Inverurie Asset Condition Assessment

Final Report

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JBA Project Manager

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Revision history

Revision Ref/Date	Amendments	Issued to
P01 / 23 March 2018	Draft Report	Alistair Scotland and Lee Watson, Aberdeenshire Council
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C01 / 03 April 2019	Published	Alistair Scotland and Lee Watson, Aberdeenshire Council

Contract

This report describes work commissioned by Gavin Penman, on behalf of Aberdeenshire Council, on 10 October 2017 by Purchase Order 1095192. Dougall Baillie's representative for the contract was Scott Macphail and Aberdeenshire Council's representative for the contract was Alistair Scotland. Christina Kampanou and Stephen Farrar of JBA Consulting carried out this work.

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Senior Engineer

Purpose

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Executive summary

A structural survey was undertaken along the main watercourses of Inverurie in Aberdeenshire, the River Urie, the River Don and the old canal of the River Don.

The structural assets along the rivers were visually inspected, recorded and assessed in accordance with the Environment Agency's Condition Assessment Manual March 2012. The visual survey locates their position, identifies the risk of blockage, maintenance required and if appropriate 'quick wins'.

Properties with property level flood protection measures have been identified from an external visual survey.

The assets were generally found to be in good condition and their likely performance, assessed in this report, can be essential for effective flood risk management.

Contents

List of Figures

List of Tables

Abbreviations

TBC	To be confirmed
CSO	Combined Sewer Overflow
FPS	Flood Protection Scheme
PLP	Property Level Protection
SW	Scottish Water
NRV	Non-return valve

1 Introduction

A full walkover survey was undertaken to assess the condition of structures in Inverurie in Aberdeenshire as part of the Inverurie Flood Protection Study. More specifically, the walkover was undertaken in Inverurie along the River Urie and the River Don. The asset condition assessment has been carried out in accordance with the Environment Agency's Condition Assessment Manual March 2012. Where information provided by the client indicates the risk of blockage is high, or where this is thought to be high this has been recorded. (no formal risk assessment/modelling has been carried out at this stage).

Category	Comments
Date of inspection(s)	29-30 November 2017
Inspector(s)	Stephen Farrar and Christina Kampanou
General inspection information	Weather on 29 November was wet and relatively windy. On 30 November there was snow.
Scheme information	The asset survey is on behalf of Aberdeenshire Council.
Nature of inspection(s)	The inspections were walkover surveys of the structural assets in the towns, as well as logging of any PLP within the survey lines. Photographs were taken but no topographic survey work was carried out.
Nature of assets	Culverts and bridges are the main structural assets in Inverurie. There are also embankments, retaining walls, sluice gates, outlet structures and a weir.
General condition / comments	The assets were generally found to be in good condition.

2 River Urie

Assets are listed below from upstream to downstream, with the numbering referenced in Figure 2-1, Figure 2-2, Figure 2-3 and Figure 2-4.

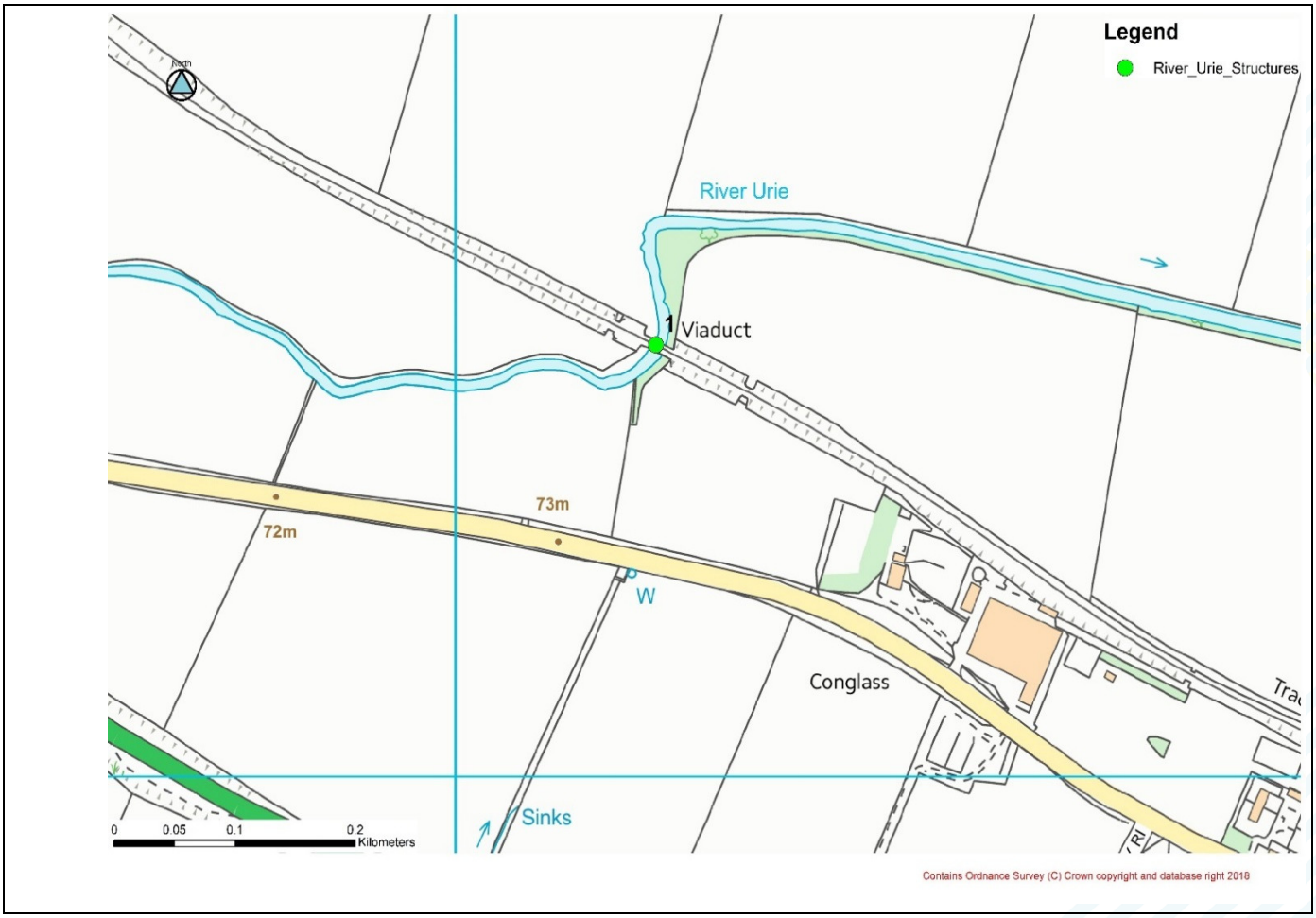


Figure 2-1: Plan showing the distribution of features identified in the asset condition assessment along the River Urie

Table 2-1 – List of structural assets shown in Figure 2-1		
Number	**Asset**	**Location**
1	ANI1 293/077 Railway Bridge	Conglass

1- ANI1 293/077 Railway Bridge (Refer to Figure 2-1)	
 ***Upstream view of masonry bridge***	**Type:** Single Arch Bridge **Upstream Grid Ref: NJ 75169 23324** **Span (m):** Unknown **Material:** Masonry / Cement rendering **Condition:** Grade 3 (Fair) **Part of FPS:** No **Comments:** Waterproofing failure - water stains. Slight to moderate spalling of brickwork. Minor mortar loss. Longitudinal fracture of arch soffit. **Risk of blockage:** Low **Maintenance:** None required **Quick Win:** N/A
 ***Upstream view of arch soffit***	

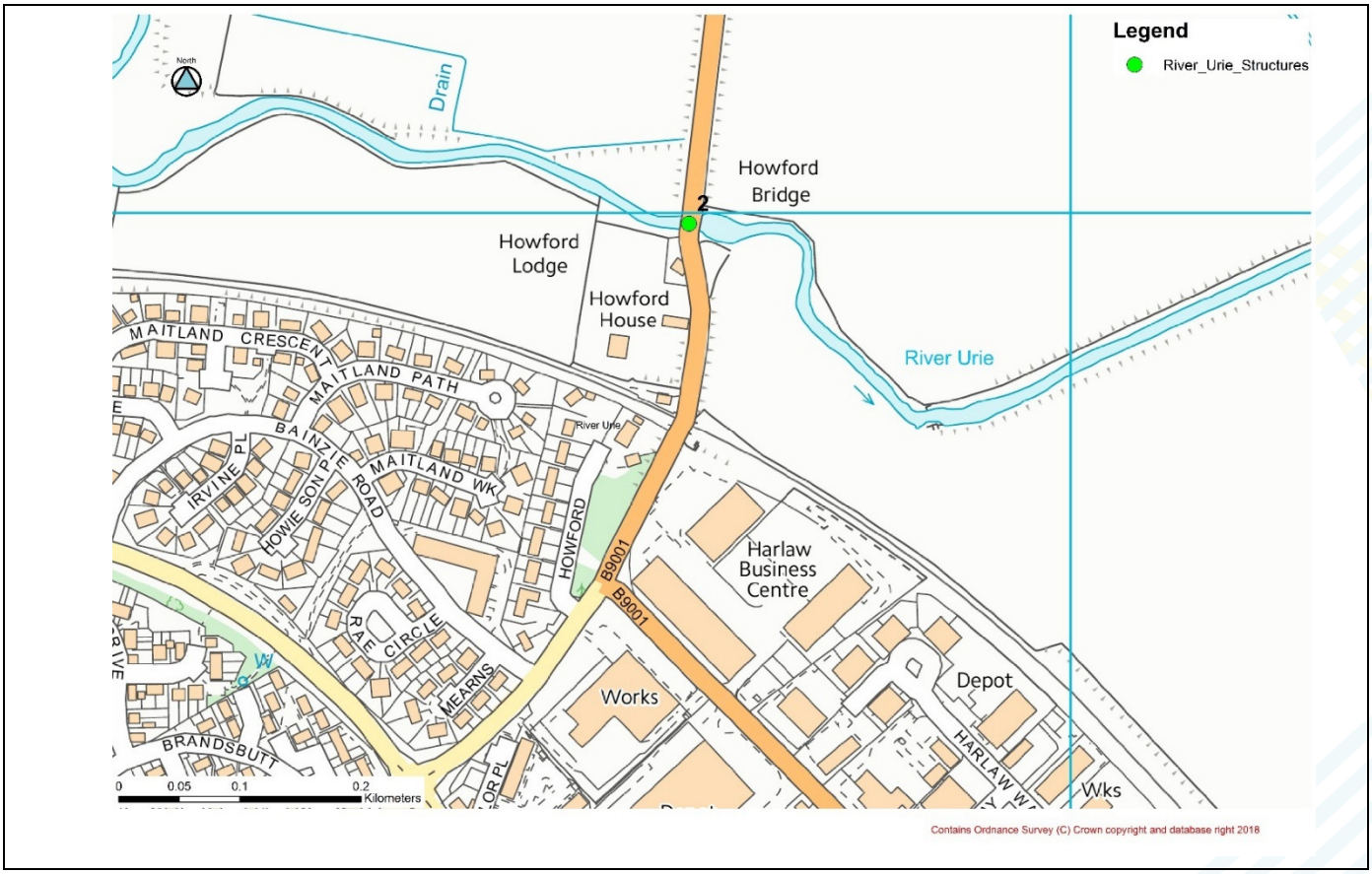


Figure 2-2: Plan showing the distribution of features identified in the asset condition assessment along the River Urie

