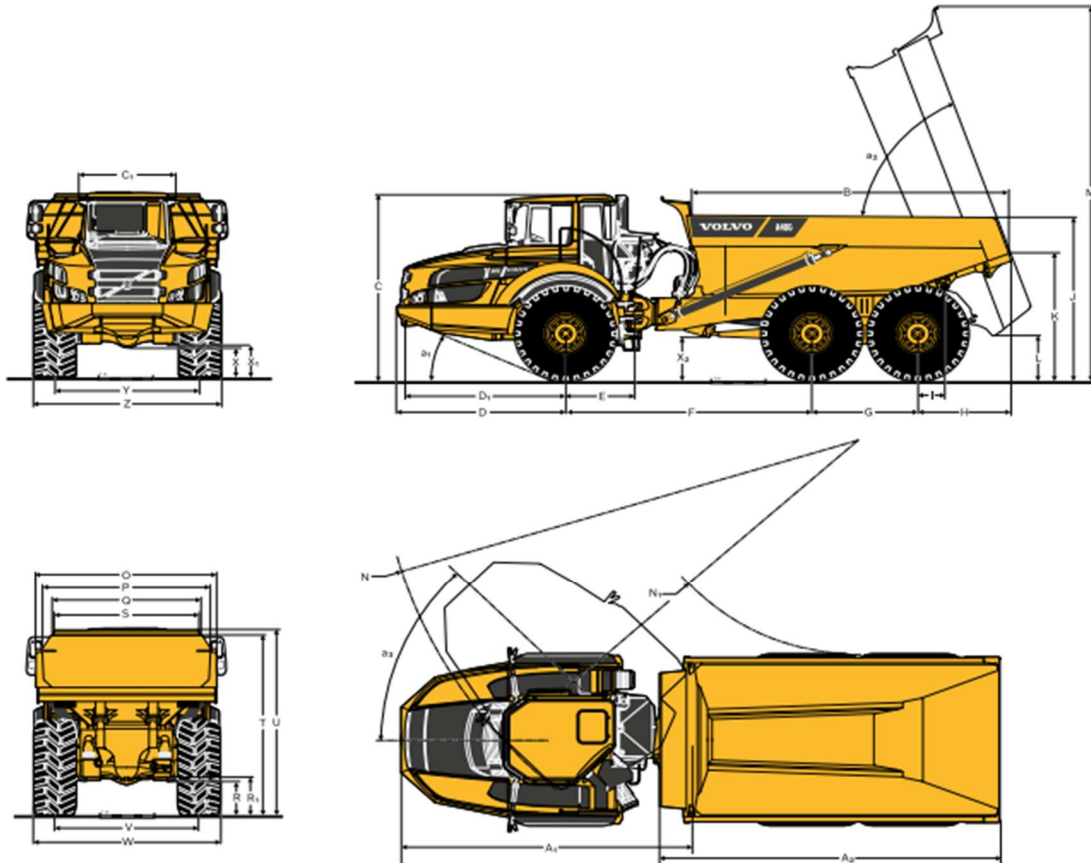
			A35G		A40G	
Tires			26.5R25*		29.5R25**	
Front	kg	lb	19,200	42,329	20,450	45,084
Rear	kg	lb	44,600	98,326	49,250	108,578
Total	kg	lb	63,800	140,655	69,700	153,662

*) A35G with tires 775/65R25, add 200 kg (440 lb)/axle

**) A40G with tires 875/65R25, add 300 kg (660 lb)/axle

GROUND PRESSURE

			A35G		A40G		A35G		A40G	
Tires			26.5R25		29.5R25		775/65R25		875/65R25	
Unloaded										
Front	kPa	psi	132	19.1	111	16.1	115	16.7	98	14.2
Rear	kPa	psi	54	7.8	47	6.8	48	7	42	6.1
Loaded										
Front	kPa	psi	158	22.9	139	20.2	138	20	121	17.5
Rear	kPa	psi	183	26.5	167	24.2	160	23.2	146	21.2



DIMENSIONS

Pos	Unit		A35G		A40G	
A	mm	ft in	11,180	36'8"	11,263	36'11"
A ₁	mm	ft in	5,476	18'	5,476	18'
A ₂	mm	ft in	6,241	20'6"	6,404	21'0"
B	mm	ft in	5,568	18'3"	5,844	19'2"
C	mm	ft in	3,547	11'8"	3,599	11'10"
C ₁	mm	ft in	1,772	5'10"	1,772	5'10"
D	mm	ft in	3,100	10'2"	3,100	10'2"
D ₁	mm	ft in	2,942	9'8"	2,942	9'8"
E	mm	ft in	1,277	4'2"	1,277	4'2"
F	mm	ft in	4,578	15'0"	4,518	14'10"
G	mm	ft in	1,820	6'	1,940	6'4"
H	mm	ft in	1,683	5'6"	1,706	5'7"
I	mm	ft in	650	2'2"	495	1'7"
J	mm	ft in	3,014	9'11"	3,132	10'3"
K	mm	ft in	2,304	7'7"	2,435	8'
L	mm	ft in	890	2'11"	822	2'8"
M	mm	ft in	7,236	23'9"	7,265	23'10"
N	mm	ft in	8,866	29'1"	8,957	29'5"
N ₁	mm	ft in	4,416	14'6"	4,327	14'2"
O	mm	ft in	3,216	10'7"	3,430	11'3"

DIMENSIONS

Pos	Unit		A35G		A40G	
P	mm	ft in	2,902	9'6"	3,118	10'3"
Q	mm	ft in	2,553	8'5"	2,820	9'3"
R	mm	ft in	564	1'10"	613	2'0"
R ₁	mm	ft in	652	2'2"	701	2'4"
S	mm	ft in	2,423	7'11"	2,651	8'8"
T	mm	ft in	3,382	11'1"	3,427	11'3"
U	mm	ft in	3,498	11'6"	3,546	11'8"
V	mm	ft in	2,534	8'4"	2,636	8'8"
W	mm	ft in	3,221	10'7"	3,403	11'2"
X	mm	ft in	500	1'8"	553	1'10"
X ₁	mm	ft in	592	1'11"	645	2'1"
X ₂	mm	ft in	738	2'5"	788	2'7"
Y	mm	ft in	2,534	8'4"	2,636	8'8"
Z	mm	ft in	3,221	10'7"	3,403	11'2"
a ₁	°		23.6		24.3	
a ₂	°		72		70	
a ₃	°		45		45	

A35G: Unloaded machine with 26.5R25

A40G: Unloaded machine with 29.5R25

$$\text{Tire width} = W - V = 3221 - 2534 = 687\text{mm}$$

$$\text{Axle load} = 44600 / 2 = 22300\text{kg} (x9.81/1000) = 218 \text{ kN}$$

BS EN
1991-2:
6.3.1

load model 1, which considers Concentrated and uniformly distributed loads, which cover most of the effects of the traffic of lorries and cars. This model should be used for global and local verifications.