Table 2-2 – List of structural assets shown in Figure 2-2		
Number	**Asset**	**Location**
2	Howford Bridge B9001	B9001, Howford

2 - Howford Bridge B9001 (Refer to Figure 2-2)	
 ***Downstream face of bridge***	**Type:** Single Arch Bridge **Upstream Grid Ref: NJ 76685 22991** **Span (m):** 15.43 **Material:** Masonry **Condition:** Grade 2 (Good) **Part of FPS:** No **Comments:** Some spalling of masonry. Minor cracks. Eroded banks. Medium scour risk (Council's Records). **Risk of blockage:** Low **Maintenance:** None required **Quick Win:** N/A
 ***Downstream view***	 ***Upstream view***

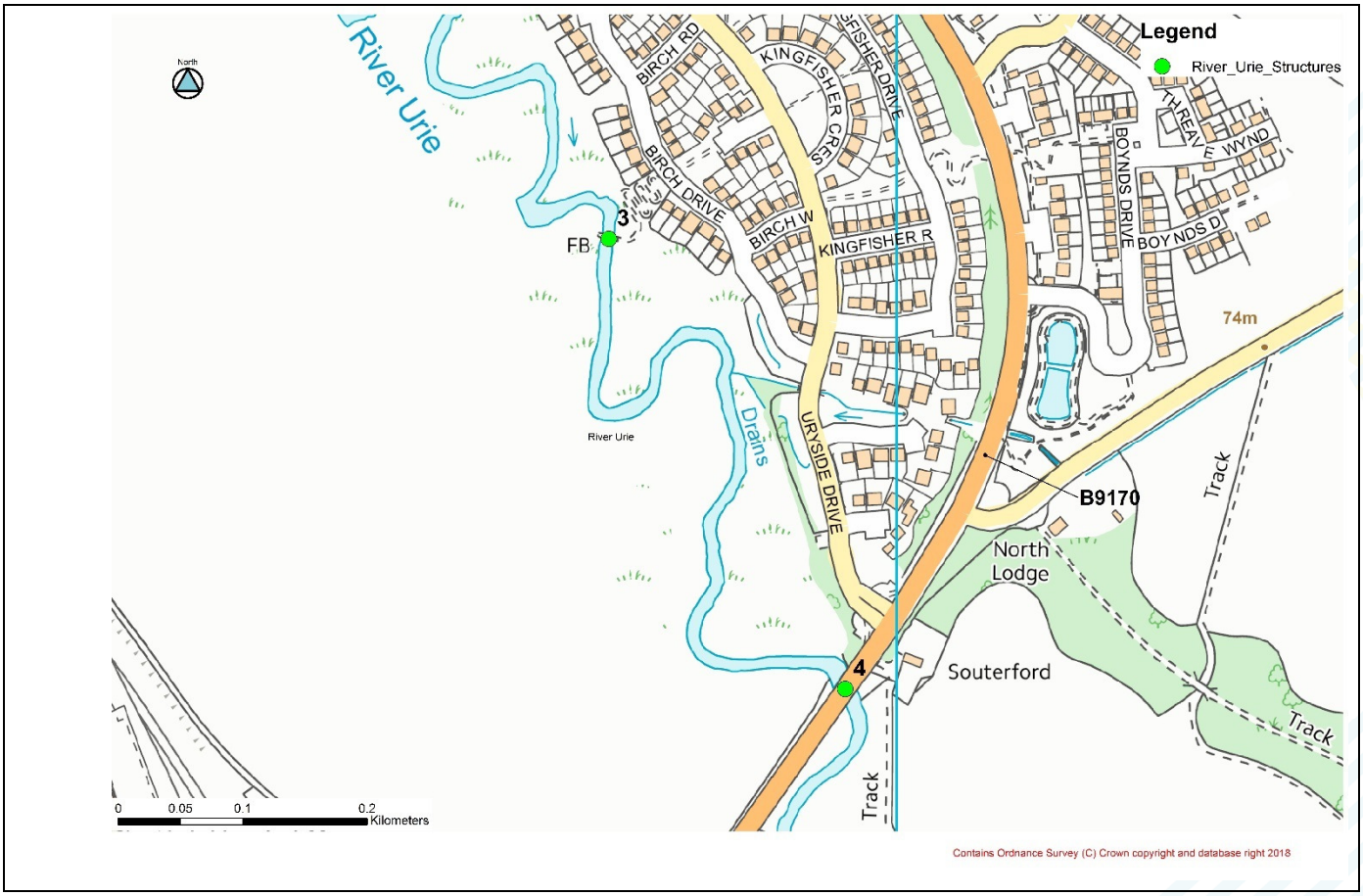


Figure 2-3: Plan showing the distribution of features identified in the asset condition assessment along the River Urie

Table 2-3: List of structural assets shown in Figure 2-3		
Number	**Asset**	**Location**
3	Park Footbridge	Birch Drive
4	Souterford Bridge	B9170 Road

3 - Park Footbridge (Refer to Figure 2-3)	
 ***Downstream face of Footbridge***	**Type:** Private Footbridge **Upstream Grid Ref: NJ 77768 22530** **Span (m):** 12.65 **Rise (m):** 1 **Material:** Steel Deck/ Masonry Abutments **Condition:** Grade 1 (Very Good) **Part of FPS:** No **Comments:** Fixings present. Abutments sound. Overgrown vegetation along banks. **Risk of Blockage:** Low **Maintenance:** None required **Quick Win:** N/A

4 - Souterford Bridge (Refer to Figure 2-3)	
 ***Upstream face of bridge, right abutment***	**Type:** Road Bridge **Upstream Grid Ref: NJ 77958 22168** **Span (m):** 19.15 **Material:** Steel Deck/ Masonry Abutments **Condition:** Grade 2 (Good) **Part of FPS:** No **Comments:** No sign of deformation. Seeping joints concrete abutments. Mortar joint loss coping stones. **Risk of Blockage:** Low **Maintenance:** None required **Quick Win:** N/A

4 - Souterford Bridge (Refer to Figure 2-3)	
	
Upstream face of bridge, left abutment	***Upstream view***

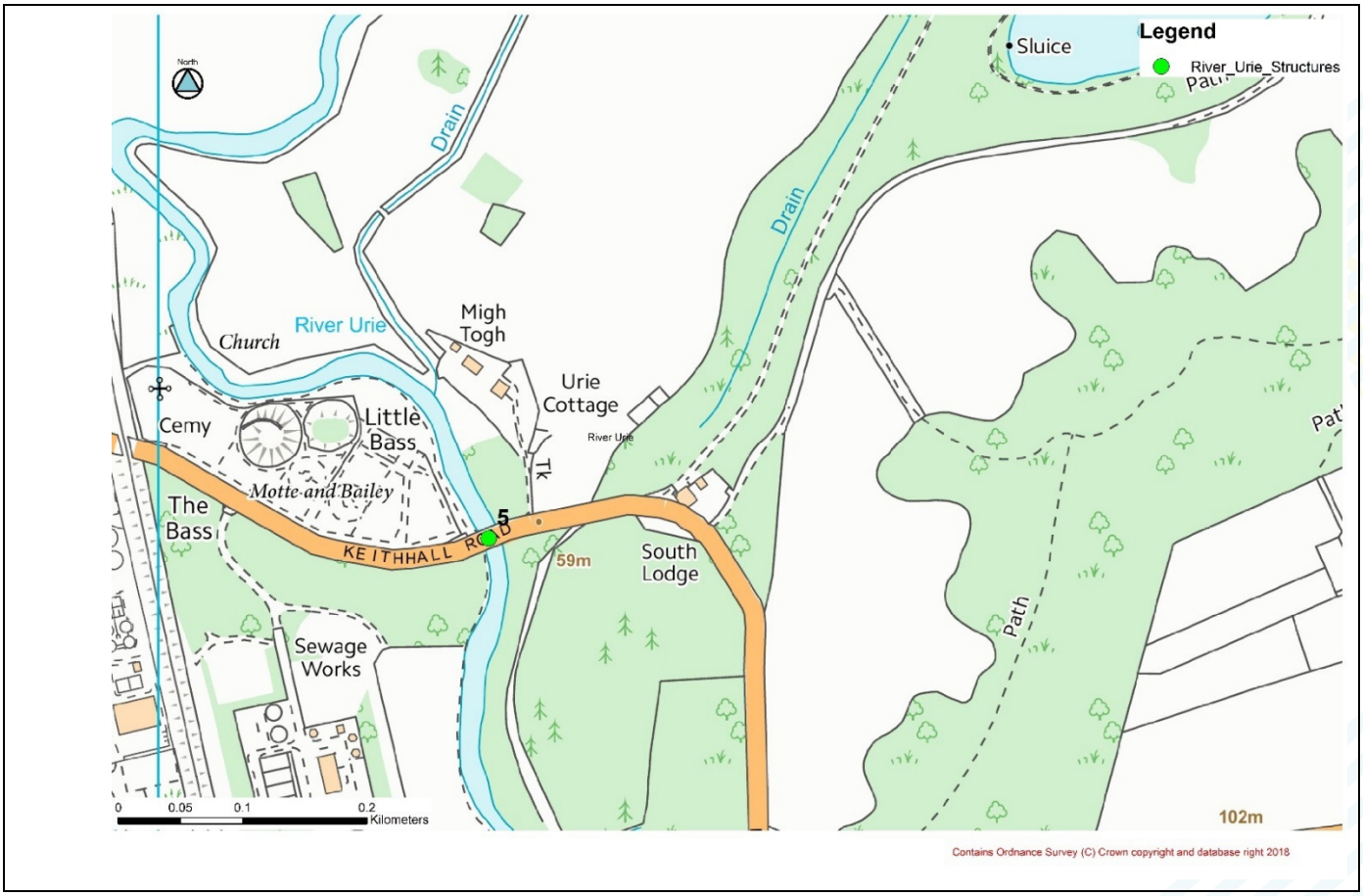


Figure 2-4: Plan showing the distribution of features identified in the asset condition assessment along the River Urie

Table 2-4: List of structural assets shown in Figure 2-4		
Number	**Asset**	**Location**
5	Keithhall Road Bridge	B993 (Keithhall) Road

5 – Keithhall Road Bridge (Refer to Figure 2-4)	
 ***Upstream view of bridge***	**Type:** Arched Bridge **Upstream Grid Ref: NJ 78265 20516** **Span (m):** 15.5 **Width (m):** 5.6 **Material:** Masonry **Condition:** Grade 2 (Good) **Part of FPS:** No **Comments:** Bridge in line with watercourse. Some mortar joint loss of soffit. Slight bulge of arch soffit. **Risk of Blockage:** Low **Maintenance:** None required **Quick Win:** N/A
 ***Upstream view of watercourse***	 ***Downstream view of watercourse***

3 River Don

Assets are listed below from upstream to downstream, with numbering referenced in Figure 3-1, Figure 3-2 and Figure 3-3.