BS EN
1991-2
6.3.2(5)

- Each axle of the tandem system should be taken into account with two identical wheels, the load per wheel being therefore equal to $0,5 \alpha Q \times Q_k$.
- The contact surface of each wheel should be taken as square and of side 0,40 m (see Figure 6.2).

In this case the tire width is known to be 0.687m. Using engineering judgement we will assume the same square contact patch.

NA BS EN
1991-2
NA.2.16.1.
3

This square contact area philosophy is further backed up in load model 3 of the National Annex, where: 'the wheel loads of all three SV models should be uniformly distributed over a square contact area as shown in figure NA.1'.

There should be an additional Dynamic Amplification Factor (DAF) applied to account for dynamic effects such as the impact or vibration caused by moving loads.

NA BS EN
1991-2
NA.2

Table NA.2 — Dynamic Amplification Factors for the SV and SOV vehicles

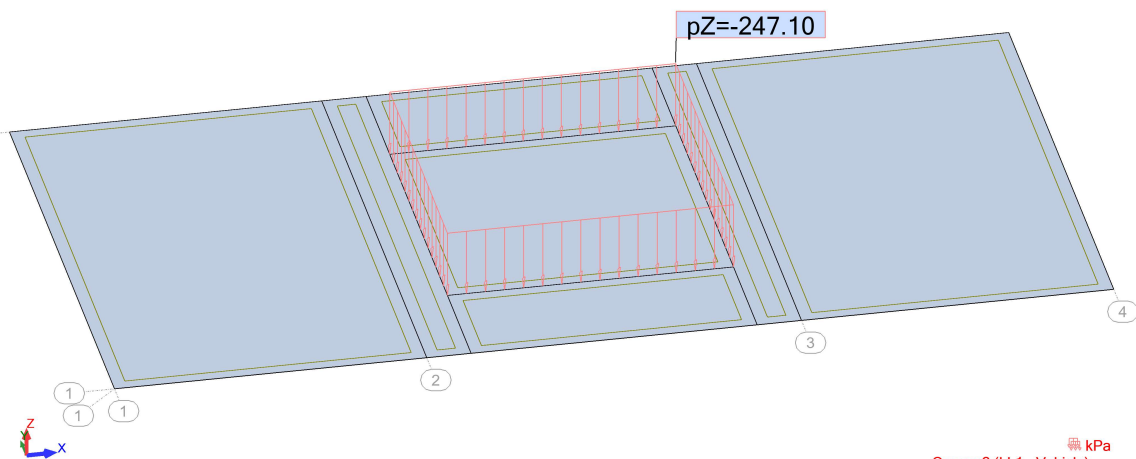
Basic axle load	DAF
100 kN	1,20
130 kN	1,16
165 kN	1,12
180 kN	1,10
225 kN	1,07

$$\text{Basic axle load} = 44600 / 2 \times 9.81 / 1000 = 218 \text{ kN}, \quad \text{Use DAF} = 1.07.$$

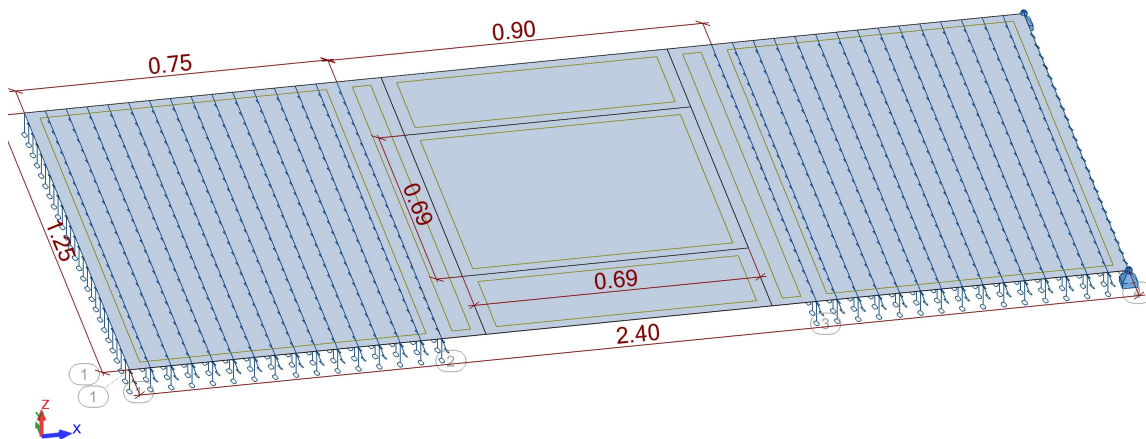
$$\text{load per wheel} = 0,5 \alpha Q \times Q_k.$$

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Unit				Date
				17/06/26
	Where: $\alpha Q = DAF = 1.07$ $Q_k = 218 \text{ kN}$ Load per wheel = $0.5 \times 1.07 \times 218 = 116.63 \text{ kN (SLS)}$ Area of tire contact on the plate = $0.687\text{m} \times 0.687\text{m}$ Area load acting on this contact patch = $116.63 / (0.687 \times 0.687) = 247.1 \text{ kN/m}^2$			