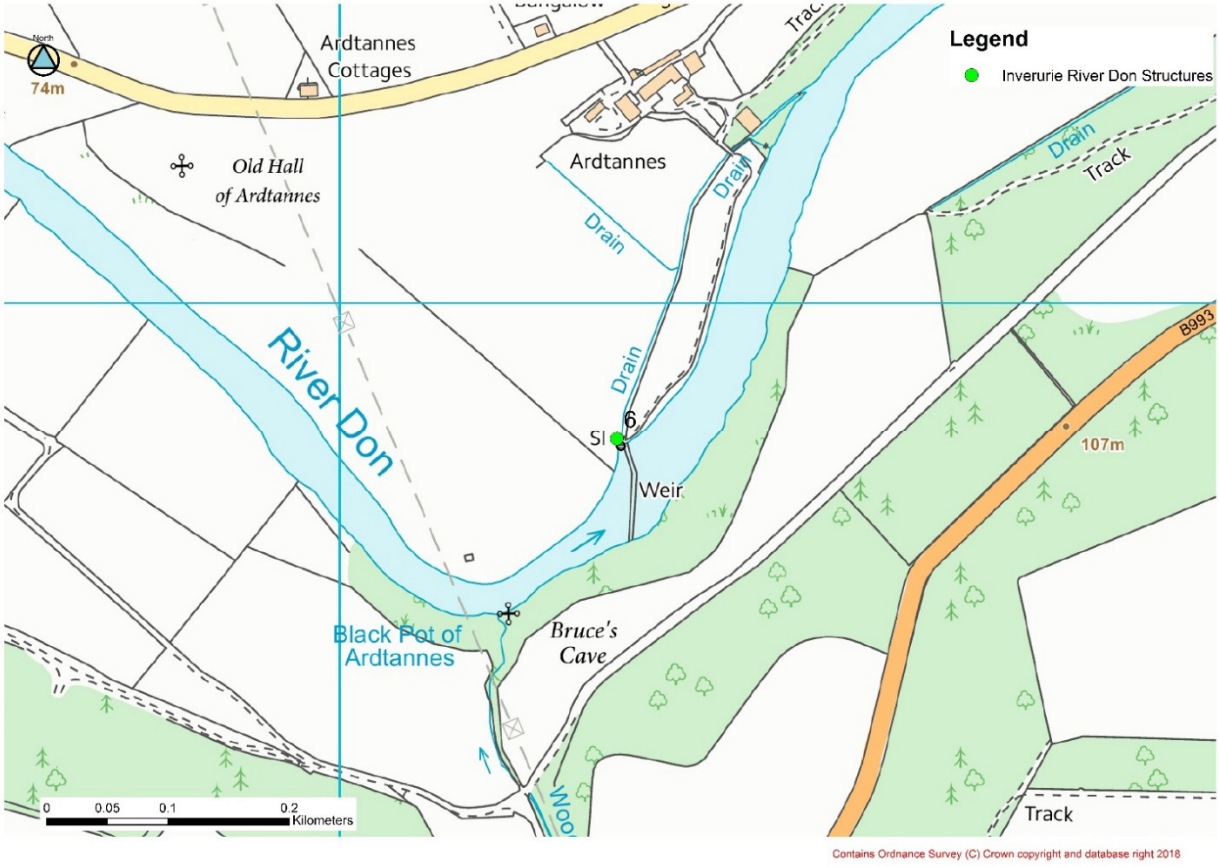


Figure 3-1: Plan showing the distribution of features identified in the asset condition assessment along the River Don

Table 3-1: List of structural assets shown in Figure 3-1		
Number	**Asset**	**Location**
6	Sluice Gate and Weir	River Don Ardtannes

6 – Sluice Gate and Weir (Refer to Figure 3-1)	
 ***Sluice Gate***	**Type**: Control Gate **Upstream grid ref: NJ 76226 19889** **Material**: Steel / Timber **Condition**: Grade 5 (Very Poor) **Part of FPS:** No **Comments**: Mechanism not operable. Considerable corrosion of steel. Rotten timber. Weir upstream partially missing. **Risk of Blockage:** N/A **Maintenance:** N/A **Quick Win:** N/A
 ***Upstream view of sluice gate***	 ***View of Weir***

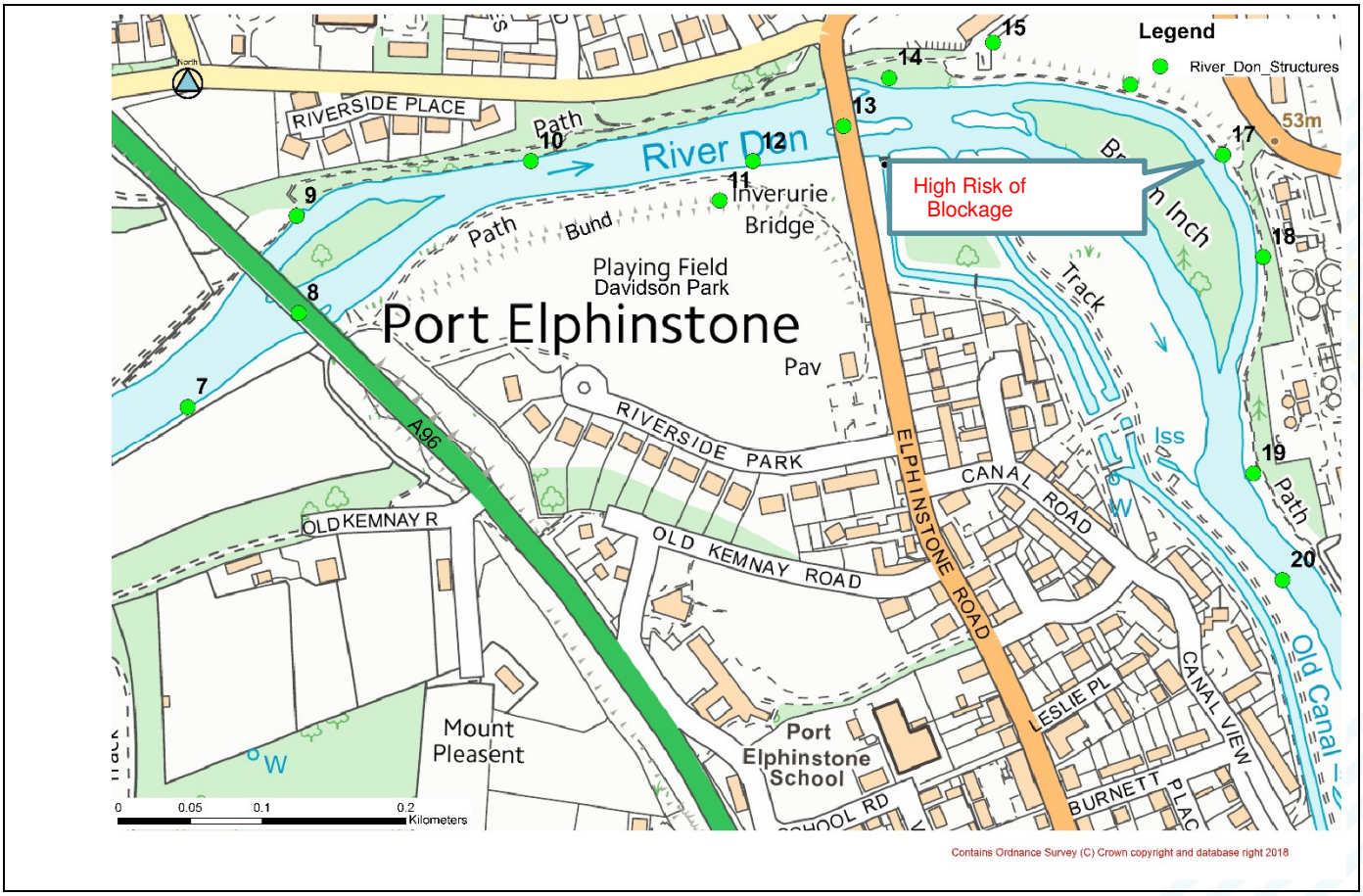


Figure 3-2: Plan showing the distribution of features identified in the asset condition assessment along the River Don

Table 3-2: List of structural assets shown in Figure 3-2		
Number	**Asset**	**Location**
7	SW Outfall	Inverurie Bridge footpath
8	Port Elphinstone Bridge	A96 Road
9	SW Outfall 2504	Port Elphinstone Playing Field footpath- Davidson Park
10	SW Outfall 4608	Port Elphinstone Playing Field footpath – Davidson Park
11	Davidson Park Embankment	Port Elphinstone
12	SW Outfall Check Valve NRV fitted (TBC) at MH5504	Port Elphinstone Playing Field footpath
13	Don Bridge	B996 (Elphinstone) Road
14	SW Outfall 6603	Port Elphinstone Footpath

Table 3-2: List of structural assets shown in Figure 3-2		
15	Inverurie Pre Cast Ltd Flood wall	Port Elphinstone Footpath
16	Scottish Water Embankment	Port Elphinstone Footpath
17	SW CSO Outfall 8501	Port Elphinstone Footpath
18	Scottish Water Embankment	Port Elphinstone Footpath
19	Culvert outlet	Port Elphinstone Footpath
20	SW Outfall 9303	Port Elphinstone Footpath

7 – SW Outfall (Refer to Figure 3-2)	
 ***Area where the outfall should be***	**Type**: Outfall **Upstream grid ref: NJ 77124 20399** **Diameter (m):** 0.3 **Material**: Unknown **Condition**: Unknown **Part of FPS:** No **Comments**: Outfall not visible. Assumed to be below water level. **Risk of Blockage:** Unknown **Maintenance:** N/A **Quick Win:** Fit NRV if source of flooding

8 - Port Elphinstone Bridge A96 (Refer to Figure 3-2)	
 ***Upstream view of bridge***	**Type**: Continuous Steel Bridge **Upstream grid ref: NJ 77241 20490** **Material**: Steel Deck and Parapet/ Concrete Columns **Condition**: Grade 2 (Good) **Part of FPS:** No **Comments**: Over floodplain. Sound supports. No signs of cracking or deformation. Some water stains. **Risk of Blockage:** Low **Maintenance:** Keep free of debris **Quick Win:** N/A

8 - Port Elphinstone Bridge A96 (Refer to Figure 3-2)	
 ***View of bridge from underneath***	 ***Upstream view of bridge***

9 – SW Outfall 2504 (Refer to Figure 3-2)	
 ***View of outfall and flap valve***	**Type**: Outfall **Upstream grid ref: NJ 77235 20552** **Diameter (m):** 0.675 **Material**: Concrete **Condition**: Grade 2 (Good) **Part of FPS:** No **Comments**: Fixings sound. Surface corrosion to mechanism. Not a likely cause of flooding. **Risk of Blockage:** Low **Maintenance:** N/A **Quick Win:** N/A
 ***View of outfall and wingwall looking downstream***	

10 – SW Outfall 2504 (Refer to Figure 3-2)	
 ***Area where the outfall should be***	**Type**: Outfall **Upstream grid ref: NJ 77401 20596** **Diameter (m):** 0.225 **Material**: **Condition**: Unknown **Part of FPS:** No **Comments**: Outfall not visible. Assumed to be below water level. Not a likely cause of flooding. **Risk of Blockage:** Unknown **Maintenance:** N/A **Quick Win:** N/A

11 – Davidson Park Embankment (Refer to Figure 3-2)	
 ***View from downstream***	**Type**: Flood Bank **Upstream grid ref: NJ 77623 20528** **Width (m):** 2 **Material**: Earth **Condition**: Grade 2 (Good) **Part of FPS:** Yes Potential to set back embankment. **Comments**: Stable and well vegetated slope. Relatively steep. Moderately uneven crest. No signs of erosion. **Risk of Blockage:** Low **Maintenance:** Maintain embankment covered with protective vegetation. **Quick Win:** N/A
 ***View from upstream***	

12 – SW Outfall (Refer to Figure 3-2)	
 ***Area where outfall should be***	**Type**: Outfall **Upstream grid ref: NJ 77561 20591** **Diameter (m):** 0.3 **Material**: Unknown **Condition**: Unknown **Part of FPS:** No **Comments**: Outfall not visible. Assumed to be below water level. **Risk of Blockage:** Unknown **Maintenance:** N/A **Quick Win:** Fit NRV if source of flooding

13 - Don Bridge (Refer to Figure 3-2)	
 ***Upstream view of Don Bridge***	**Type**: Bridge **Upstream grid ref: NJ 77620 20620** **Span (m):** 53.92 **Material**: Reinforced Concrete Beam and Slab / Masonry piers **Condition**: Grade 2 (Good) **Part of FPS:** No **Comments**: Some concrete spalling. Surface damage. Low scour risk (Council's Record). **Risk of Blockage:** Low **Maintenance:** None required **Quick Win:** N/A
 ***Right Pier***	 ***View from downstream***

14 – SW Outfall 6603 (Refer to Figure 3-2)	
 ***View of outfall***	**Type**: Outfall with gate **Upstream grid ref: NJ 77659 20646** **Diameter (m):** Unknown **Material**: Concrete **Condition**: Grade 2 (Good) **Part of FPS:** No **Comments**: Pipe sound. **Risk of Blockage:** Low **Maintenance:** N/A **Quick Win:** Fit NRV if source of flooding

15 – Inverurie Pre Cast Ltd Flood Wall (Refer to Figure 3-2)	
 ***Flood Wall***	**Type**: Private Flood Wall **Upstream grid ref: NJ 77724 20678** **Thickness (m):** 0.3 **Height (m):** From 1 to 1.7 **Width (m):** 1 **Material**: Concrete **Condition**: Grade 2 (Good) **Part of FPS:** No **Comments**: No consistent foundation. Some spalling. Minor loss of joint material. Not likely to be waterproof. Unlikely to meet codified standards. **Risk of Blockage:** Low **Maintenance:** None required **Quick Win:** N/A

15 – Inverurie Pre Cast Ltd Flood Wall (Refer to Figure 3-2)	
 ***Left hand sife of the wall***	

16 – Scottish Water Embankment (Refer to Figure 3-2)	
 ***Downstream view***	**Type**: Embankment **Upstream grid ref: NJ 77734 20668** **Material**: Earth **Condition**: Grade 2 (Good) **Part of FPS:** No **Comments**: Informal embankment. Uneven crest. **Risk of Blockage:** Low **Maintenance:** Keep embankment well vegetated **Quick Win:** N/A

17 – SW CSO Outfall 8501 (Refer to Figure 2-1)	
 ***Outfall***	**Type**: Outfall **Upstream grid ref: NJ 77884 20600** **Material**: Concrete **Condition**: Grade 3 (Fair) **Part of FPS:** No **Comments**: Vegetation growth at all sides of structure. Corrosion of pipe grill. Fixings still present. Eroded banks. Flood debris in surrounding area. **Risk of Blockage:** High **Maintenance:** Keep trash screen and canal free of debris

17 – SW CSO Outfall 8501 (Refer to Figure 2-1)	
	Quick Win: Fit a non-return valve, remove debris, remove pipe grill.
 ***Downstream view***	 ***Upstream view***

18– Scottish Water Embankment (Refer to Figure 3-2)	
 ***Upstream end***	**Type**: Embankment **Upstream grid ref: NJ 77905 20538** **Material**: Earth **Condition**: Grade 3 (Fair) **Part of FPS:** No **Comments**: Uneven crest. Overflown embankment. Relatively steep downstream. **Risk of Blockage:** Low **Maintenance:** Keep embankment well vegetated **Quick Win:** N/A

18– Scottish Water Embankment (Refer to Figure 3-2)

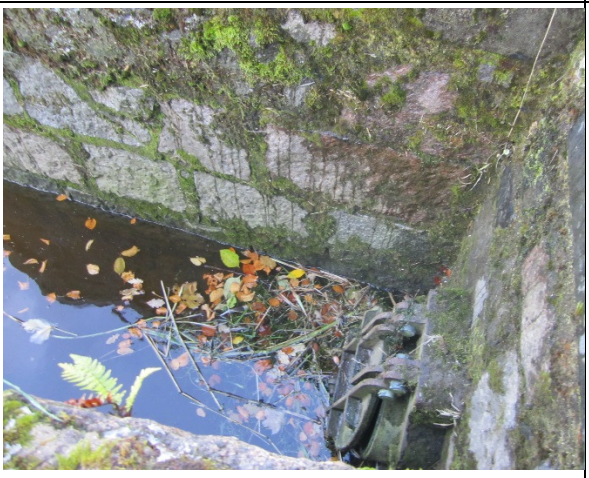
Flood Debris

Downstream end

19 – Culvert outlet (Refer to Figure 3-2)

Outfall

Type: Outfall and flap valve
Upstream grid ref: NJ 77905 20378
Material: Concrete
Condition: Grade 4 (Poor)
Part of FPS: Yes
Comments:
Outfall of old Wastewater Treatment Works.
Vegetation growth between stonework.
Protective barriers partially collapsed.
Loss of mortar.
Cracks of masonry.
Slight corrosion of flap valve.
Flood debris in surrounding area.
Possibly abandoned.
Risk of Blockage: Moderate
Maintenance: Keep free of debris
Quick Win: N/A



Flap valve

Outfall side walls

20 – SW Outfall 9303 (Refer to Figure 3-2)	
 ***Outfall***	**Type**: Outfall **Upstream grid ref: NJ 77918 20312** **Material**: Concrete / Brickwork **Condition**: Grade 4 (Poor) **Part of FPS:** No **Comments**: Manhole exposed due to bank erosion. Outfall breaking up. Horizontal Displacement of upper part. **Risk of Blockage:** Moderate **Maintenance:** Keep free of debris **Quick Win:** N/A