5.1. ISOMETRIC VIEWS

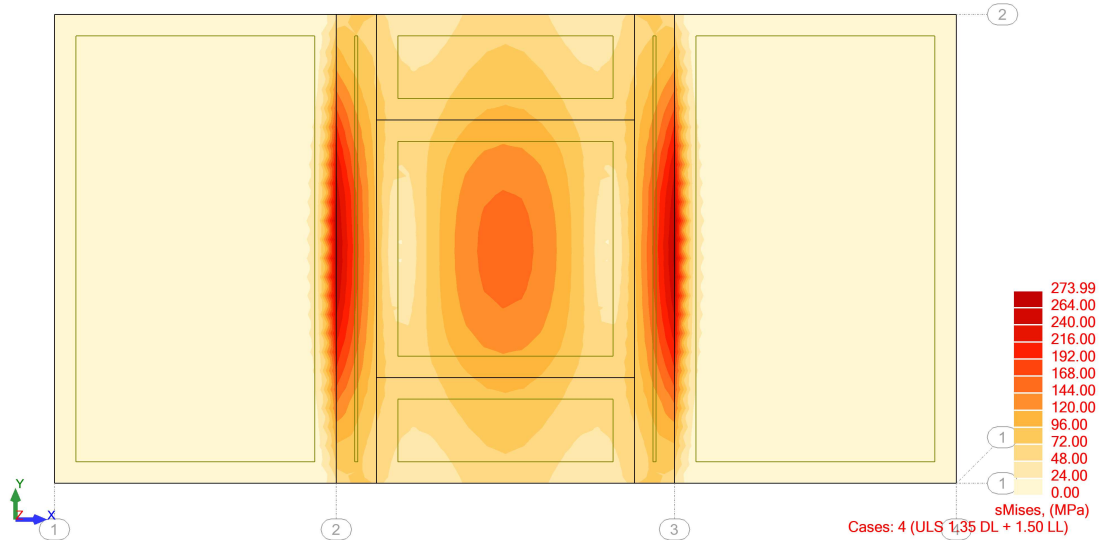


Isometric View showing vehicle live loading on the modelled steel plate.

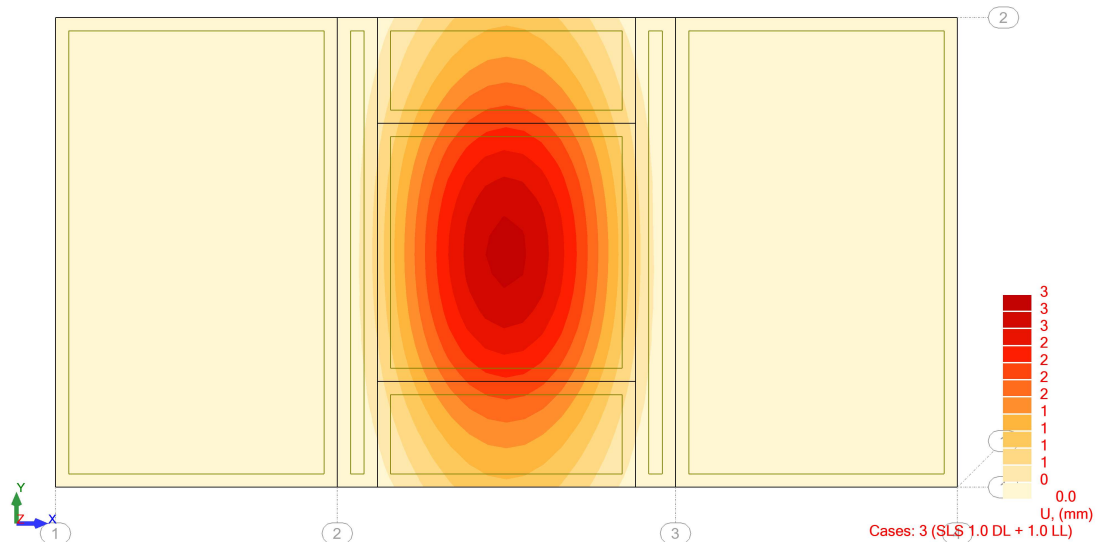


Isometric View showing plate dimensions and support conditions.

5.2. FINITE ELEMENT ANALYSIS



$273.99 \text{ N/mm}^2 < 275 \text{ N/mm}^2$, Therefore PASS
Stresses are within allowable limits.



Consider an allowable deflection = span / 200 for a short spanning structural element with no brittle finishes = $900 / 200 = 4.5 \text{ mm}$

$3 \text{ mm} < 4.5 \text{ mm}$, Therefore PASS
Deflections are within allowable limits.

3mm of deflection should be able to occur without exhausting the limits of the compressible material to ensure no imposed load on the steel plate is distributed to the granular pipe surround underneath. Thus, redistributing loads away from acting on the crown of pipe.