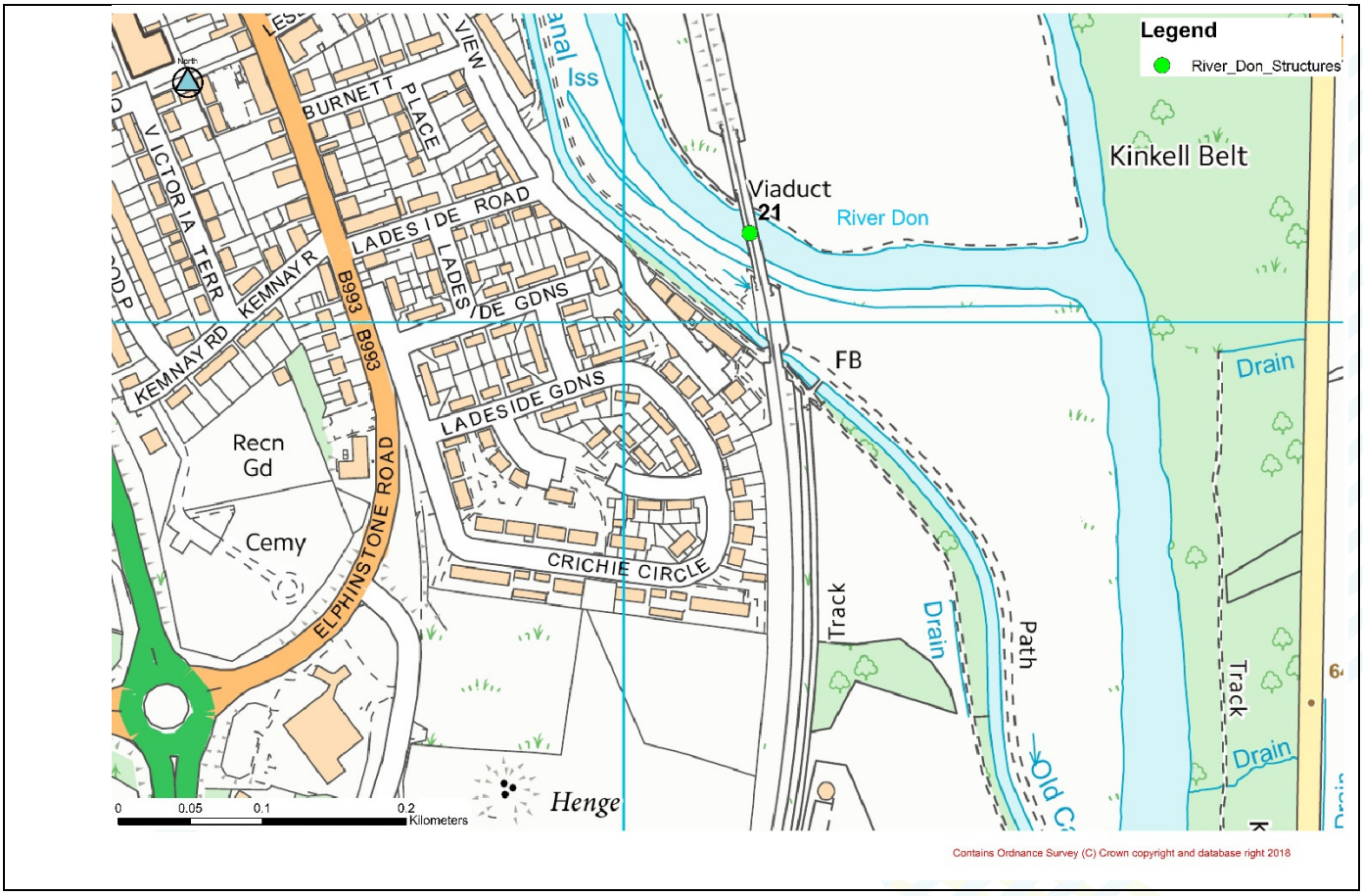


Figure 3-3: Plan showing the distribution of features identified in the asset condition assessment along the River Don

Table 3-3: List of structural assets shown in Figure 3-3		
Number	**Asset**	**Location**
21	ANI1 293/068 Railway Bridge (Viaduct)	Port Elphinstone

21 – ANI1 293/068 Railway Bridge (Refer to Figure 3-3)

Upstream view of bridge

Type: Viaduct
Upstream grid ref: NJ 78087 20062
Material: Steel Deck / Masonry Piers
Condition: Grade 2 (Good)
Part of FPS: No
Comments:
Railway Viaduct.
Risk of Blockage: Low
Maintenance: None required
Quick Win: N/A

Downstream view

Downstream view of watercourse

4 River Don Old Canal

Assets are listed below from upstream to downstream, with numbering referenced in Figure 4-1, Figure 4-2 and Figure 4-3.

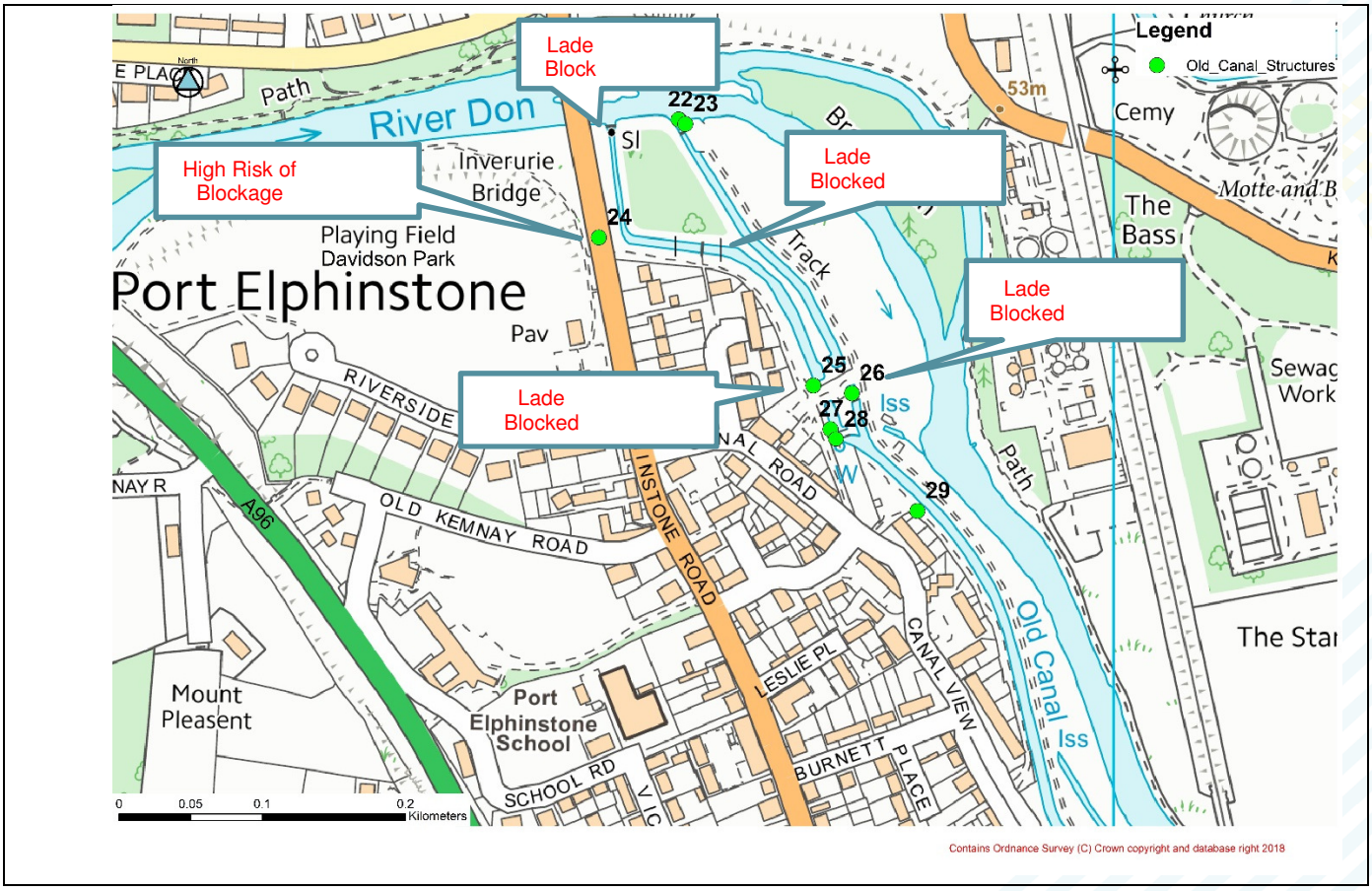


Figure 4-1: Plan showing the distribution of features identified in the asset condition assessment along the River Don Old Canal

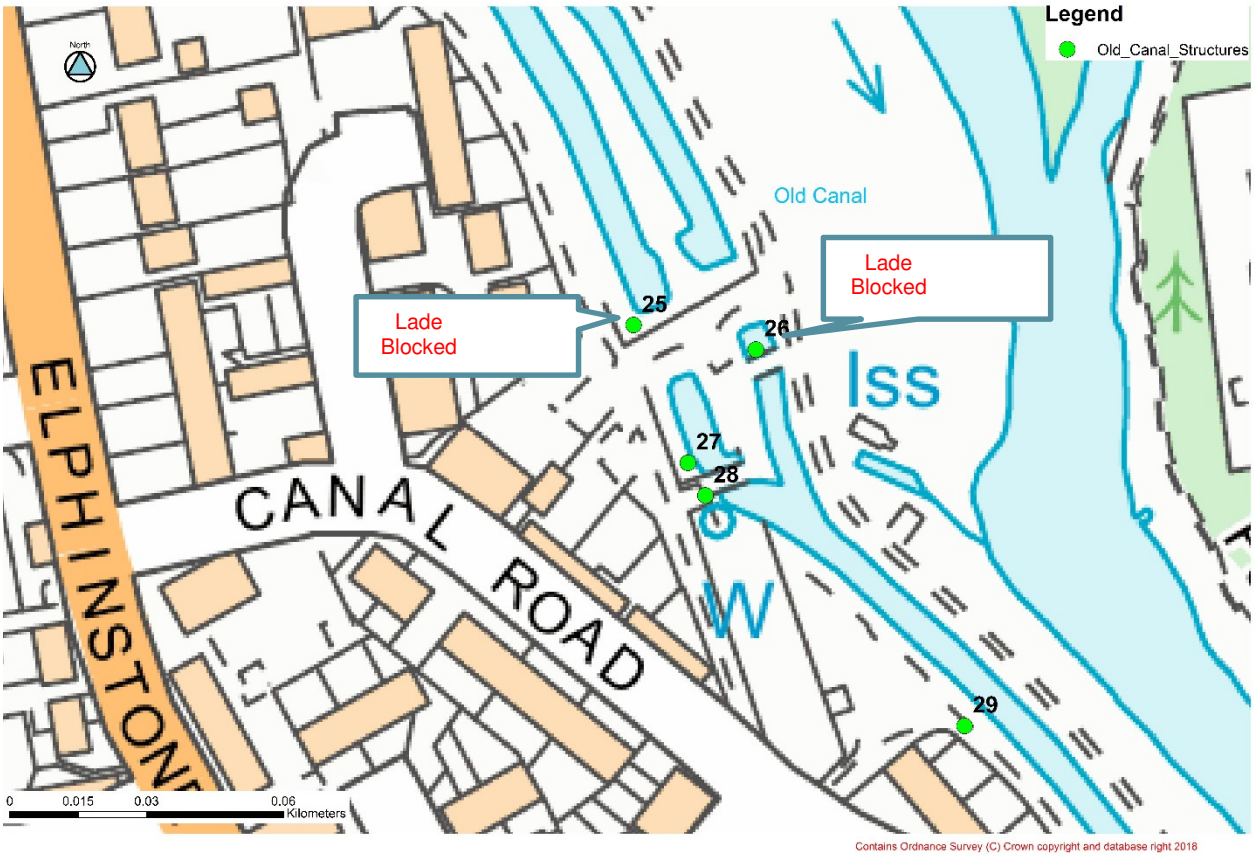


Figure 4-2: Closer view showing the distribution of features 25-28 identified in the asset condition assessment along the River Don Old Canal

Table 4-1: List of structural assets shown in Figure 4-1 and Figure 4-2		
Number	**Asset**	**Location**
22	Gantry Bridge	Port Elphinstone
23	Sheet Pile Wall	Port Elphinstone
24	Gowan Bank Bridge	B993 (Elphinstone) Road
25	Embankment	Old Canal Footpath
26	Culvert	Old Canal Footpath
27	Culvert	Old Canal Footpath
28	Wall	Old Canal Footpath
29	Informal Flood Wall	Old Canal Footpath

22 – Gantry Bridge (Refer to Figure 4-1)	
 ***View of bridge***	**Type**: Bridge **Upstream grid ref: NJ 77648 20599** **Material**: Steel **Condition**: Grade 2 (Good) **Part of FPS:** No **Comments**: Privately owned. **Risk of Blockage:** Low, although debris trapped by bridge **Maintenance:** Investigate the control regime of the canal system **Quick Win:** N/A

23 – Sheet Pile Wall (Refer to Figure 4-1)	
 ***Upstream view of wall***	**Type**: Wall **Upstream grid ref: NJ 77698 20603** **Material**: Steel wall and concrete capping **Condition**: Grade 2 (Good) **Part of FPS:** No **Comments**: No sign of movement. Some corrosion of piles. Privately owned. **Risk of Blockage:** Low **Maintenance:** Investigate the control regime of the canal system **Quick Win:** N/A

24- Gowan Bank Bridge (Refer to Figure 4-1)	
 ***Upstream view***	**Type**: Bridge with triple culverts **Upstream grid ref: NJ 77640 20678** **Diameter of culvert (m):** 0.9 **Material**: Concrete **Condition**: Grade 3 (Fair) **Part of FPS:** No **Comments**: Minor cracking. Some spalling of concrete. Minor deformation of shape. No vegetation through culvert. Connects playing field flood area to canal. **Risk of Blockage:** High

24- Gowan Bank Bridge (Refer to Figure 4-1)	
	Maintenance: Keep free of debris **Quick Win:** N/A

25– Embankment (Refer to Figure 4-1 and Figure 4-2)	
 ***Upstream view***	**Type**: Pedestrian Bridge / Culvert **Upstream grid ref: NJ 77790 20419** **Material**: Earth **Condition**: Grade 3 (Fair) **Part of FPS:** No **Comments**: Unevenly vegetated. Uneven crest. Steep and unstable slope downstream. Scour at toe downstream. **Risk of Blockage:** Already blocked up. **Maintenance:** N/A **Quick Win:** N/A
 ***Downstream view***	

26 – Culvert (Refer to Figure 4-1 and Figure 4-2)	
 ***Upstream view***	**Type**: Pedestrian Bridge / Culvert **Upstream grid ref: NJ 77814 20411** **Length (m): 8 approximately** **Material**: Concrete **Condition**: Grade 4 (Poor) **Part of FPS:** No **Comments**: Concrete spalling. Culvert blocked by large boulders, possibly to do with canal accident[1]. Sediment deposition occupying the whole cross section. **Risk of Blockage:** Already blocked up **Maintenance:** N/A **Quick Win: N/A**

27 – Culverts (Refer to Figure 4-1 and Figure 4-2)	
 ***Upstream view***	**Type**: Culverts **Upstream grid ref: NJ 77800 20406** **Material**: Masonry **Condition**: Grade 3 (Fair) **Part of FPS:** Yes **Comments**: Part of old Canal. Main flow through east canal but partially blocked. Eroded and overgrown banks. Moss & algae on stones. Water stains. **Risk of Blockage:** Moderate **Maintenance:** Keep free of debris **Quick Win:** N/A

[1] Refer to http://news.bbc.co.uk/1/hi/scotland/2731491.stm

27 – Culverts (Refer to Figure 4-1 and Figure 4-2)	
 ***Upstream view***	

28 – Wall (Refer to Figure 4-1 and Figure 4-2)	
 ***Downstream view***	**Type**: Wall **Upstream grid ref: NJ 77801 20376** **Material**: Concrete **Condition**: Grade 2 (Good) **Part of FPS:** Yes **Comments**: Moss & algae on stones. Water stains. No sign of movement. **Risk of Blockage:** Moderate **Maintenance:** Keep free of debris **Quick Win:** N/A
 ***Downstream view***	

29 – Wall (Refer to Figure 4-1)	
 ***Upstream view***	**Type**: Informal Flood Wall **Upstream grid ref: NJ 77860 20328** **Material**: Masonry **Condition**: Grade 1 (Very Good) **Part of FPS:** Yes **Comments**: None **Risk of Blockage:** Low **Maintenance:** None required **Quick Win:** N/A

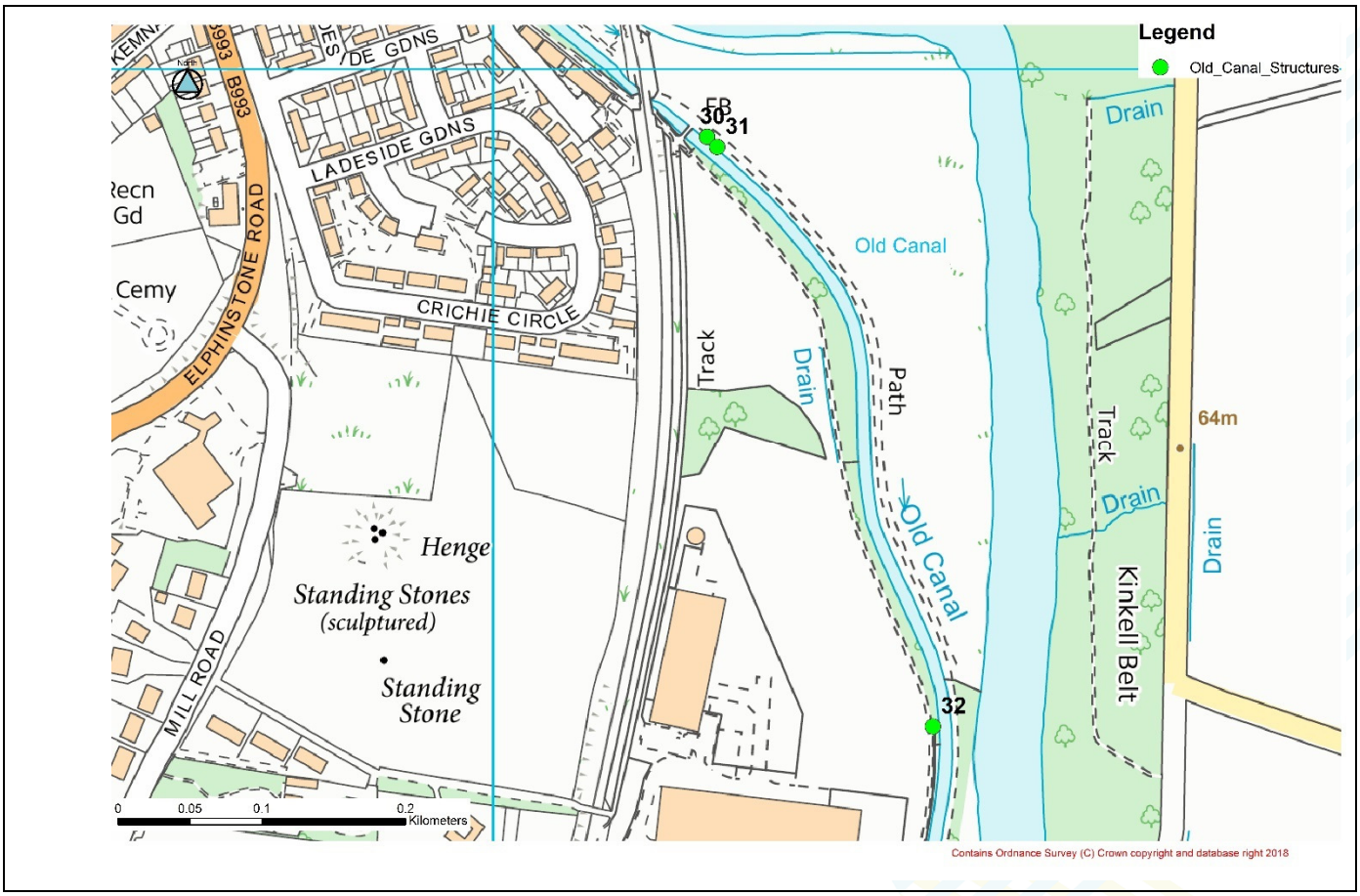


Figure 4-3: Plan showing the distribution of features identified in the asset condition assessment along the River Don Old Canal

Table 4-2: List of structural assets shown in Figure 4-3		
Number	**Asset**	**Location**
30	Footbridge	Old Canal Footpath
31	Railway Bridge	Port Elphinstone Footpath
32	Pipe Bridge	Kirkwood Commercial Park

30 – Footbridge (Refer to Figure 4-3)	
 ***Upstream view of bridge***	**Type**: Single span footbridge **Upstream grid ref: NJ 78148 19953** **Material**: Concrete / Steel **Condition**: Grade 3 (Fair) **Part of FPS:** Yes **Comments**: Spalling and minor cracking of abutments. Corrosion and deformation of handrails. Water stains. **Risk of Blockage:** Moderate **Maintenance:** Keep canal free of debris **Quick Win:** N/A

31 – Railway Bridge (Refer to Figure 4-3)	
 ***Upstream view of bridge***	**Type**: Railway Bridge over canal **Upstream grid ref: NJ 78155 19946** **Material**: Steel Deck / Masonry Abutments **Condition**: Grade 3 (Fair) **Part of FPS:** Yes **Comments**: Abutments show long cracks. Seeping joints. Minor corrosion of cross girders. Loss of mortar. Spalling of brickwork. Timber platform below not inspected. **Risk of Blockage:** Low **Maintenance:** None required **Quick Win:** N/A

31 – Railway Bridge (Refer to Figure 4-3)	
 ***View from underneath***	

32 – Pipe Bridge (Refer to Figure 4-3)	
 ***View from downstream***	**Type**: Pipe Bridge over canal **Upstream grid ref: NJ 78305 19543** **Material**: Steel **Condition**: Grade 3 (Fair) **Part of FPS:** No **Comments**: Corroded parts. **Risk of Blockage:** Low **Maintenance:** None required **Quick Win:** N/A