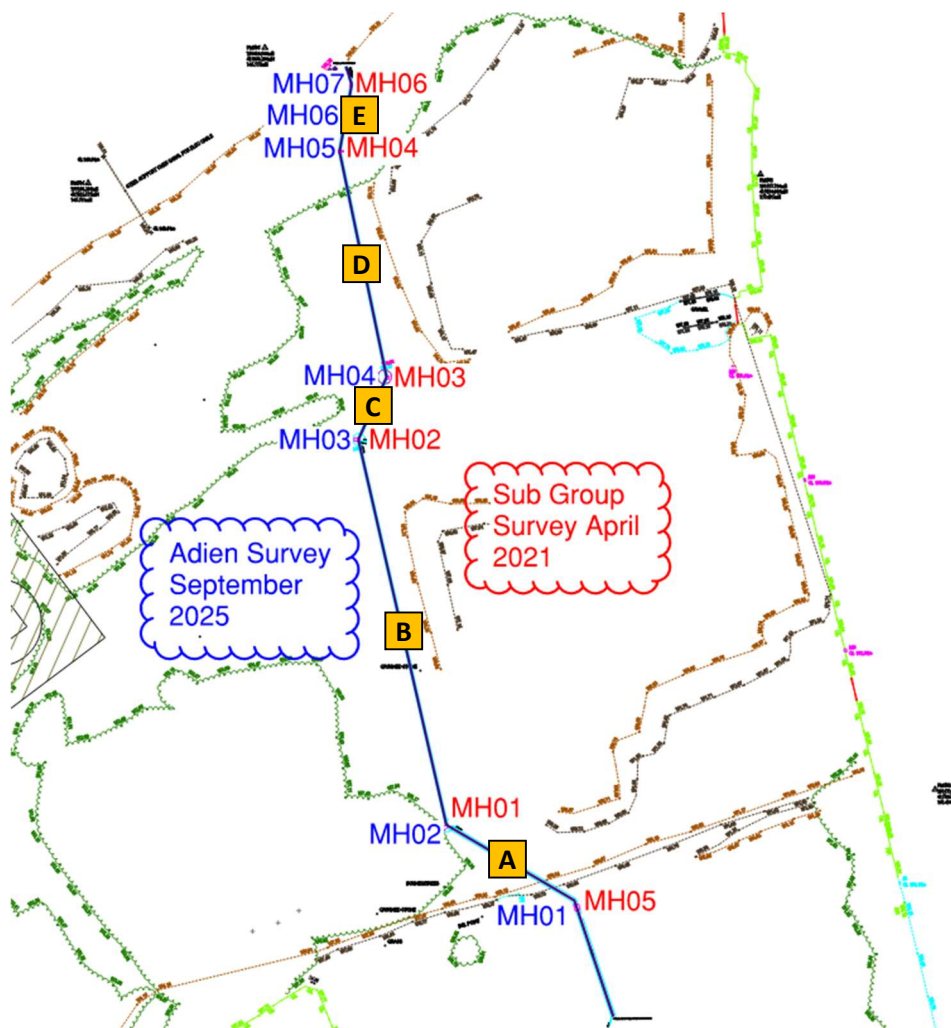
6. SUMMARY OF CULVERT DRAINAGE SURVEYS

Prior to starting construction works on site, a survey of the culvert was carried out by Sub Group in April of 2021. Steel protective plates have since been installed over the culvert to protect the existing infrastructure from damage during the bulk earthworks. The plates were removed once levels were brought up to proposed levels with sufficient cover to the crown of the culvert. Eastwoods CE are responsible for the engineering design & have confirmed the suitability of the final design in this regard – see appended email correspondence.

A second September 2025 survey has now been done after the completion of the bulk earthworks, roads, sewers and plots within proximity of the culvert.

The report findings show that the condition of the culvert within the extents shown below have not worsened. No issues were flagged during Adien's recent survey.

The below markup shows the survey extents of the culvert. The node references differ between reports so have been labelled as sections A through E for ease of comparison within this report, and tabulated on the following pages side by side.



Project

LITTLEBOROUGH CULVERT PROTECTION REPORT

Job No.

YZ074

Drawing Reference

Calculations by

HB

Checked by

SB

Calc Sheet No.

20

Unit

Date

10/02/26

Section A

2021 Sub Group survey

SUB GROUP LTD DONCASTER Tel: 01302 880537 joe.walshaw@sub-group.co.uk									
Section Inspection - 27/04/2021 - 05X									
Section	Inspection	Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR		
4	1	27/04/21	10:34	Not Specified	Dry	0	05X		
Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID				
JW	VAN1	235	Not Specified	Not Specified	Not Specified				
Town or Village:		Littleborough		Inspection Direction:		Upstream		Upstream Node:	
Road:		Hollingworth Rd		Inspected Length:		29.70 m		Upstream Pipe Depth:	
Location:		Fields		Total Length:		29.70 m		Downstream Node:	
Surface Type:				Joint Length:		0.00 m		Downstream Pipe Depth:	
Use:				Culverted watercourse		Pipe Shape:		Circular	
Type of Pipe:						Dia/Height:		600 mm	
Flow Control:						Pipe Material:		Concrete	
Year Constructed:				Not Specified		Lining:		No Lining	
Inspection Purpose:				Associated with future capital scheme including Drainage Area Planning					
Lining Material:				No Lining					
Comments:									
Recommendations:									
Scale:	1:257	Position [m]	Code	Observation	MPEG	Photo	Grade		
Depth: m									
01									
0.00		GO	General observation: HEAVY FAST FLOW				00:00:00		
0.00		ST	Start of survey				00:02:39		
0.00		MH	Manhole: 01				00:02:39		
0.00		WL	Water level, 20% of sewer height				00:02:39		
29.70		MH	Manhole: 05				00:03:01		
29.70		FH	Finish survey				00:03:02		
05									
Depth: m									
Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

HOLLINGWORTH RD, LITTLEBOROUGH

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2025 Adien Survey

ADIEN MILLFIELD IND EST, DONCASTER									
Section Inspection - 11/11/2025 - 01X									
Item No.	Insp. No.	Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR		
7	1	11/11/25	9:40	Not Specified	No Rain Or Snow	No	01X		
Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID				
JW	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified				
Town or Village:		Littleborough		Inspection Direction:		Upstream		Upstream Node:	
Road:		Hollingworth Rd		Inspected Length:		31.10 m		Upstream Pipe Depth:	
Location:		Footway		Total Length:		31.10 m		Downstream Node:	
Surface Type:				Joint Length:				Downstream Pipe Depth:	
Use:				Culverted watercourse		Pipe Shape:		Circular	
Type of Pipe:				Gravity drain/sewer		Dia/Height:		600 mm	
Flow Control:				No flow control		Material:		Concrete	
Year Constructed:				Not Specified		Lining Type:		No Lining	
Inspection Purpose:				Routine inspection					
Lining Material:				No Lining					
Comments:									
Recommendations:									
Scale:	1:270	Position [m]	Code	Observation	MPEG	Photo	Grade		
Depth: m									
02									
0.00		MH	Start node, manhole, reference: 02						
0.00		WL	Water level, 5% of the vertical dimension						
31.10		MHF	Finish node, manhole, reference: 01						
01									
Depth: m									
Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

LITTLEBOROUGH HOLLINGWORTH RD

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2025 Adien Survey



Sub Group

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 . DONCASTER
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 joe.walshaw@sub-group.co.uk

Section Rehab - 27/04/2021 - 05X

Section	Inspection	Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR
4	1	27/04/21	10:34	Not Specified	Dry	0	05X
Operator JW		Vehicle VAN1		Camera 235	Preset Length Not Specified	Legal Status Not Specified	Alternative ID Not Specified

Town or Village: Littleborough

Road: Hollingworth Rd

Location: Fields

Surface Type:

Inspection Direction: Upstream

Inspected Length: 29.70 m

Total Length: 29.70 m

Joint Length: 0.00 m

Upstream Node: 05

Upstream Pipe Depth: 0

Downstream Node: 01

Downstream Pipe Depth: 0

Comments:

Recommendations:

Scale: 1:217

Position [m]

Code

Observation

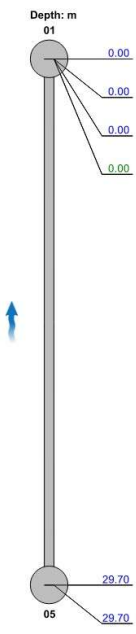
MPEG

Photo

Grade

Depth: m

01



0.00	GO	General observation: HEAVY FAST FLOW	00:00:00
0.00	ST	Start of survey	00:02:39
0.00	MH	Manhole: 01	00:02:39
0.00	WL	Water level, 20% of sewer height	00:02:39
29.70	MH	Manhole: 05	00:03:01
29.70	FH	Finish survey	00:03:02

Depth: m

HOLLINGWORTH RD, LITTLEBOROUGH

Project

LITTLEBOROUGH CULVERT PROTECTION REPORT

Job No.

YZ074

Drawing Reference

Calculations by
HB

Checked by
SB

Calc Sheet No.

22

Unit

Date

17/06/26

Section B

2021 Sub Group survey



SUB GROUP LTD
, DONCASTER
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joe.walshaw@sub-group.co.uk

Section Inspection - 27/04/2021 - 01X

Section	Inspection	Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR
1	1	27/04/21	9:49	Not Specified	Dry	0	01X
Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID		
JW	VAN1	235	Not Specified	Not Specified	Not Specified		

Town or Village: Littleborough
Road: Hollingworth Rd
Location: Fields
Surface Type:

Inspection Direction: Downstream
Inspected Length: 82.50 m
Total Length: 82.50 m
Joint Length: 0.00 m

Upstream Node: 01
Upstream Pipe Depth:
Downstream Node: 02
Downstream Pipe Depth:

Use: Culverted watercourse
Type of Pipe:
Flow Control:
Year Constructed: Not Specified
Inspection Purpose: Associated with future capital scheme including Drainage Area Planning

Pipe Shape: Circular
Dia/Height: 600 mm
Pipe Material: Concrete
Lining: No Lining
Lining Material: No Lining

Comments:
Recommendations:

Scale:	1:712	Position [m]	Code	Observation	MPEG	Photo	Grade
Depth: m	01						
		0.00	GO	General observation: HEAVY FAST FLOW	00:00:00		
		0.00	ST	Start of survey	00:02:19		
		0.00	MH	Manhole: 01	00:02:19		
		0.00	WL	Water level, 20% of sewer height	00:02:19		
		82.50	MH	Manhole: 02	00:04:09		
		82.50	FH	Finish survey	00:04:09		
Depth: m	02						

Construction Features

Miscellaneous Features

STR No.	Def	STR Peak	STR Mean	STR Total	STR Grade	SER No.	Def	SER Peak	SER Mean	SER Total	SER Grade
0		0.0	0.0	0.0	1.0	0		0.0	0.0	0.0	1.0

HOLLINGWORTH RD, LITTLEBOROUGH



ADIEN
MILLFIELD IND EST, DONCASTER

Section Inspection - 06/11/2025 - 02X

Item No.	Insp. No.	Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR
2	1	06/11/25	19:14	Not Specified	No Rain Or Snow	No	02X
Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID		
JW	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified		

Town or Village: Littleborough
Road: Hollingworth Rd
Location: Footway
Surface Type:

Inspection Direction: Downstream
Inspected Length: 43.90 m
Total Length: 43.90 m
Joint Length:

Upstream Node: 02
Upstream Pipe Depth:
Downstream Node: 03
Downstream Pipe Depth:

Use: Surface water
Type of Pipe: Gravity drain/sewer
Flow Control: No flow control
Year Constructed: Not Specified
Inspection Purpose: Routine inspection

Pipe Shape: Circular
Dia/Height: 600 mm
Material: Concrete
Lining Type: No Lining
Lining Material: No Lining

Comments:
Recommendations:

Scale:	1:381	Position [m]	Code	Observation	MPEG	Photo	Grade
Depth: m	02						
		0.00	MH	Start node, manhole, reference: 02			
		0.00	WL	Water level, 15% of the vertical dimension			
		43.90	MHF	Finish node, manhole, reference: 03			
Depth: m	03						

Construction Features

Miscellaneous Features

STR No.	Def	STR Peak	STR Mean	STR Total	STR Grade	SER No.	Def	SER Peak	SER Mean	SER Total	SER Grade
0		0.0	0.0	0.0	1.0	0		0.0	0.0	0.0	1.0

LITTLEBOROUGH HOLLINGWORTH RD

Project

LITTLEBOROUGH CULVERT PROTECTION REPORT

Job No.

YZ074

Drawing Reference

Calculations by
HB

Checked by
SB

Calc Sheet No.

23

Unit

Date

17/06/26

Section B

2021 Sub Group survey



SUB GROUP LTD
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joe.walshaw@sub-group.co.uk

Section Rehab - 27/04/2021 - 01X

Section	Inspection	Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR
1	1	27/04/21	9:49	Not Specified	Dry	0	01X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
JW	VAN1	235	Not Specified	Not Specified	Not Specified

Town or Village: Littleborough
Road: Hollingworth Rd
Location: Fields
Surface Type:

Inspection Direction: Downstream
Inspected Length: 82.50 m
Total Length: 82.50 m
Joint Length: 0.00 m

Upstream Node: 01
Upstream Pipe Depth: 0
Downstream Node: 02
Downstream Pipe Depth: 0

Comments:
Recommendations:

Scale: 1:603

Position [m]

Code

Observation

MPEG

Photo

Grade

Depth: m

01

0.00

0.00

0.00

0.00

02

82.50

82.50

Depth: m

GO General observation: HEAVY FAST FLOW 00:00:00

ST Start of survey 00:02:19

MH Manhole: 01 00:02:19

WL Water level, 20% of sewer height 00:02:19

MH Manhole: 02 00:04:09

FH Finish survey 00:04:09

HOLLINGWORTH RD, LITTLEBOROUGH

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2025 Adien Survey



ADIEN
MILLFIELD IND EST, DONCASTER

Section Inspection - 06/11/2025 - 02X

Item No.	Insp. No.	Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR
3	1	06/11/25	19:20	Not Specified	No Rain Or Snow	No	02X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
JW	Not Specified	Not Specified	Not Specified	Not Specified	Not Specified

Town or Village: Littleborough
Road: Hollingworth Rd
Location: Footway
Surface Type:

Inspection Direction: Downstream
Inspected Length: 84.40 m
Total Length: 84.40 m
Joint Length:

Upstream Node: 02
Upstream Pipe Depth:
Downstream Node: 03
Downstream Pipe Depth:

Use: Culverted watercourse
Type of Pipe: Gravity drain/sewer
Flow Control: No flow control
Year Constructed: Not Specified
Inspection Purpose: Routine inspection

Pipe Shape: Circular
Dia/Height: 600 mm
Material: Concrete
Lining Type: No Lining
Lining Material: No Lining

Comments:
Recommendations:

Scale: 1:731

Position [m]

Code

Observation

MPEG

Photo

Grade

Depth: m

02

0.00

0.00

84.40

03

Depth: m

MH Start node, manhole, reference: 02

WL Water level, 10% of the vertical dimension

MHF Finish node, manhole, reference: 03

Construction Features

STR No.	Def	STR Peak	STR Mean	STR Total	STR Grade
0	0.0	0.0	0.0	0.0	1.0

Miscellaneous Features

SER No.	Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	0.0	1.0

LITTLEBOROUGH HOLLINGWORTH RD

2

Project

LITTLEBOROUGH CULVERT PROTECTION REPORT

Job No.