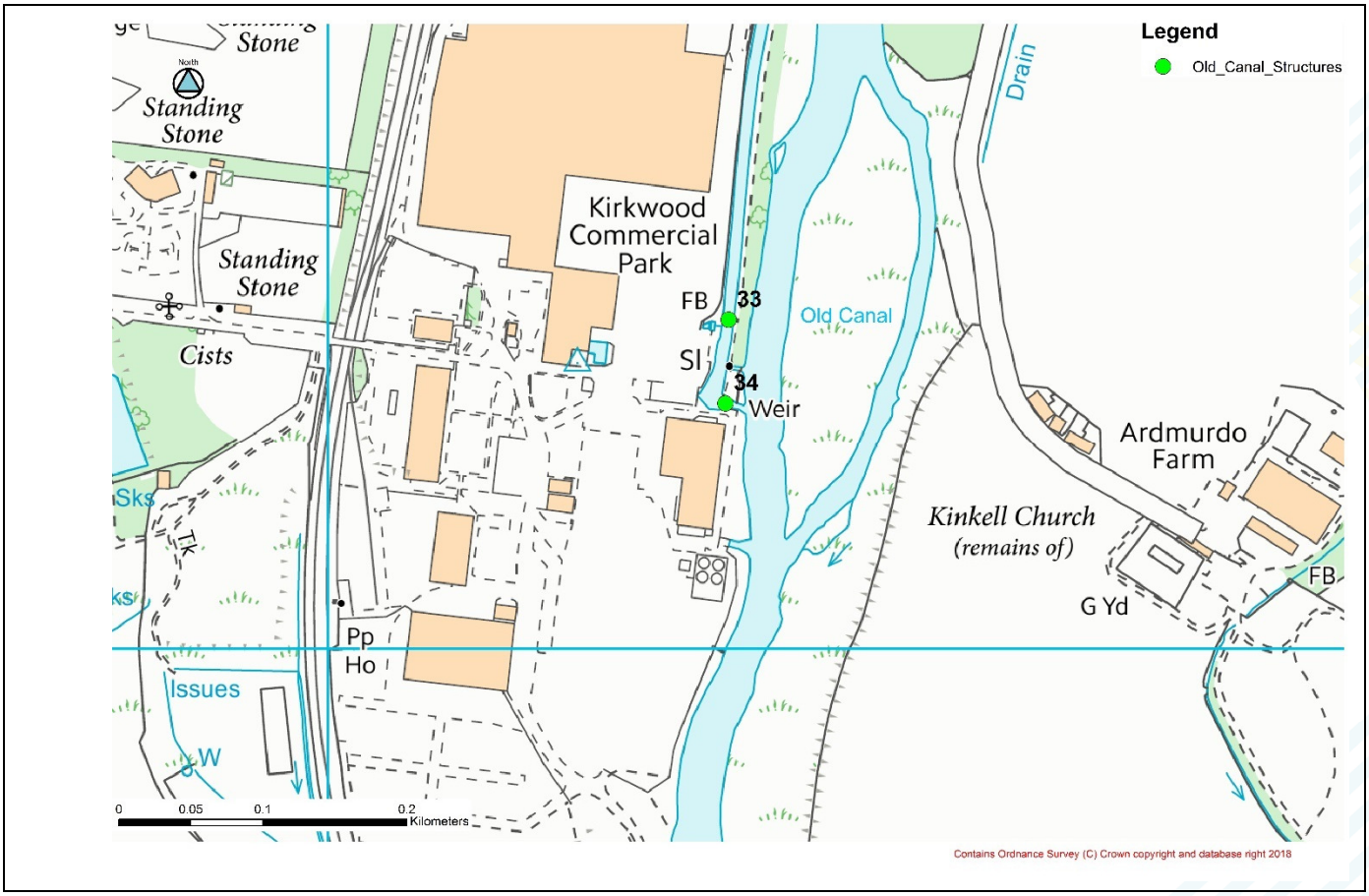


Figure 4-4: Plan showing the distribution of features identified in the asset condition assessment along the River Don Old Canal

Table 4-3: List of structural assets shown in Figure 4-4

Number	Asset	Location
33	Footbridge	Kirkwood Commercial Park
34	Footbridge and Weir	Kirkwood Commercial Park

33 – Footbridge (Refer to Figure 4-4)	
 ***View from downstream***	**Type**: Footbridge **Upstream grid ref: NJ 78255 19226** **Material**: Steel **Condition**: Grade 3 (Fair) **Part of FPS:** No **Comments**: Corrosion of parapet. **Risk of Blockage:** Low **Maintenance:** Keep canal free of debris **Quick Win:** N/A

34 – Footbridge and Weir (Refer to Figure 4-4)	
 ***View from downstream***	**Type**: Footbridge and weir from canal **Upstream grid ref: NJ 78272 19172** **Material**: Steel/ Masonry **Condition**: Grade 3 (Fair) **Part of FPS:** No **Comments**: Slightly uneven flow over weir crest. Mortar loss, cracking and spalling of masonry wingwalls. **Risk of Blockage:** Low **Maintenance:** Keep canal free of debris **Quick Win:** N/A
 ***Downstream of weir***	

5 Property Level Protection (PLP)

Property Level Protection was recorded in a commercial property off B9170 (AB51 0ZH, NJ 77734 21850) and a residential property on Keithhall Road (AB51 3UA, NJ 77874 20749). A possible PLP is recorded on Works off Harlaw Drive (AB51 4SF, NJ 77230 22269) and residential properties on Canal Road (AB51 3UQ, NJ 77756 20379) . Figure 5-1, Figure 5-2 and Figure 5-3 show the properties with PLP. The survey only identifies externally visible measures. Internal measures such as watertight doors, non-return valves etc. have not been identified.