YZ074

Drawing Reference

Calculations by
HB

Checked by
SB

Calc Sheet No.

24

Unit

Date

17/06/26

Section C

2021 Sub Group survey

Section		Inspection		Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR
2	1	27/04/21	9:58	Not Specified	Dry	0	02X		
Operator		Vehicle		Camera	Preset Length	Legal Status	Alternative ID		
JW		VAN1		235	Not Specified	Not Specified	Not Specified		

Section Inspection - 27/04/2021 - 02X

Town or Village:	Inspection Direction:	Upstream Node:
Littleborough	Downstream	02
Road:	Inspected Length:	Upstream Pipe Depth:
Hollingworth Rd	11.30 m	
Location:	Total Length:	Downstream Node:
Fields	11.30 m	03
Surface Type:	Joint Length:	Downstream Pipe Depth:
	0.00 m	

Use: Culverted watercourse
Type of Pipe: Gravity drain/sewer
Flow Control: No flow control
Year Constructed: Not Specified
Inspection Purpose: Associated with future capital scheme including Drainage Area Planning

Pipe Shape: Circular
Dia/Height: 600 mm
Pipe Material: Concrete
Lining: No Lining
Lining Material: No Lining

Comments:
Recommendations:

Scale:	Position [m]	Code	Observation	MPEG	Photo	Grade
1:98	02	GO	General observation: HEAVY FAST FLOW	00:00:00		
Depth: m	0.00	ST	Start of survey	00:04:20		
	0.00	MH	Manhole: 02	00:04:20		
	0.00	WL	Water level, 20% of sewer height	00:04:20		
	11.30	MH	Manhole: 03	00:01:04		
	11.30	FH	Finish survey	00:01:05		
Depth: m						

Construction Features					Miscellaneous Features				
STR No.	Def	STR Peak	STR Mean	STR Total	SER No.	Def	SER Peak	SER Mean	SER Total
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

HOLLINGWORTH RD, LITTLEBOROUGH

3

2025 Adien Survey

Section		Inspection		Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR
4	1	06/11/25	19:28	Not Specified	No Rain Or Snow	No	03X		
Operator		Vehicle		Camera	Preset Length	Legal Status	Alternative ID		
JW		Not Specified		Not Specified	Not Specified	Not Specified	Not Specified		

Section Inspection - 06/11/2025 - 03X

Town or Village:	Inspection Direction:	Upstream Node:
Littleborough	Downstream	03
Road:	Inspected Length:	Upstream Pipe Depth:
Hollingworth Rd	8.30 m	
Location:	Total Length:	Downstream Node:
Footway	8.30 m	04
Surface Type:	Joint Length:	Downstream Pipe Depth:

Use: Culverted watercourse
Type of Pipe: Gravity drain/sewer
Flow Control: No flow control
Year Constructed: Not Specified
Inspection Purpose: Routine inspection

Pipe Shape: Circular
Dia/Height: 600 mm
Material: Concrete
Lining Type: No Lining
Lining Material: No Lining

Comments:
Recommendations:

Scale:	Position [m]	Code	Observation	MPEG	Photo	Grade
1:72	03	MH	Start node, manhole, reference: 03			
Depth: m	0.00	WL	Water level, 5% of the vertical dimension			
	0.00					
	8.30	MHF	Finish node, manhole, reference: 04			
Depth: m						

Construction Features					Miscellaneous Features				
STR No.	Def	STR Peak	STR Mean	STR Total	SER No.	Def	SER Peak	SER Mean	SER Total
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

LITTLEBOROUGH HOLLINGWORTH RD

3

Vistry Group



Linden
HOMES

Vistry
Partnerships

Project

LITTLEBOROUGH CULVERT PROTECTION REPORT

Job No.
YZ074

Drawing Reference

Calculations by
HB

Checked by
SB

Calc Sheet No.
25

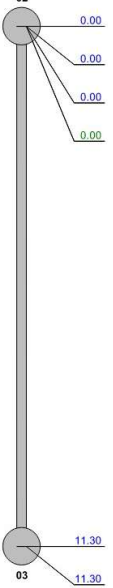
Unit

Date
17/06/26

Section C

2021 Sub Group survey

2025 Adien Survey

		SUB GROUP LTD DONCASTER Tel. 01302 880537 joe.walshaw@sub-group.co.uk					
Section Rehab - 27/04/2021 - 02X							
Section 2	Inspection 1	Date 27/04/21	Time 9:58	Client's Job Ref Not Specified	Weather Dry	Pre Cleaned 0	PLR 02X
Operator JW	Vehicle VAN1	Camera 235	Preset Length Not Specified	Legal Status Not Specified	Alternative ID Not Specified		
Town or Village: Road: Location: Surface Type:		Littleborough Hollingworth Rd Fields		Inspection Direction: Inspected Length: Total Length: Joint Length:		Downstream 11.30 m 11.30 m 0.00 m	
				Upstream Node: Upstream Pipe Depth: Downstream Node: Downstream Pipe Depth:		02 0 03 0	
Comments: Recommendations:							
Scale:	1:83	Position [m]	Code	Observation	MPEG	Photo	Grade
Depth: m							
02							
							
0.00							
GO General observation: HEAVY FAST FLOW 00:00:00							
0.00							
ST Start of survey 00:04:20							
0.00							
MH Manhole: 02 00:04:20							
0.00							
WL Water level, 20% of sewer height 00:04:20							
11.30							
MH Manhole: 03 00:01:04							
11.30							
FH Finish survey 00:01:05							
Depth: m							

HOLLINGWORTH RD, LITTLEBOROUGH

Project LITTLEBOROUGH CULVERT PROTECTION REPORT			Job No. YZ074
Drawing Reference	Calculations by HB	Checked by SB	Calc Sheet No. 26
Unit			Date 17/06/26

Section D

2021 Sub Group survey



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Section Inspection - 27/04/2021 - 03X

Section 3	Inspection 1	Date 27/04/21	Time 10:05	Client's Job Ref Not Specified	Weather Dry	Pre Cleaned 0	PLR 03X
Operator JW	Vehicle VAN1	Camera 235	Preset Length Not Specified	Legal Status Not Specified	Alternative ID Not Specified		

Town or Village: Road: Location: Surface Type:	Littleborough Hollingworth Rd Fields Footway	Inspection Direction: Inspected Length: Total Length: Joint Length:	Downstream 47.60 m 47.60 m 0.00 m	Upstream Node: Upstream Pipe Depth: Downstream Node: Downstream Pipe Depth:	03 47.60 m 04 47.60 m
Use: Type of Pipe: Flow Control: Year Constructed: Inspection Purpose:	Culverted watercourse Gravity drain/sewer No flow control Not Specified Associated with future capital scheme including Drainage Area Planning	Pipe Shape: Dia/Height: Pipe Material: Lining: Lining Material:	Circular 600 mm Concrete No Lining No Lining		
Comments: Recommendations:					

Scale:	1:411	Position [m]	Code	Observation	MPEG	Photo	Grade
Depth: m							
03		0.00	GO	General observation: HEAVY FAST FLOW	00:00:00		
		0.00	ST	Start of survey	00:01:15		
		0.00	MH	Manhole: 03	00:01:15		
		0.00	WL	Water level, 20% of sewer height	00:01:15		
		47.60	MH	Manhole: 04	00:02:29		
		47.60	FH	Finish survey	00:02:30		
04							
Depth: m							

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

HOLLINGWORTH RD, LITTLEBOROUGH

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2025 Adien Survey



ADIEN
MILLFIELD IND EST, DONCASTER

Section Inspection - 06/11/2025 - 04X

Item No. 5	Insp. No. 1	Date 06/11/25	Time 19:32	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR 04X
Operator JW	Vehicle Not Specified	Camera Not Specified	Preset Length Not Specified	Legal Status Not Specified	Alternative ID Not Specified		

Town or Village: Road: Location: Surface Type:	Littleborough Hollingworth Rd Footway Footway	Inspection Direction: Inspected Length: Total Length: Joint Length:	Downstream 49.60 m 49.60 m 0.00 m	Upstream Node: Upstream Pipe Depth: Downstream Node: Downstream Pipe Depth:	04 49.60 m 05 49.60 m
Use: Type of Pipe: Flow Control: Year Constructed: Inspection Purpose:	Culverted watercourse Gravity drain/sewer No flow control Not Specified Routine inspection	Pipe Shape: Dia/Height: Material: Lining Type: Lining Material:	Circular 600 mm Concrete No Lining No Lining		
Comments: Recommendations:					

Scale:	1:430	Position [m]	Code	Observation	MPEG	Photo	Grade
Depth: m							
04		0.00	MH	Start node, manhole, reference: 04			
		0.00	WL	Water level, 5% of the vertical dimension			
		49.60	MHF	Finish node, manhole, reference: 05			
05							
Depth: m							

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

LITTLEBOROUGH HOLLINGWORTH RD

4

Project

LITTLEBOROUGH CULVERT PROTECTION REPORT

Job No.

YZ074

Drawing Reference

Calculations by
HB

Checked by
SB

Calc Sheet No.

27

Unit

Date

17/06/26

Section D

2021 Sub Group survey

2025 Adien Survey



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Tel. 01302 880537
joe.walshaw@sub-group.co.uk

Section Rehab - 27/04/2021 - 03X

Section 3	Inspection 1	Date 27/04/21	Time 10:05	Client's Job Ref Not Specified	Weather Dry	Pre Cleaned 0	PLR 03X
Operator JW	Vehicle VAN1	Camera 235	Preset Length Not Specified	Legal Status Not Specified	Alternative ID Not Specified		

Town or Village: Littleborough

Road: Hollingworth Rd

Location: Fields

Surface Type:

Inspection Direction: Downstream

Inspected Length: 47.60 m

Total Length: 47.60 m

Joint Length: 0.00 m

Upstream Node: 03

Upstream Pipe Depth: 0

Downstream Node: 04

Downstream Pipe Depth: 0

Comments:

Recommendations:

Scale: 1:348

Position [m]