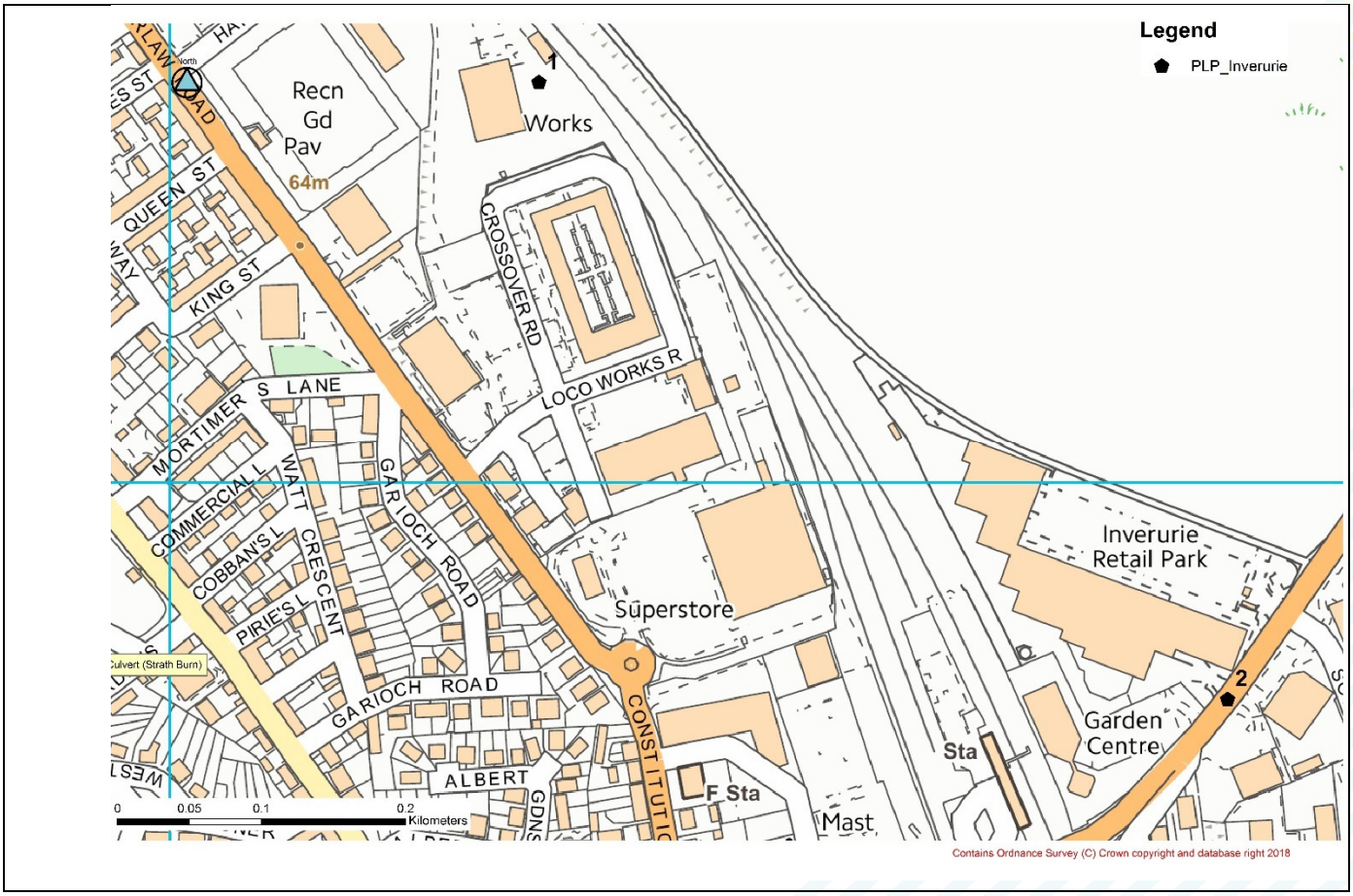


Figure 5-1: Plan showing the location of the PLP assets

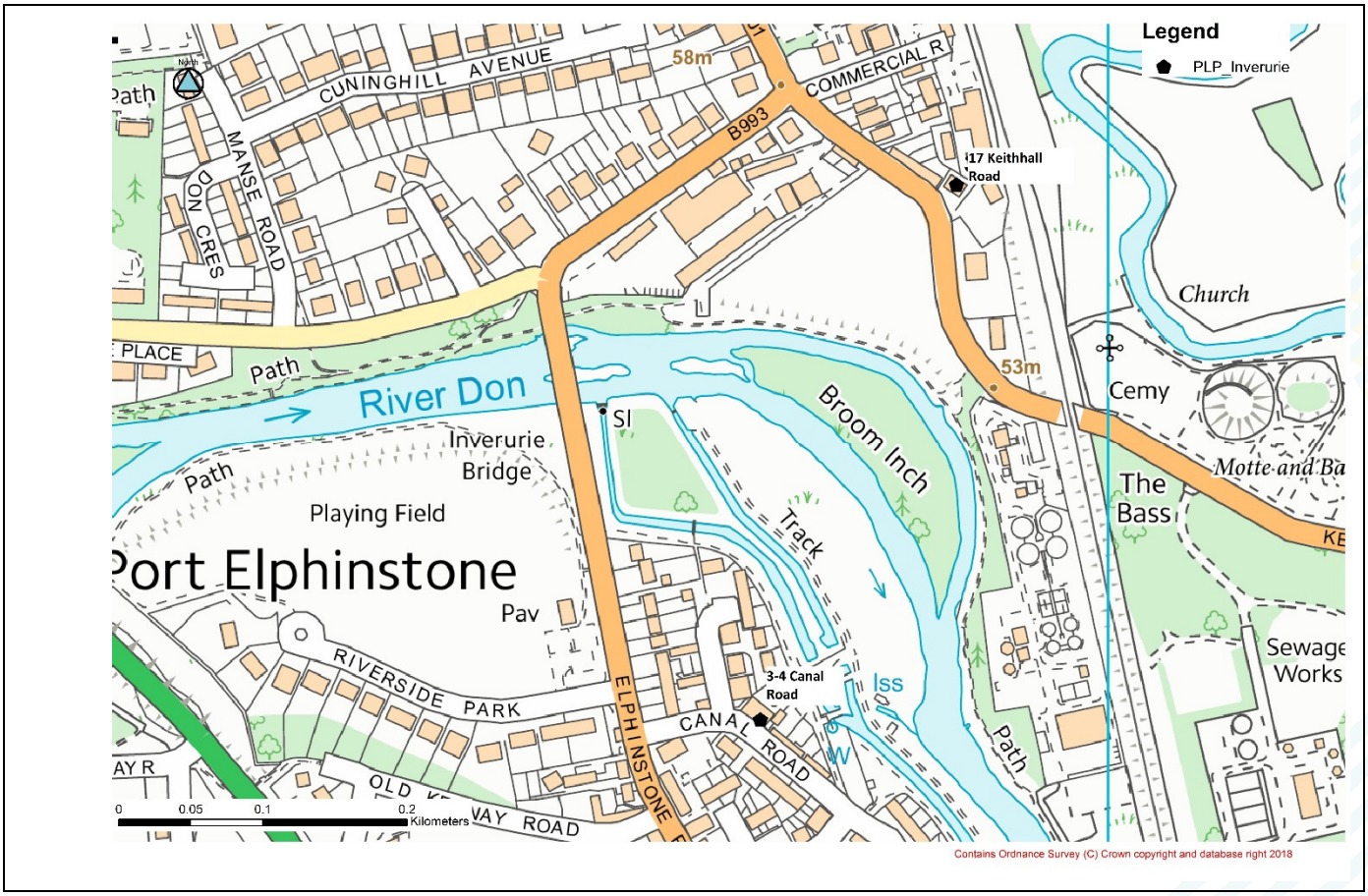


Figure 5-2: Plan showing the properties with PLP and their house numbers

The Property Level Protection used in the commercial properties is timber and concrete walls. Airbrick covers were used in the residential property on Keithhall Road and a possibly raised threshold in the residential properties on Canal Road. Figure 5-3, Figure 5-4, Figure 5-5 and Figure 5-6 show the PLP recorded.

Figure 5-3: Possible Property Level Protection of commercial property on Works off Harlaw Drive (No. 1)

Figure 5-4: Property Level Protection of commercial property (Scotframe Timber Engineering Limited) off B9170 (No. 2)

Figure 5-5: Property Level Protection of the 17 Keithhall Road

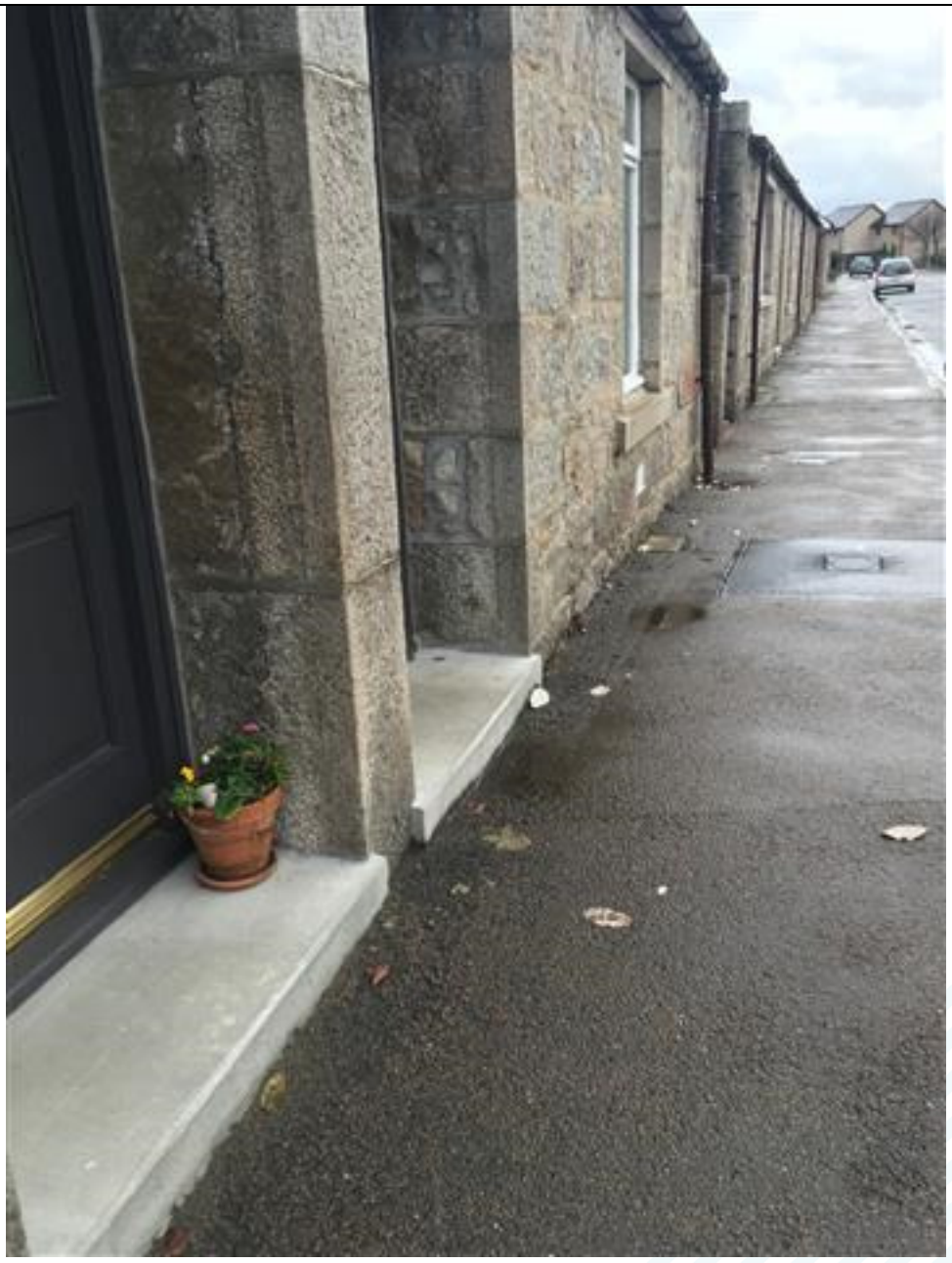


Figure 5-6: Property Level Protection on 3-4 Canal Road

Appendices

A Complete list of structural assets

A.1 River Urie

Table A-1 – Structural assets along the River Urie			
Number	**Asset**	**Location**	**Condition**
1	ANI1 293/077 Railway Bridge	Conglass	Grade 3
2	Howford Bridge B9001	Howford	Grade 2
3	Park Footbridge	Birch Drive	Grade 1
4	Souterford Bridge	B9170 Road	Grade 2
5	Keithhall Road Bridge	B993 (Keithhall) Road	Grade 2

A.2 River Don

Table A-2 – Structural assets along the River Don			
Number	**Asset**	**Location**	**Condition**
6	Sluice Gate and Weir	Ardtannes	Grade 5
7	SW Outfall	Inverurie Bridge footpath	
8	Port Elphinstone Bridge	A96 Road	Grade 2
9	SW Outfall 2504	Port Elphinstone Plying Field footpath	
10	SW Outfall 4608	Port Elphinstone Plying Field footpath	
11	Davidson Park Embankment	Port Elphinstone	Grade 2
12	SW Outfall (TBC) NRV fitted at MH5504	Port Elphinstone Plying Field footpath	
13	Don Bridge	B996 (Elphinstone) Road	Grade 2
14	SW Outfall	Port Elphinstone Footpath	
15	Inverurie Pre-cast Ltd. Flood wall	Port Elphinstone Footpath	Grade 2
16	Scottish Water Informal Embankment	Port Elphinstone Footpath	Grade 2
17	SW CSO Outfall 8501	Port Elphinstone Footpath	Grade 3

Table A-2 – Structural assets along the River Don			
			High Risk of Blockage
18	Scottish Water Embankment	Port Elphinstone Footpath	Grade 3
19	Culvert outlet	Port Elphinstone Footpath	Grade 4
20	SW Outfall 9303	Port Elphinstone Footpath	Grade 4
21	ANI1 293/068 Railway Bridge (Viaduct)	Port Elphinstone	Grade 2

A.3 River Don Old Canal

Table A-2 – Structural assets along the River Don Old Canal			
Number	**Asset**	**Location**	**Condition**
22	Sluice Gate	Port Elphinstone	
23	Sheet Pile Wall	Port Elphinstone	
24	Gowan Bank Bridge	B993 (Elphinstone) Road	Grade 3 High Risk of Blockage
25	Embankment	Old Canal Footpath	Grade 3 Blocked
26	Culvert	Old Canal Footpath	Grade 4 Blocked
27	Culvert	Old Canal Footpath	Grade 3
28	Wall	Old Canal Footpath	Grade 2
29	Informal Flood Wall	Old Canal Footpath	Grade 1
30	Footbridge	Old Canal Footpath	Grade 3
31	Railway Bridge	Port Elphinstone Footpath	Grade 3
32	Pipe Bridge	Kirkwood Commercial Park	Grade 3
33	Footbridge	Kirkwood Commercial Park	Grade 3
34	Footbridge and Weir	Kirkwood Commercial Park	Grade 3

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