Code

Observation

MPEG

Photo

Grade

Depth: m

03

0.00

0.00

0.00

0.00

47.60

47.60

04

Depth: m

GO General observation: HEAVY FAST FLOW 00:00:00

ST Start of survey 00:01:15

MH Manhole: 03 00:01:15

WL Water level, 20% of sewer height 00:01:15

MH Manhole: 04 00:02:29

FH Finish survey 00:02:30

HOLLINGWORTH RD, LITTLEBOROUGH

Project
LITTLEBOROUGH CULVERT PROTECTION REPORT

Job No.
YZ074

Drawing Reference

Calculations by
HB

Checked by
SB

Calc Sheet No.
28

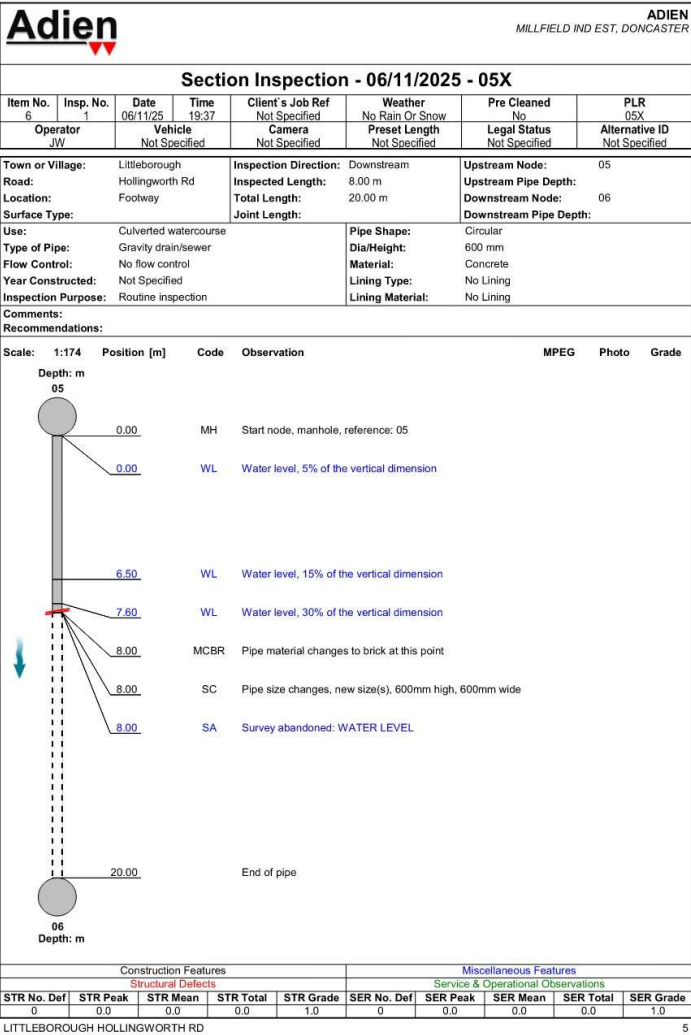
Unit

Date
17/06/26

Section E

2021 Sub Group survey

2025 Adien Survey



Vistry Group   	Project LITTLEBOROUGH CULVERT PROTECTION REPORT			Job No. YZ074
	Drawing Reference	Calculations by HB	Checked by SB	Calc Sheet No. 29
	Unit			Date 17/06/26

	7. SUMMARY All stresses and deflections are within allowable limits for the steel plate & is designed to resist the most onerous construction loads during bulk earthworks in the temporary case. It is noted that these calculations have been disputed by United Utilities. These calculations rely on the steel plate bridging over the culvert and gravel surround. The use of a compressible material ensures loads do not surcharge the gravel surround to the culvert. The design is based on load transfer acting downwards through the banks of natural strata either side of the culvert & not transferring laterally into the gravel surround. Should the theoretical methodology be disputed, further evidence has been gathered in the form of condition surveys to ensure the culvert has been protected from all damage. A post-earthworks culvert condition survey has been undertaken by Adien (2025) to compare to the original condition survey pre-earthworks by Sub Group (2021). It has been shown that no defects were found and the condition is the same as before. The bulk earthworks has already been completed in its entirety using the methodology set out in this report. Upon completion of the road construction, the additional cover as well as the less onerous vehicle loads will result in a less concentrated, distributed load of smaller magnitude. However, the steel protective plate is removed in the permanent case. The final design / end-use case has been verified by our project engineers, Eastwoods CE, by way of a written statement and appended overleaf. In addition to this, cursory design checks for the permanent case have been undertaken within this report at the request of UU, taking into account overburden pressures and road surcharge loads for both extremities of cover to the crown of the pipe. This report evidence that the culvert has been adequately protected and will continue to be suitably protected from damage following site completion.	
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Vistry Group Bovis Homes Linden HOMES Vistry Partnerships	Project LITTLEBOROUGH CULVERT PROTECTION REPORT			Job No. YZ074
	Drawing Reference	Calculations by HB	Checked by SB	Calc Sheet No. 30
	Unit			Date 17/06/25

8. ANNEX A – EASTWOODS CE DESIGN STATEMENT

From: Grace Holley <grace.holley@eastwoodce.com>
Sent: 13 February 2026 14:17
To: Henry Byfield; Sakhile Majola; Chris Hodge
Subject: RE: Littleborough Culvert

Categories: hollingworth road - littleborough

NOTE: Email originated outside of Vistry Group.

Hi Henry

We have been asked to comment on whether the existing culvert is suitably protected in its end case use. Our understanding is that the existing culvert is a 600dia concrete culvert and that the designs have been completed to provide a minimum 1.2m cover. We would deem 1.2m cover to be suitable for typical highway loadings assuming appropriate bed and surround has been maintained to the pipe. The existing culvert is an adoptable UU asset that was in place when the land was previously used as agricultural land and therefore will have been designed to take loading from agricultural vehicles. The anticipated vehicular loading to the culvert from the newly constructed residential development is therefore no worse than it was originally designed for. In summary, we expect that the culvert in its permanent case will be sufficiently protected for the design life of the pipe and normal traffic and loading conditions.

Kind regards,

Grace Holley
Senior Engineer

DD: 0114 399 4524
T: 0114 255 4554

Please note that I work compressed hours so may not be available on Friday afternoons.



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Vistry Group Bovis Homes  Linden HOMES  Vistry Partnerships 	Project LITTLEBOROUGH CULVERT PROTECTION REPORT			Job No. YZ074
	Drawing Reference	Calculations by HB	Checked by SB	Calc Sheet No. 31
	Unit			Date 17/06/25

9. Annex B – Photographs of Exposed Culvert Pipe & Gravel Surround

Drainage Consultation on Application – 23/01087/DOC

Date of response: 17th October 2023

APPLICANT'S SUBMISSION

NOTE: The 'water main' is the raw water transfer pipe that can send flows from Hollingworth lake to the canal.

- Culvert ("Raw Water Main") long sections by Eastwood & Partners drg 45466/210/rev A dated 26.09.23
- S104 Layout Sheet 1 by Eastwood & Partners drg 45466/030/rev F dated 14.10.23
- S104 Layout Sheet 2 by Eastwood & Partners drg 45466/031/rev G dated 14.10.23



Photo of "raw water main" culvert pipe. This confirms that the material is concrete and it has gravel bedding.

DRAINAGE OFFICER RECOMMENDATIONS:

The new information: the cross-section details, the pipe material as concrete, and the photo above confirm that that the 'raw water main' is suitable for an access road to be built above it.

I assume that the Developer is in regular contact with United Utilities on the protection of this "raw water main".

The cross-section details seems to indicate that there are manhole-chambers on the pipe, labelled MH 5,1,2,3,4, and 6. These do not seem to be shown on a Plan drawing that has been submitted. I have to assume that these are existing and that the covers will be readjusted to final ground (road) levels? However, this is something for the Developer and United Utilities' raw water main dept. to monitor.

For the reasons provided above, I have no objection to the discharging of Condition 6.

Consultation by Stephen McCann

Drainage & Flooding Officer

01706 924606 / 07552 570262

✉ stephen.mccann@rochdale.gov.uk